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MID-TERM PERFORMANCE EVALUATION OF THE NEW APPLIED TECHNOLOGY EFFICIENCY AND LIGHTING INITIATIVE (NATELI)

FINAL REPORT

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NATELI MID-TERM PERFORMANCE EVALUATION

FINAL REPORT

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ACRONYMS

AIOC	Azerbaijan International Operating Company
BAU	Business as Usual
BP	British Petroleum
BTC Co.	Baku-Tbilisi-Ceyhan Pipeline Company
BAU	Business as Usual
CA	Condominium Associations
CER	Certified Emission Reductions
CFL	Compact Fluorescent Lamp
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EEC	Energy Efficiency Centre
ENSI	Energy Saving International
ESCO	Energy Service Company
GEEP	Georgia Energy Efficiency Project
GTU	Georgian Technical University
ISET	International School of Technology at Tbilisi State University
NATELI	New Applied Technology Efficiency and Lighting Initiative
PV	Photovoltaic
RE	Renewable Energy
REMISSIA	Sustainable Development Center
REP	Rural Energy Program
SCPC	South Caucasus Pipeline Company
SDAP	Sustainable Development and Policy Center
SEAP	Sustainable Energy Action Plan
SO	Strategic Objective
USD	US Dollars
WEG	World Experience for Georgia

EXECUTIVE SUMMARY

BACKGROUND AND PURPOSE

The New Applied Technology Efficiency and Lighting Initiative (NATELI) was a two-year USAID-sponsored activity, and follow-on agreement to the Rural Energy Program, implemented by Winrock International from October 1, 2009 through September 30, 2011. The NATELI project was designed to fulfill USAID's Strategic Objective (SO) 1.51—*A foundation for a more sustainable energy system and Intermediate Result IR* and section 1.51.3—*Increased efficiency in the energy sector*.

This mid-term evaluation (covering activities between October 1, 2009 and September 30, 2011) is designed to assess whether the NATELI project achieved its stated objectives and, where appropriate, make recommendations regarding emphasis and methodology for the remaining work. Evaluation efforts were designed to answer four key questions posed by USAID/Caucasus in the request for proposals and statement of work.

EVALUATION RESEARCH QUESTIONS

In this evaluation, we focused on the effectiveness of NATELI's interventions and the sustainable nature of the outcomes. To be sustainable, some facet of NATELI's work must be carried on beyond the end of the program, without USAID funding. The end goal of the NATELI project was to build in-country capacity to continue developing and delivering energy efficient practices and technologies.

The four key questions addressed by this evaluation were:

1) How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, Georgian State Technical University (GTU) buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?
2) What were the effects of Energy Bus operations on target communities? How effective and efficient was this public-private partnership in attaining the planned results? Did the project affect men and women in target communities differently? How is the project perceived by its beneficiaries?
3) How effective was the curriculum on energy efficiency and energy auditing, as well as the energy auditor's certification programs within GTU? How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?
4) How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

RESEARCH METHODS

Primary data were collected through a series of interviews with stakeholders, key informants and program beneficiaries. Interviews were conducted in face-to-face meetings, small focus groups, and by telephone. Interview guides were developed for each agency interviewed; these were used to conduct the semi-structured interviews tailored to the research question and key informant. Altogether, the evaluation team spoke with about 60 people. Key informants included representatives from NATELI contractors and sub-contractors: Winrock International; the Sustainable Development and Policy Center (SDAP; World Experience of Georgia (WEG); the Sustainable Development Center Remissia; the Energy Efficiency Center (EEC); and, British Petroleum (BP). NATELI beneficiaries interviewed included GTU staff; directors of the Cell Technology and Therapy Center, Marneuli Hospital, and Tianeti Hospital; Tbilisi City Hall; teachers from schools in Khidistavi and Samtavisi; representatives from select banks; and attendees at training seminars.

NATELI quarterly and annual reports provided background information to develop the interview guides and identify key informants. These documents and others (e.g., Energy Audits, Energy Passports, Energy Bus presentations, materials inventories and consultation lists) provided additional supporting information to address the evaluation's research questions.

