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**ENVIRONMENTAL ASSESSMENT FOR ELECTRIC
DISTRIBUTION COMMERCIALIZATION PILOT PROJECT
AND PURCHASE AND INSTALLATION OF EQUIPMENT**

**NIS Institutional Based Services Under the
Energy Efficiency and Market Reform Project
Contract No CCN-Q-00-93-00152-00**

**Delivery Order No 14
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

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ENVIRONMENTAL ASSESSMENT FOR ELECTRIC DISTRIBUTION COMMERCIALIZATION PILOT PROJECT AND PURCHASE AND INSTALLATION OF EQUIPMENT

Summary

In accordance with Delivery Order No 14, Contract No CCN-Q-14-93-00152-00 and USAID's environmental procedures, 22 C F R 216, this environmental assessment has been prepared to discuss the environmental effects of the proposed commercialization pilot project at the electric distribution system in Rustavi, Georgia, and the purchase and installation of equipment for the Georgian National Electric Regulatory Commission

Based on this review, it may be concluded

- ▶ The pilot program is not expected to produce significant adverse environmental impacts,
- ▶ The donation of equipment will not cause adverse environmental impacts,
- ▶ The pilot program and installation of equipment should have salutary impacts on the human environment, in terms of public safety and improvement in the efficient use of electricity

Purpose

The Georgian electric sector is currently experiencing a high degree of economic stress. Electric consumers pay only a small percentage of what they owe. Distribution companies, in turn, pay their supplier only a portion of what they should. And 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.

The commercialization pilot project, as proposed by Hagler Bailly, is designed to improve commercial operation of a Georgian electric distribution company by the introduction of Western management, accounting, and commercial procedures. The pilot project involves the following

- ▶ Procurement, installation, and use of computer hardware and customer accounting software to demonstrate the operation of a monthly utility billing system
- ▶ Definition of a new utility-customer relationship, in which customers receive increased availability of electricity, in exchange for which they must pay their bills or be disconnected

- ▶ Customer service area modifications, in which electric meters are moved from customer apartments to secured areas and disconnect switches are installed
- ▶ Establishment of a commercial relationship between the distribution company and the wholesale power supplier

The fundamental objectives of the pilot program are to implement computerized monthly customer billing, carry out customer cut-offs for non-payment of bills, introduce general ledger software and procedures to which the billing software will be linked, implement a model service agreement between the distribution company and its customers, and develop a plan to phase in full-time electric service to customers keyed to feeders or transformers where agreements for full and regular payments can be established. In short, the program is designed to put electric service to the customers included in the program on a paying, self-sustaining basis.

The commercialization pilot will involve the purchase and installation of electrical components (for example, meters, transformers, and cables) for field installation, and office equipment (computers, printers, and copier) to support the project's accounting and billing functions. In addition, under a separate task, Hagler Bailly is supplying office equipment (computers, copier, fax machine, and telephones) to the Georgian National Electric Regulatory Commission (GNERC), as part of the capacity-building process for that agency.

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 microregions. In New Town, each microregion includes 15 to 20 apartment blocks. The pilot program covers two microregions, for a total of 35 apartment blocks, or about 3,600 customers (a "customer" is an apartment, or electrical connection).

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 will also involve distribution substations, windowless buildings approximately 8 meters by 8 meters by 3 meters in height. The project will convert ten of these substations, which, prior to conversion, are in uniformly poor condition. 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.

The computer and other office equipment related to the pilot project will be installed in an office building in Rustavi's Old Town. The GNERC equipment will be installed at the Commission's offices in Tbilisi.

Environmental Consequences of the Proposed Action

Effects on the Immediate Physical Environment

The environmental impacts of the proposed commercialization project are, on the whole, benign or positive.

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 to be installed as part of the pilot will be grounded, thus 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 will relocate 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 will be 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 will remove and dispose of other items no longer useful to electrical distribution, including wire and cable scraps, older dilapidated junction boxes, inoperable elevator transformers, and inoperable fuses.

