

PN-ACJ-108

**FINAL ENVIRONMENTAL ASSESSMENT FOR  
EXPANSION PHASE OF THE ELECTRIC  
DISTRIBUTION COMMERCIALIZATION PILOT  
PROJECT IN RUSTAVI, GEORGIA**

**Contract No. LAG-I-00-98-0005-00  
Task Order No. 4  
Georgia Power Sector Reform**

*Final Report*

*Prepared for:*

U.S. Agency for International Development  
Bureau for Europe and NIS  
Office of Environment, Energy and Urban Development  
Energy and Infrastructure Division

*Prepared by:*

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## FINAL ENVIRONMENTAL ASSESSMENT FOR EXPANSION PHASE OF THE ELECTRIC DISTRIBUTION COMMERCIALIZATION PILOT PROJECT IN RUSTAVI, GEORGIA

### Summary

In accordance with Task Order No. 4, Contract No. LAG-I-00-98-00005-00 and USAID's environmental procedures, 22 C.F.R. 216, this environmental assessment discusses the environmental effects of the expansion of the commercialization pilot project at the electric distribution system in Rustavi, Georgia. The original pilot project was undertaken as part of Delivery No. 14, Contract No. CCN-Q-00-93-00152-00.

Based on this review, we conclude:

- ▶ The pilot program, which was carried out in Rustavi under USAID Contract No. CNN-0002-Q-12-3152-03, Delivery Order 14, has contributed positively to the improvement of the local environment through displacement of polluting, supplemental fuel usage in individual homes, and in eliminating public safety hazards which had previously existed.
- ▶ The proposed expansion of this pilot program is expected to continue this positive trend in both the environment and in public safety, while continuing to improve the efficient use of electricity.
- ▶ By providing an example of how changing the commercial relationship of consumers and electricity suppliers can improve the efficient use of electricity, long-term improvements in the efficiency of the energy sector of Georgia can be encouraged. Additionally, improved financial relationships can provide necessary financial resources for improved maintenance of generating stations, improved fuel quality and increased energy efficiency for all of Georgia.

### Purpose

The Georgian electric sector is continuing to experience economic stress, due to the fact that electricity consumers pay only a small percentage of what they owe and distribution companies, in turn, pay their supplier only a portion of what they should. The supplier, in its turn, pays generators only a small fraction of sums due. The system produces so little revenue that electric enterprises cannot, for example, buy sufficient fuel, pay sector employees regularly, or perform routine maintenance. Accounting systems, to extent that they exist at all, fail to provide useful information. Financial controls are inadequate and intermittently applied.

## Results to Date

Implementation of the Rustavi Commercialization Pilot Project by Hagler Bailly, under Contract No. CCN-Q-00-93-00152-00, Delivery Order No. 14, began the improvement of commercial operations of the Relasi electric distribution company through the introduction of Western management, accounting, and commercial procedures. The pilot project has involved implementation of the following:

- ▶ Computer hardware and customer accounting software has been purchased and installed and is being utilized in the operation of a monthly utility billing system for all electricity customers in the sub-regions covered by the Pilot Project.
- ▶ A new utility-customer relationship has been established with over 4,000 customers included in selected sub-regions of Rustavi. Customers are receiving increased availability of electricity in exchange for full payment of their electricity bills, or they are disconnected from service until such payment is received.
- ▶ Renovation of electricity service entrances to apartment buildings and individual customer metering has been undertaken. All electric meters are re-calibrated to insure accuracy and then relocated to a central secured installation, where both customers and utility meter readers may view the monthly usage of electricity.
- ▶ Renovation of service entrance wiring to apartment buildings, commercial businesses and communal service facilities such as stairway lighting and elevators, thus improving safety and reliability of electrical service.
- ▶ Elimination of multiple wires and electricity sources from buildings where the use of diverted (non-metered) electricity had been taking place, thus improving the commercial viability of the operation of the electric distribution company and improving energy efficiency.
- ▶ Renovating and securing doors to local distribution substations, thereby eliminating public safety hazards, which in the past have resulted in personal injury and death.
- ▶ Re-calibration of existing meters and addition of new metering to ensure that all electricity, which is consumed, is fairly paid for according to current commercial tariffs.
- ▶ Introduction of management controls and division of responsibilities of personnel involved in the commercial aspects of the operations, in order to ensure transparency and maintenance of project financial viability.
- ▶ Establishment of a commercial relationship between the distribution company and the wholesale power supplier.