LIMITATIONS

Limitations to this evaluation included a lack of actual documentation to confirm energy savings resulting from installing measures recommended in Energy Audits and Energy Passports. Requisite data would show the post-intervention energy consumption and cost data for the newly built and renovated hospitals. Key informants provided some self-report data, but the buildings were relatively new and there are little post data available. GTU does not separately meter buildings and could not provide actual consumption data for the renovated classrooms. Only one interview group, students attending the GTU energy auditing course, was not available as planned since classes were not in session. Limited time and budget dictated that the evaluation team restrict on-site visits to GTU, three new hospitals, and two communities visited by the Energy Bus, all within a two-hour radius from Tbilisi.

KEY FINDINGS

The evaluation team found that overall, NATELI successfully contributed to efforts that made significant progress in raising awareness of energy efficiency and the local utilization of renewable energy resources. Barriers to implementing these technologies exist, but have been identified, and work continues to improve Georgian's access to knowledge and the means to improve efficient use of energy. Summary findings of the evaluation are offered below, addressing key areas of interest to USAID.

Capacity Building

- Overall, Winrock International did an excellent job as the implementing organization, demonstrating flexibility with changing project needs. One of their most important contributions was assembling an outstanding array of local sub-contractors. The Georgian stakeholders involved with this project also deserve substantial credit. Georgians were actively involved in the work at all stages and made significant contributions to the success of the project.
- The capacity building aspect of the NATELI project has been demonstrated through a variety of activities. These examples all point to NATELI's effectiveness and success which have already led to sustainable actions. The USAID funding was critical in all cases to providing various organizations with the ability to implement various aspects of the project that would not otherwise have been completed. In each case, the funding was a catalyst for additional work conducted without USAID funds. It appears that a great amount of work can be done with tangible, and intangible, accomplishments in a short time. As one informant said, "Anything is possible."
- At the same time, the underlying political situation and policies slow the implementation of energy efficiency technologies. The poor condition of existing buildings and infrastructure such as electric wiring, lack of access to funding, and lack of building codes that stipulate minimum energy requirements are three examples where policies are needed to affect more widespread change.

GTU Energy Audit and Energy Efficiency Program

- NATELI funded development and writing of the Energy Auditing Manual. A ten-credit Energy Audit and Energy Efficiency Program is taught over one semester (15 weeks); its syllabus is based on the Energy Auditing Manual. GTU incorporated the audit program into the Masters of Energy Management degree. The Master's degree is 60 credits, earned over two years. The first class of 33 students completed this program and graduated last year. At this time, only students in the master's program have completed the ten-credit course; the audit program is open to others interested in only the Audit program.

- Georgia's law on Higher Education addresses certification and accreditation issues. In addition, there are regulations on accreditation of educational programs. These regulations are used to accredit programs where official certificates or diplomas will be issued that are formally accepted by the Government of Georgia. The GTU Energy Audit Certification course currently lacks the same legal status as a diploma. For the certificate of accomplishment of this course to have about the same legal status as a diploma issued by the higher educational institutions, the current law should be amended. That would secure a wider official recognition of GTU's Energy Audit course certificates.

- The building space for the Energy Lab at Georgian Technical University (GTU) was renovated with NATELI and GTU funds. NATELI financed purchase of equipment for the Energy Lab, which is a live training facility at GTU. International School of Technology at Tbilisi State University (ISET) students and others have visited this lab. All have found value with the firsthand experience working with the PV, wind generation, and hydronic systems installed at GTU. They have increased their knowledge by working with an energy auditor's tools and diagnostic equipment. USAID funds were clearly a catalyst for investment and enhancement of the Lab by other parties. The Lab continues to build its own capacity. By doing so, it builds a sustainable in-country capacity not only to conduct energy audits, but to work more broadly in the field of energy efficiency and renewable energy technologies. In addition, one ISET student of energy economics was hired by WEG and assisted the firm with the energy audits, feasibility studies and calculations for the condominiums.

Hospital Energy Efficiency Component

- The owners and director of the privately owned Cell Technology and Therapy Center, Ltd. worked with NATELI engineers to design an energy efficient hospital to replace an existing building. This analysis detailed in the Energy Passport modeled the building very close to "as built" conditions. The results show an anticipated 44% reduction in energy use compared to the baseline (typical Georgian construction practices). The owner reported he is tracking costs and consumption data and anticipates a two-year payback rather than the projected eight-year payback.