The ten distribution substations to be used in the pilot project will be refurbished. These structures, which are commonly filled with garbage or trash, will be cleaned. Doors of heavy steel with locks will be installed where none currently exist, and the roofs will be tarred to stop leaks.

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

Long-term Effects

The long-term effects of the proposed pilot are expected to be beneficial.

Rustavi residents currently receive electricity for only a few hours a day (from one to six hours, depending on the season). As a result, all distribution lines, transformers, and supply cables have been 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 the effect of lowering the distribution system's peak load, by 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 will also have 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, unmetered lines directly into distribution cables. With the pilot project's rewiring and the prospect of being cut off for nonpayment, many customers are 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 anticipated benefit of the pilot is that local distribution personnel will be trained in the use and further implementation of the commercialization program. If successful, this training will enable Relasi, the local distribution company, to continue to commercialize Rustavi, 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. The installation of office equipment at GNERC will also have a beneficial long-term effect, to the extent that the equipment enables the Commission more efficiently to perform its mission of ensuring electric supply at a reasonable cost.

Consultation With Host Country Counterparts

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 2 September, 1998, (Georgia-language and translated copies, Attachment 1), the Utility Supervisory Department of Rustavi Municipality stated that it had no comments on the EA, and that it is sure that the impacts of the pilot project "are only positive "

By letter dated 9 September, 1998 (Georgia-language and translated copies, Attachment 2), the Ministry of Environment and Natural Resources Protection, Department of Environmental Permissions and State Ecological Examination commented that the most important issue raised by the project is the management of remnants, or debris Hagler Bailly's standard contract for customer service area modifications and substation rehabilitation includes a standard provision (section 3 1) requiring that "all old materials must be passed to the Purchaser" ("Purchaser" is Hagler Bailly) Another section of the standard contract (section 3 4) explicitly provides for clean up

It is understood that a rigorous inspection of installations shall be performed before payment is made However, there may be some follow-up or clean-up work that may be required after payment is made For this purpose, it is understood that the Contractor shall make available workers to perform such works to the extent required for reasonable follow-up and clean up

We believe that these contract provisions, and Hagler Bailly's ability to direct clean up, will ensure that the Ministry's concern is properly addressed

The Mayor of the Municipality of Rustavi did not respond to the request for comments

List of Preparers

McNeill Watkins

Mr Watkins is Senior Energy Advisor and Manager of Hagler Bailly's Georgia Institutional Energy Reform Project Mr Watkins has extensive experience with electric energy sector environmental issues, having represented Edison Electric Institute, the trade association of the United States' investor-owned electric utilities, in preparing and submitting comments on the Federal Energy Regulatory Commission's rules under the National Environmental Policy Act Mr Watkins has participated in the preparation of environmental assessments for, among other projects, the Hudson County landfill and waste-to-energy project in Bayonne, New Jersey, and the Smith Creek Hydropower Project, a 35 MW plant in Boundary County, Idaho Mr Watkins was awarded his BA from Princeton University, and received his JD from the University of Florida

Irakli Aviliani

Mr Aviliani is an energy specialist in Hagler Bailly's Tbilisi, Georgia, office, with principal responsibility for electric sector issues generally, and distribution issues specifically Mr Aviliani earned his undergraduate degree in physics and his doctorate in theoretical and mathematical physics from the University of Tbilisi, and attended the University of California, Berkeley, as an IREX scholar in the Lawrence Berkeley Laboratory He has served as a senior researcher and assistant professor of physics at Tbilisi State University

Mr Aviliani has worked extensively on projects involving the Georgian electric sector Between 1994 and 1996, he worked in the Tbilisi office of Burn and Roe, an American firm specializing in energy-related matters With Burn and Roe, Mr Aviliani participated in the rehabilitation feasibility study for Gardabani Thermal Station Unit 10, a 300 MW gas-fired unit, and in rehabilitation studies for four large hydroelectric plants, with a total installed capacity of 250 MW Since joining Hagler Bailly in 1997, Mr Aviliani has focused on privatization issues relating to the electric sector, and on the Rustavi commercialization pilot project