Nearly all objectives of the pilot program have been met, and the positive response by individual consumers has been gratifying. The original objectives included: implementation of a

computerized monthly customer billing system; disconnection of customers for non-payment of bills; introduction of general ledger accounting software; introduction of procedures to link accounting and billing software; implementation of a model service agreement between the distribution company and its customers; and development of a plan to phase in full-time electric service to customers keyed to feeders or transformers where agreements for full and regular payments were established.

### **Environmental Improvements:**

In addition to the original objectives defined for the project, the following additional environmental benefits have accrued during the process of work:

- Basements have been cleaned up, reducing the potential habitat and feeding sites for rodents and other unwanted animal life, thus reducing the risk of infectious disease and improving the general quality of health for the residents of these building.
- Illegal and technically unsafe wiring has been removed from basements and stairwells, reducing the risk of electrocution, fire and otherwise hazardous circumstances, again contributing to an improvement in the general quality of health for the residents.
- Original cabling which had been allowed to deteriorate due to lack of funds for maintenance has been replaced, and unsightly cable connections have been eliminated, contributing to the general well being of the public health and safety.
- Neighborhood Distribution Substations have been cleaned and rehabilitated with the installation of new fuses of appropriate sizing and locking devices on doors, thus eliminating access to a potentially deadly environment for children, while at the same time contributing to safer electrical operations and protection against accidental electrocution and fire hazard.
- By increasing the availability of electricity, kerosene and wood-burning heat sources have been reduced in apartment buildings, thus reducing the level of smoke and other emissions and, again, reducing the risk of fire hazard.

### **Equipment Utilized**

The commercialization pilot has involved the purchase and installation of various electrical components, including meters, meter housings, junction boxes, etc., for field installation, as well as office equipment (computers, printers, copier) to support the project's accounting and billing functions. The proposed expansion of the project will continue the purchase of meters and meter housings to the extent that they are necessary to expand the number of individual customers in the scope of the project. No additional computing equipment is expected to be necessary for this expansion.

## Affected environment

Rustavi is a largely residential town with a population of approximately 170,000. Part of the town, the "Old Town," was built in the 1940s and 1950s. The other part, "New Town," was built in the 1960s to serve as housing for adjacent industrial complexes. The pilot project will be undertaken in New Town.

New Town features several hundred large, Soviet-style, nine-story apartment blocks. The standard block has either four or six entryways. The entryways on the ends of the building have two apartments per floor, for a total of 18; those on the interior have three per floor, for a total of 27 apartments per floor. Rustavi is divided, for administrative purposes, into micro-regions. In New Town, each microregion includes 15 to 20 apartment blocks. The initial pilot program covered two micro-regions, for a total of 35 apartment blocks, or about 3,600 customers (a "customer" is an apartment, or electrical connection). The expansion of this project will result in a total of five micro-regions, 93 apartment blocks, and approximately 9,100 customers having had their electricity service renovated and improved.

With the breakup of the Soviet Union, local industries have declined, employment has plummeted, and Rustavi has become relatively impoverished. Streets and yards are littered with trash and debris. Grass in the areas around the buildings is sparse to non-existent. Apartment block basements, where much of the pilot project work takes place, are in some cases filled with water (up to a depth of a meter), and in other cases filled with garbage and trash. Common areas of apartment blocks, such as stairwells, also tend to be littered or dirty.

The pilot project involves renovation of distribution substations, windowless buildings approximately 8 meters by 8 meters by 3 meters in height. The original project converted ten of these substations, which, prior to conversion, were in uniformly poor condition. The expansion of this project will result in an additional 13 substations being converted, for a total of 23. Many existing substations are missing doors, are filled with debris, have damaged electrical components, and leaky roofs. These structures represent health hazards, due to their accessibility to children and the existence of high-voltage electrical components. Indeed, a 10 year-old child was electrocuted and killed in 1997 while playing in a Rustavi substation. As noted above, by cleaning and locking these buildings, fire hazards, safety hazards and public nuisances are reduced.