- The Center saw an unexpected benefit from switching to the lighter energy efficient wall system. Using perlite blocks rather than traditional construction material reduced the wall thickness from nearly one-half meter to around one-fifth meter. This created an additional 1,020 square meters of useable floor space. In addition, the lighter walls allowed a sixth floor to be added to the building.

- NATELI funded $19,945 USD for energy efficient lighting and motion sensors at the Cell Therapy Center. The total cost of the new hospital constructed with enhanced thermal performance of the building structure is estimated to be 2,830,000 GEL. The director/co-owner stated the additional cost to construct the building with the energy efficient perlite block walls was $150,000 USD, which was "nothing" considering the total construction cost. NATELI assisted hospital owners to secure a $1,230,000 loan with a 14% interest rate from the Bank of Georgia to finance construction.

- In the spring of 2010 the Health Minister of Georgia stressed the role of the insurance industry as a key player in hospital sector development. As a result, insurance companies now own the hospitals. The hospital energy efficiency component of the NATELI project can serve as a model for replication by non-assisted institutions, but this process will take time. As the insurance companies gain more experience with the operations of the hospitals where measures were installed, and as they realize the energy savings, we expect that additional buildings will be renovated. At least one insurance company has already expressed interest in an audit for a commercial building.

- Altogether, five hospitals followed up the 22 Energy Audits (retrofit) and Energy Passports (new construction) and installed measures (23%). If all measures were installed according to recommendations, these five were expected to save over 11,800 GEL monthly. The payback periods were estimated to range from three to nine years.

- Getting involved early in the design process for new buildings is important. Introducing new technologies or uncommon building practices requires additional time in the design and construction process. Under time and cost constraints, once a project is committed to paper, it is often too late to introduce changes.

The Energy Bus Project

- The National Energy Globe 2011 award-winning Energy Bus project was successful. In many ways it exceeded the expectations of the original planners. The Bus was well attended, well received, and provided information that has already been put to use. Over 60,000 Energy Bus visitors took away practical information for daily use and information that could help them plan future projects. The Bus disseminated nearly 1 million brochures and leaflets over the two-year program. The Energy Bus received extensive TV and print media coverage. EEC sponsored annual competitions among journalists, with awards presented during Sustainable Energy Day activities. Sustainable Energy Day marked its third annual event, with much publicity and positive reception.
- School teachers are very proud of the174 students who participated in the Energy Bus poster and essay contests and boast of their students who won contests or went on to develop in-class projects. Another competition among schoolchildren for the best technologically and economically achievable project, with possibilities of implementation, received 29 submissions. An annual National Youth Conference in Renewable Energy and Energy Efficiency was launched within the Sustainable Energy Day activities. Prizes were awarded for winning posters, articles, projects, and for the best presentations and devotion. Teachers reported that students continued their work in the classroom, developing curriculum to include energy efficiency and renewable energy topics.
- EEC received inquiries for additional information to design biodigesters, small wind systems, solar electric systems, and small hydro, as appropriate for their community. EEC recorded 1,166 individual private consultations in person or by phone, with citizens reaching out during or after visiting the Energy Bus. In one quarter alone, for example, 127 people across 41 districts received follow-up technical assistance. While the total number of villagers able to install systems to utilize locally available renewable energy resources is not known, the annual reports provided success stories and stated several villagers installed efficient woodstoves and biodigesters; more than 10 families installed solar water heaters; one installed a 2 kW micro hydro plant; some replaced incandescent light bulbs with CFLs; and two families used plastic bottles to insulate their attics. Many of these were do-it-yourself approaches rather than purchasing of off-the-shelf systems.
- In follow-up calls to a random sample of 10 citizens who received consultations from EEC, all reported that the information provided was useful. Nine out of 10 could not manage the finances to install the systems of interest. One respondent reported that, with information from the Energy Bus consultants, he became very interested in solar systems, and negotiated the installation of 56 solar panels where he works.
- The public-private partnership between BP, Winrock, and the Energy Efficiency Centre (EEC) worked well. All stakeholders cooperated and coordinated the activity-intensive project. With the numbers of communities visited and the materials developed, printed and distributed, this was no small feat.

Access to Financing

- Overall results of the NATELI project do not specifically demonstrate improved access to funds due to a number of factors that are beyond NATELI's scope. These external factors include limitations which are political, legal, financial, and social in nature. Apparently, a more comprehensive approach is required to address the issue. Emphasis needs to be made on assisting the government and a wider range of stakeholders to formulate national priorities in the area of energy efficiency.