Dean White

Mr White is Vice President of Hagler Bailly Services Mr White has worked with an U S utility to help develop its approach to reflecting environmental considerations as part of its resource planning process He has authored one chapter in a book examining the environmental impacts of energy use Additionally, Mr White has submitted testimony before the Massachusetts Department of Public Utilities (DPU 90-261) that examined the environmental impacts regarding consumption of electricity and natural gas Of greatest relevance to this assignment, Mr White was the principal author of the environmental assessments for Hagler Bailly's electricity and natural gas distribution commercialization pilot projects in Armenia

Mr White holds a BA in urban studies/planning and political science from the University of California and an MPP from the John F Kennedy School at Harvard University

APPENDIX A

LETTER FROM Z. LOMIDZE AND ENGLISH TRANSLATION

**saqarTvelo q rusTavis
merus saqalaqo
meurneobis departamenti**

**Department of Cities
Farm Major of Rustavi**

**216316724
02-Sept-1998
N 155**

**To: Hagler Bailly Consulting
Country Project Manager
Mr. MacNeil Watkins**

The Utility Supervisory Department of Rustavi Municipality likes to inform you, that we do not have any comments on your document "Environmental Assessment for Electric Distribution Commercialization Pilot Project" We are sure that environmental impacts of the Commercialization Pilot Project in Rustavi are only positive

Chairman of the City
Utility Supervisory Department
of Rustavi Municipality

Z Lomidze

APPENDIX B

LETTER FROM S. TSABADZE AND ENGLISH TRANSLATION



**საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტრო
გარემოსდაცვითი ნებართვისა და სახელმწიფო
ეკოლოგიური მსახურების დეპარტამენტი**

საქართველო, 380062 თბილისი ფალიაშვილი ქ. 87 ტელ 29-41-24 ფაქსი 98-34-25

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№ წერილის პასუხად

ჰაგლერ ბაი-ს პროექტის
მენეჯერის მოადგილეს
ბ-ნ. ი. ავალიანს

ბატონო ირაკლი,

გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს გარემოსდაცვითი ნებართვისა და სახელმწიფო ეკოლოგიური ექსპერტიზის დეპარტამენტმა განიხილა თქვენი წერილი “კომერციული ბაიოპროექტის” შესახებ, რომელიც მიმდინარეობს ქ. რუსთავეის ელექტროსტრუქტურის გამანაწილებელ მუნიციპალურ კომპანიაში და ითვალისწინებს შემხმარებელთა ელექტრომომსახურების გაუმჯობესებას.

დეპარტამენტს მოაჩნია, რომ გარემოსდაცვითი საკითხებიდან ძირითადი ყურადღება უნდა დაეთმოს ნარჩენების მართვას უფრო დეტალურად უნდა იქნეს წარმოდგენილი ნარჩენების წარმოშობის, მათი შეგროვების და განთავსების პირობები, რომელიც უნდა შეთანხმდეს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს ქვემო ქართლის რეგიონალურ სამმართველოებთან

პატივისცემით,

ს. გაბაძე
დეპარტამენტის თავმჯდომარე

MINISTRY OF ENVIRONMENT AND NATURAL RECOURSES PROTECTION

**DEPARTMENT OF ENVIRONMENTAL PERMISSION AND STATE
ECOLOGICAL EXAMINATION**

Georgia, 380062 Tbilisi 87 Paliashvili str Tel 29-41-24 Fax 98-34-25

09-09-1998
N 13-12/53

TO I Avaliani
Assistant of Project Manager
Hagler Bailly Consulting

The Department of Environmental Permission and State Ecological Examination of the Ministry of Environment and Natural Recourses Protection reviewed your letter and document about "Environmental Assessment for Commercialization Pilot Project", which takes place at the electricity distribution municipal company in Rustavi and is designed to improve a service

We think that among different environmental issues, the most important is a management of remnants. This issue has to be agreed with the Kvemo Kartli regional department of the Ministry of Environment and Natural Recourses Protection.

Sincerely,
S Tsabadze
Chairman of the Department