The computer and other office equipment related to the pilot project have been installed in an office building in Rustavi's Old Town, which also houses the Relasi Electric Distribution Company. In addition, a second building has been provided by the Rustavi City Administration for use as a field office, where meters are inspected and certified by the State Inspection Agency, and where meter readers and inspectors are able to meet with customers to discuss individual customer problems.

## **Environmental consequences of the proposed action**

### *Effects on the immediate physical environment*

The environmental impacts of the commercialization project have, on the whole, improved the human environment and safety of the public, while contributing to a positive impact on the health and well being of the public through reduced emissions and increased energy efficiency.

The pilot's principal physical work involves service area modifications. First, the entryway basement and other parts of the relevant service areas are cleared of all trash and debris. Electric meters are then removed from each customer's apartment and relocated to the entryway basement or, where water or dampness is a problem, to the first or second floor. The meters are installed in new junction/distribution boxes, along with disconnect switches. Many of the existing cables and junction boxes are not grounded, which poses a hazard of shock or electrocution; all new junction and distribution boxes installed as part of the pilot are be grounded, this eliminating the hazard.

In the existing apartment blocks, distribution cables enter the building at the basement level, and are then routed up the stairwell to the top floors of the buildings. These lines are commonly riddled with spliced lines to bypass meters or for other reasons. Accordingly, the pilot program relocates the cables entering the basements so that they first enter a junction, or distribution, box. Inside the box, the cables split and pass through individual meters, one for each customer in the stairway. Cables then continue to each apartment. To the extent that customer-modified wiring represents a threat to safety (and inspection of such installations strongly suggests that they do), then the pilot project will mitigate those hazards, because all such lines are disconnected and de-energized.

In the process of conversion, some existing cables are removed and given to Relasi, the local distribution company, for re-use. The project removes and disposes of other items no longer useful to electrical distribution, including wire and cable scraps, older dilapidated junction boxes, inoperable elevator transformers, and inoperable fuses. Fuses are replaced with operable safety devices; stairway lighting is provided, and elevator switches and fuses are replaced and rewired, within locking metal enclosures, thus eliminating safety and fire hazards.

Ten distribution substations to be used in the pilot project have already been refurbished. An additional thirteen (13) substations will be refurbished during the expansion phase of this project. These structures, which are commonly filled with garbage or trash, are cleaned. Doors of heavy steel with locks are installed where none have existed in the past, and the roofs are tarred to stop leaks.

There will be no adverse physical effects from the installation of office equipment at Rustavi.

*Long-term effects*

The long-term effects of the expansion of the pilot project are expected to continue to be beneficial.

Rustavi residents not currently in the Pilot Project receive electricity for only a few hours a day (from one to six hours, depending on the season). As a result, distribution lines, transformers, and supply cables are loaded to the maximum during service hours. This heavy loading creates technical losses of power, shortens the life of components, and represents a safety hazard. Under the pilot program, customers are asked to pay their electric bills in full (or be cut off), and in return, power deliveries are increased to nearly 24 hours/day. This has had the effect of lowering the distribution system's peak load, and spreading usage out over a longer period of time. As a result, the stresses on the system are eased, and safety and durability of equipment are enhanced.

The commercialization of customer accounts in the pilot has also had the effect of reducing overall consumption. Before conversion, approximately 20% of customers had no meter and accordingly either did not pay for electricity, or paid for less than actual consumption. Also, many customers resorted to self-help measures, by wiring around their meters, or splicing new, un-metered lines directly into distribution cables. With the pilot project's rewiring and the prospect of being cut off for nonpayment, many customers are now on a paying basis for the first time in years. There is evidence from elsewhere in Georgia that consumption is elastic; as payments have increased, consumption has diminished. This will lead to a more efficient usage of generation, transmission, and distribution resources.

Another benefit of the pilot project is that local electrical distribution company personnel have been trained in the use and implementation of the commercialization program. This successful pilot is being utilized to conduct additional training in Tbilisi at the newly privatized AES-Telasi Distribution company, and is thus continuing to spread the benefits of the program.

The installation of office equipment at Rustavi, which will support and represent a critical part of the pilot program (because it supports the accounting and billing functions), will have a similar beneficial effect in the long-term.