- Still, NATELI was effective in responding to the applications or requests submitted by the wider range of stakeholders. A large number of meetings and discussions were held with beneficiaries, target/interest groups, banks and partners on financing issues. Hospitals and condominiums were assisted in conducting energy audits and developing energy passports for their respective premises. Due to time limitations, however, not all recommendations presented in the energy passports were implemented. NATELI assisted one hospital (Cell Technology and Therapy Center) to secure financing to build the energy efficient building.

CONCLUSIONS

USAID designed a program to build awareness about energy efficiency and to demonstrate technologies that impacted a wide range of stakeholders. NATELI provided the seed money and the catalyst necessary to get the Energy Efficiency and Auditing Program at GTU underway. Hospitals were able to take advantage of the recommendations of Energy Passports and Energy Audits as well as the partial funding for energy efficiency remediation efforts.

Winrock International did an excellent job as the implementing organization, demonstrating flexibility with changing needs. One of their most important contributions was assembling an outstanding array of local sub-contractors. At times, these local sub-contractors had to grow with their responsibilities, but this led to increased in-country capacity and ability to provide services in the energy efficiency arena.

RECOMMENDATIONS

- To determine the energy savings attributable to the NATELI program, a pre- post-intervention analysis could be conducted using actual energy consumption data. This would require one or two years of post-intervention data. For a more immediate assessment of energy and cost savings, an updated Energy Passport could be generated, using specific inputs of the as-built conditions, construction costs, interest rates, and inflation rates.

- Collect post-intervention energy consumption and cost data for the buildings built or renovated under the NATELI program. These buildings will be good case studies and models that demonstrate achievable savings.

- To facilitate the new building design process and introduce energy efficiency technologies, it is important to get involved early, with enough time to incorporate and fund design changes. Consider exploring ways to work with building architects and engineers to improve designs and demonstrate reduced energy use.

- Stay in touch with insurance companies owning buildings that received Audits and Passports. While there were time and cost constraints barring uptake of recommendations, this may not always be the case. Keeping this experience and information in mind will encourage building owners to take action in the future.

- USAID should consider the benefits of seeking accreditation for the energy auditor certification course offered through GTU.

- This evaluation pointed out the need for small-scale financing that is readily accessible at a reasonable cost. It would be useful for USAID to look at this issue in more detail, although it may need to be undertaken within a broader financial sector project.

- We recommend that USAID continue to invest in pilot projects that demonstrate energy efficiency improvements and renewable energy technologies. The demonstration projects uncover the political and technical issues that must be addressed in order to proceed on a larger scale. It is also important to continue working with local government and policymakers as the SEAP methods are put into action. Since USAID already demonstrated their involvement and positive accomplishments

with that task, and in a highly political setting, pilot projects may serve as a good mechanism through which to continue working in the policy arena.

INTRODUCTION

EVALUATION PURPOSE AND EVALUATION QUESTIONS

This mid-term evaluation (covering activities between October 1, 2009 and September 30, 2011) is designed to assess whether the New Applied Technology Efficiency and Lighting Initiative (NATELI) project has achieved its stated objectives up to this point and, where appropriate, make recommendations regarding emphasis and methodology for the remaining work. Evaluation efforts are designed to answer four key questions posed by USAID/Caucasus in the request for proposal.

The four key questions addressed by this evaluation are:

1. How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, Georgian State Technical University (GTU) buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?
2. What were the effects of Energy Bus operations on target communities? How effective and efficient was this public-private partnership in attaining the planned results? Did the project affect men and women in target communities differently? How is the project perceived by its beneficiaries?
3. How effective was the curriculum on energy efficiency and energy auditing, as well as energy auditor's certification programs within GTU? How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?
4. How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

PROJECT BACKGROUND

The New Applied Technology Efficiency and Lighting Initiative (NATELI) was a two-year USAID-sponsored activity, and programmatic follow-on to the Rural Energy Program, implemented by Winrock International from October 1, 2009, through September 30, 2011. The NATELI project was designed to fulfill USAID's Strategic Objective (SO) 1.51—*A foundation for a more sustainable energy system and Intermediate Result IR* and section 1.51.3—*Increased efficiency in the energy sector*.

The objective of the program was to promote energy efficiency (and to a lesser extent, renewable energy technologies) to the Georgian public and business sectors, and to design financial, technical and operational frameworks to foster the development and implementation of energy efficiency projects. NATELI focused on some of Georgia's larger energy consumers, hospitals and condominium associations, and helped them implement energy efficiency measures, decreasing their energy consumption and therefore energy costs. This work included public outreach and environmental activities.[1]

The main objectives of the NATELI project were to:[2]

1) **Help large institutions reduce their energy consumption with a special focus on hospitals.** NATELI performed energy audits, examined financial costs and benefits of various energy efficiency improvements, assisted hospitals with implementation on a limited basis, taught local

[1] Project as described in the Annual report: Winrock International, NATELI Quarter 4 Progress Report and Year 2 Annual Report, October 2011.

[2] Ibid.

stakeholders how to manage their energy consumption, evaluated the financial viability of energy efficiency improvements, facilitated access to financing, and promoted results to the public.

2) **Support pilot projects that promote residential energy efficiency.** NATELI worked with the Tbilisi Municipality and condominium associations. Additionally, NATELI worked with Georgian State Technical University (GTU) to incorporate energy efficiency matters into their curriculum, and to implement energy efficiency retrofitting in several GTU buildings.
3) **Continue support to the Energy Bus, in conjunction with British Petroleum (BP) Georgia.** The Energy Bus toured Georgian communities and educated Georgian citizens about energy efficiency and renewable energy in general, as well as their practical application.

EVALUATION METHODS AND LIMITATIONS

This is a mid-term evaluation covering a two-year period ending September 30, 2011. There is a wide range of effort represented by the work undertaken in the four areas covered by those questions.

The terms "effective" and "sustainable" are used in the four research questions presented in the Task Order. We used the following definitions for these terms so that we could collect data and evaluate results against these criteria.

- We defined "effective" to mean that the NATELI team met the planned objectives and goals in a manner that beneficiaries found useful. In the short term, this can be seen, for example, in beneficiaries taking action on recommendations, activities and ideas introduced during trainings being adopted, or in the motivation of peer agencies or nonparticipants to voluntarily seek information or assistance provided by the program.
- We defined the term "sustainable" to mean that NATELI's efforts are carried on beyond the end of the program. For example, work begun by NATELI becomes self-sustaining, or program beneficiaries take initiatives or actions independent of USAID funding. Sustainable activities can come in the form of entities independently continuing NATELI's work, concepts introduced by NATELI developing into similar or related work, or concepts and activities becoming standard practice. It can also mean that the efforts or prototypes funded and completed through NATELI can be replicated by others.

For this evaluation, primary data were collected through a series of interviews with stakeholders, key informants and program beneficiaries. Interviews were conducted in face-to-face meetings, small group sessions, and by telephone. A focus group with students at GTU was not conducted because classes were not in session. Altogether, the evaluation team spoke with about 60 people.

Interview guides were developed for each agency and stakeholder group interviewed; these were used to conduct the semi-structured interviews tailored to the research question and key informant. NATELI quarterly and annual reports provided background information to develop the interview guides and identify key informants. These documents and related materials (e.g., Energy Audits, Energy Passports, Energy Bus and quarterly report attachments) provided additional supporting information to address the evaluation's research questions.

Table 1 summarizes the key research questions, data collection methods and sample selection criteria. Annex B provides additional detail about the final evaluation approach and differences from the planned approach. Annex C lists the interview respondents from each agency as well as the purpose and intent of each interview. Annex D includes the individual interview guides.

Table 1. Summary of Evaluation Research Question, Sample Selection and Data Collection Methodology