### **Consultation with host country counterpart**

Hagler Bailly circulated copies of the draft environmental assessment to the following:

- ▶ Georgia Ministry of Environment and Natural Resources Protection
- ▶ Mayor, Municipality of Rustavi
- ▶ Utility Supervisory Department, Municipality of Rustavi

By letter dated 6 April, 1999 (Georgia-language and translated copies, Attachment 1), the Ministry of Environment commented that the project will “have only positive impact on the sanitary conditions of residential buildings and will help Rustavi Municipality in cleaning up the city.” They add that more emphasis should be given in our report to the issues of sorting, disposal and utilization of commercial waste; currently a high priority in Georgia. Based on this comment, we have re-confirmed with our contractors that all debris from the project is properly disposed of, and that commercial wastes, such as wire and cable that is removed from the buildings as part of this project, is re-used or properly recycled.

Hagler Bailly staff inspects all project conversion sites, prior to final acceptance and payment to the contractor, thus helping to assure that all waste materials have been properly disposed of, or recycled, as appropriate. We believe that the standard contract provisions in the construction contracts which address waste disposal, coupled with Hagler Bailly’s continuous inspection of the project work sites, ensure that the Ministry’s concerns are properly addressed, and that all commercial waste is properly utilized.

By letter dated 26 April, 1999, (Georgia-language and translated copies, Attachment 2), the Mayor of the Municipality of Rustavi (in coordination with the Utility Supervisory Department of Rustavi Municipality), stated that he had no comments on the draft EIA. They added that “It is obvious that the environmental impact from (this) project will be only positive.”

## List of Preparers

### **Eric W. Haskins, P.E.**

Mr. Haskins is a resident of Tbilisi, Georgia and Senior Energy Advisor for Hagler Bailly in the Rustavi Pilot Project and other Commercialization assistance projects in Georgia. Mr. Haskins has over 30 years of experience in the electric utility industry, and most recently held the position of Task Manager and Senior Energy Advisor to the Ministry of Energy and electrical distribution companies (Oblenergos) throughout Ukraine, as part of the USAID-sponsored Energy Restructuring Project in that country. Prior to moving to Ukraine, Mr. Haskins managed the start-up of the USAID/US Energy Association's "Utility Partnership Program" throughout the countries of Central and Eastern Europe, from its inception in 1991 until 1995 when he started his own consulting firm. Previously, he had been Manager of Engineering for the Edison Electric Institute in Washington DC for over 12 years, and a field representative for McGraw Edison, Power Systems Division for over 10 years, working with electric utilities throughout the United States. He graduated from Oregon State University with a Bachelor of Science in Electrical Power Engineering and a minor in Business Administration, and is a registered Professional Engineer in the State of Oregon.

### **Murman Margvelashvili**

Mr. Margvelashvili is a Deputy Project Manager of Hagler Bailly's Georgia Commercialization Pilot Project. Mr. Margvelashvili has five years experience of work in electric power sector of Georgia. Prior to his current assignment in Hagler Bailly Mr. Margvelashvili worked with Burns & Roe enterprises on USAID-sponsored projects. He has participated in procurement programs, hydro and thermal plant assessments, and feasibility studies for dispatch and communications systems of Georgian power utility. Mr. Margvelashvili was a Georgian project manager for the recent Least Cost Development Planning study. Mr. Margvelashvili has participated in environmental studies for the Early Oil Export Pipeline. Prior to his work in Energy Sector Mr. Margvelashvili worked as a high-energy physicist in major scientific centers of Russia and Europe. He holds the Candidate of Science degree from Moscow Institute of Nuclear Research.

**ATTACHMENT 1**

**COMMENTS OF THE  
GEORGIAN MINISTRY OF ENVIRONMENT**

**April 6, 1999**



საქართველოს ენერჯეტიკის მინისტროს  
**რესურსების დაცვის სამინისტრო**

საქართველო, 380015 თბილისი, მ. კოსტავას ქ. 68ა. ტელ: 23-06-64 ფაქსი: 94-36-70.

"... 1997

№ .../...

თქვენი 1998 წლის "..."

№ ... წერილის პასუხად

ჰაგლერ ბაი  
რეკონსტრუქციის პროექტი  
საქართველოში.  
პროექტის მენეჯერის მოადგილეს  
ბ-ნ მ. მარგველაშვილს

ბატონო მურმან.

საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო გაეცნო თქვენს წერილს, რაც ეხება "ელექტროენერჯის განაწილების სექტორის კომერციალიზაციის პილოტ-პროექტის გაფართოებული ფაზის გარემოზე ზემოქმედების შეფასების დოკუმენტის პროექტს".

აღნიშნულთან დაკავშირებით გაცნობებთ, რომ საქმიანობის მიზანი ფრიად საგულისხმო და საყურადღებოა. ეჭვი არავის ეპარება, რომ გარემოს დაცვის თვალსაზრისით აღნიშნული საქმიანობის განხორციელება უდაოდ ხელს შეუწყობს საცხოვრებელი სახლების სანიტარული მდგომარეობის გაუმჯობესებას და შეუმსუბუქებს ქ. რუსთავის მერიას ქალაქის დასუფთავების პრობლემებს.

თუმცა გვინდა აღვნიშნოთ, რომ ჩვენი აზრით "პილოტ-პროექტის" გარემოზე ზემოქმედების შეფასების დოკუმენტის პროექტში ძირითადი ყურადღება უნდა დაეთმოს სამეურნეო ნარჩენების დახარისხების, განთავსების და უტილიზაციის საკითხებს, რაც საქართველოში დღეისათვის დიდ პრობლემას წარმოადგენს. აღნიშნული საკითხის ოპტიმალურად გადაწყვეტა უნდა იყოს პროექტის ძირითადი მიზანი, რადგან ნარჩენების ოპტიმიზაცია გარემოზე ზემოქმედების შერბილების ერთ-ერთი საუკეთესო ღონისძიებაა.

პატივისცემით,

ზ. თავართქილაძე  
მინისტრის პირველი მოადგილე

Ministry of Environment of Georgia  
Letter #13-12/357 of April 6, 1999

To: Murman Margvelashvili  
Deputy Project Manager  
Hagler Bailly Consulting

Batono Murman,

The ministry of Environment has reviewed your draft Environmental Impact Assessment related to "Draft Environmental Impact Assessment of the expansion phase of Electricity distribution sector Commercialization Pilot Project" .

We welcome the goals and objectives of your activity and consider them as deserving great attention. Nobody doubts that from the environmental point of view your work will have only positive impact on the sanitary conditions of residential buildings and will help Rustavi Municipality in cleaning up the city.

At the same time we believe that in the Draft Environmental Assessment document more emphasis should be given to the issues of sorting, disposal and utilization of commercial waste, which is a high priority now in Georgia. The optimal solution of these problems should be among the priority objectives of your program, since waste optimization is one of the best ways of environmental impact mitigation.

Sincerely yours,

Z. Tavartkiladze  
First Deputy Minister

**ATTACHMENT 2**

**COMMENTS OF THE MAYOR OF RUSTAVI**

**April 26, 1999**



საქართველო  
GEORGIA

ქალაქ რუსთავის მერია

MUNICIPALITY OF RUSTAVI

№ 12-50-10.95-44-60 1999 წ.

ქ. რუსთავი, კოსტავას 20

☎ 12-50-10. 95-44-60

პაგლერ ბაი  
რესტრუქტურის პროექტის  
მენეჯერის მოადგილეს,  
ბატონ მურმან მარგველაშვილს

ბატონო მურმან!

“პაგლერ ბაი კონსალტინგის” მიერ წარმოდგენილ კომერციალიზაციის პილოტ-პროექტთან დაკავშირებით გაცნობებთ, რომ აღნიშნული პროექტის მიმართ შენიშვნა არ გაგვაჩნია და პროექტის განხორციელების შედეგად ზეგაველენა გარემოზე მხოლოდ დადებითია.

პატივისცემით,

ქ. რუსთავის მერი:

მ. ტყეშელაშვილი

Municipality of Rustavi  
Letter of 26 April, 1999

To: Hagler Bailly  
Deputy Manager of Restructuring Project  
Mr. Murman Margvelashvili

Batono Murman,

Please be advised that we don't have any comments in relation to the Draft EIA submitted by "Hagler Bailly Consulting" and related to expansion phase of the Distribution Sector Commercialization Project. It is obvious that the environmental impact due to your project will be only positive.

Sincerely yours,

M. Tkeshelashvili  
Mayor of Rustavi