Evaluation Questions	Key Informants	Data Collection Methods	Sampling or Selection Criteria
What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings? How effective and sustainable were NATELI's interventions?	• Winrock • SDAP • Remissia • WEG • GTU • BP • City of Tbilisi • Energy Efficiency Center	• Semi structured interviews with key informants, including NATELI contractors and sub-contractors, GTU and hospital directors • Interviews with key informants in the city government • Project documentation review • Site visits at GTU and 3 assisted medical institutions • Indirect measures of history, barriers and intentions	• Directed sample • Identified key stakeholders • Selected completed projects
Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings?	• Winrock • SDAP • WEG • GTU • Selected hospitals	• Interviews with the GTU Deans, professors • On-site visit at GTU, visiting Energy Lab and treated buildings • On-site visit to three selected hospitals; interviews with directors • Review sample of audit reports and energy passports, review audit assumptions; engineering best practices	• Directed sample • Identified key stakeholders • Selected completed projects
Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users?	• Cell Technology and Therapy Center • Marneuli Hospital, IRAO Group • Tianeti Hospital, GPI Holding	• Semi structured interviews • In person interview conducted with the Director/Owner of the Cell Therapy Center • In person interviews with 2 hospital directors; phone interviews with respective insurance holding company representatives • Selected hospitals within 1.5 hour drive of Tbilisi	• Directed sample • One privately owned hospital • Two insurance-owned hospitals
What were the effects of Energy Bus operations on target communities? How is the project perceived by its beneficiaries?	• EEC • BP representatives • Beneficiaries at two communities • Citizens consulting with EEC staff	• Interviews with the implementing partners EEC and BP • Focus group with beneficiaries at two communities visited by the Energy Bus; selected jointly by evaluation team and EEC, within 1 hour drive of Tbilisi • Phone interview with random sample of 10 citizens in a variety of regions who requested and received consultations from EEC	• Directed sample • Key informant discussions; nonprobability sample • Random sample
How effective was the curriculum on energy efficiency and energy auditing, as well as energy auditors' certification programs within GTU?	• GTU Dean of Faculty of Power Engineering; Dean, and, Associate Professor of Civil Engineering	• Key informant interviews with GTU personnel, additional comments provided by other professors during site visit to various buildings • On-site visit to Energy Lab and GTU buildings treated by NATELI • Training materials review	• Directed sample • Key GTU staff available
How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects?	• Winrock • TBC • Bank of Georgia • ProCredit • Seminar participants	• Project documentation review • Interviews with representatives of three key banks identified by Winrock • Key informant telephone interviews with sample of seminar participants with available contact information	• Nonprobability sample for bank interviews • Random sample of seminar participants with contact information

Materials provided by Winrock and other stakeholders were also reviewed, including quarterly and annual reports, GTU curriculum materials, and Energy Bus project literature.

The NATELI team modeled energy use and estimated savings from installing recommended measures, reporting findings in the Energy Audit and Energy Passport reports. This evaluation's Work Plan envisioned a full post-intervention evaluation of the cost-benefits of specific energy projects. However, the primary limitation in this evaluation was the lack of post-intervention energy consumption data at the hospitals and GTU, where energy efficiency measures and technologies were installed. Newly constructed hospitals did not have required post-installation data to compare actual results with the baseline simulated in the Energy Passports. The buildings at GTU are not individually metered. Lack of consumption data limits the ability to definitively determine the amount of energy savings that can be attributed to NATELI interventions. However, only lighting was funded through NATELI; other recommended measures were installed with non-NATELI funding. Information provided during the evaluation points to real energy savings over the established baseline, including both the NATELI funded lighting and the measures recommended in the NATELI-funded reports, but installed with non-NATELI funding sources.

Because actual consumption and cost data were not available, a sample of Energy Audit and Energy Passport reports were reviewed to assess the inputs and results for reasonableness. Limited data were input into an energy simulation model to evaluate the NATELI results. Results indicated that output was similar between the NATELI modeling software and the evaluator's software, and that the inputs and savings estimates were reasonable. Modeling "as built" conditions with the NATELI software could provide a good estimate of savings. This estimate can be available more quickly than a post analysis conducted with one or two years of post-intervention data.

REPORT ORGANIZATION

This evaluation report is structured around the four research questions specified in the Scope of Work and Task Order. Each question is presented independently, as a chapter. The following topics are included within each question's chapter. The chapter structure is as follows:

- Evaluation Question
- Evaluation Purpose
- Evaluation Methods and Limitations
- Findings, Conclusions and Recommendations

In Question 1, with four sub-sections, each sub-section includes a discussion of findings, conclusions and recommendations. Following presentation of the four research question chapters is a section on overarching findings. Annexes follow as the last section.

EVALUATION QUESTION 1

EVALUATION PURPOSE

Evaluation questions that address the effectiveness of NATELI's interventions include:

a) How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas?

b) Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings?

c) Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users?

d) What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

EVALUATION METHODS AND LIMITATIONS

Question 1 represents the major level of effort under the NATELI project and received the broadest attention in this evaluation. The research questions 1a) and 1d) particularly overarch all of the NATELI project's efforts.

Question 1b) asks whether the NATELI interventions saved energy. Noted above, the primary limitation in the evaluation of this question is the lack of post-intervention energy consumption data at the hospitals and GTU, where energy efficiency measures and technologies were installed. This limits our ability to determine the size of the energy savings that can be attributed to NATELI interventions.

Primary factors leading to this lack of actual data included: (1) Actual post-installation consumption and cost data were not collected by the Winrock team, who stated that this task was not specified in the NATELI project and therefore this activity was not considered. (2) GTU buildings are not separately metered; actual data were pro-rated to model potential savings. In the future, collecting pre- and post-measure installation data will need to be carefully planned and executed to collect requisite data for specific buildings and floors. (3) Not enough time has passed since the measures were installed to collect actual consumption data. One or two years of post-installation data are needed to determine if the intervention resulted in persistent energy savings. Also note that the NATELI team did not model buildings "as built" to update savings estimates to reflect actual measures installed; this task was not specified.

The evaluation team took the following approach to assess energy savings. The team: (1) conducted on-site visits to verify measure installation; (2) reviewed the assumptions and inputs to the Energy Audit and Energy Passport for selected projects to determine their reasonableness; and (3) interviewed building managers about consumption and asked for records or any data they could provide.

In addition, because actual data were not available to evaluators to assess changes in consumption, the team reviewed the NATELI software model inputs and outputs. Data included in the NATELI reports for two buildings were input into a different software model to assess the reasonableness of the NATELI assumptions and outputs.

QUESTION 1A): FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Question 1a) asks: *How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas?* To answer this question, we collected data from all interview respondents (see Table 1, Annex B and Annex C). Key stakeholders were identified with NATELI's prime contractor Winrock International, who also arranged the interviews.

We offer several examples where NATELI was particularly effective (goals were met) and efforts produced sustainable actions (efforts were carried on beyond the end of the program).

Findings

The evaluation team found examples where the NATELI efforts were effective and sustainable. The following highlight these areas.

a) Cell Technology and Therapy Center

The Cell Technology and Therapy Center is an excellent example of a successful public-private partnership. Being privately owned, directors took full advantage of expertise offered through NATELI. The director and co-owner of the Center noted that their engineers worked with the NATELI engineers to design the Center. These negotiations took several months. The unique lightweight and energy efficient Perlite wall blocks allowed one more story and an extra 1,020 square meters per floor. This alone represents increased capacity at the Center itself. Once built, the Cell Therapy Center installed nearly all measures recommended in the Energy Passport. They have configured the roof to install recommended solar measures, and plan to install them as funding becomes available. The

director/owner stated that the building design and anticipated payback period allowed the Center to provide more services, including some that were only provided out of country before. The Center's director/owner reports he is monitoring energy costs and expects a much faster payback than anticipated, quoting a 44% reduction in energy use over the baseline, had the building been built to standard practice.

The director spoke at NATELI's Green Hospital seminar, discussing the Center's design, unique features, and the advantages of the energy efficient design. In our interview, he also reported that colleagues from other centers and hospitals have visited his facility with expressed interest in the design and construction.

The Cell Therapy Center is one example where NATELI successfully provided assistance to secure financing. The NATELI representative working with the Center and the director stated they discussed the project with seven financial institutions. They received proposals from four banks interested in financing the project; these were able to consider energy efficiency as a factor in the loan terms. These offers allowed the Center's owners to choose the offer to best meet their needs.

b) GTU Energy Lab

We interviewed the Dean of Faculty of Power Engineering and Telecommunication as well as the Associate Professor of Civil Engineering at GTU. They reported that NATELI funding for the GTU Energy Lab, building retrofits, and training was a catalyst opening the door to other donor support. It enabled GTU to take the next steps to retrofit other buildings. The Lab and curriculum provided material for professors to master their own understanding of energy efficiency and to train students. GTU, International School of Technology at Tbilisi State University (ISET) students, and visitors experience operating energy efficiency and renewable energy systems. NATELI provided funding for energy auditing test equipment, and facilitated the transfer of other equipment from the Georgian Ministry of Energy. Energy efficiency and energy audit training courses are ongoing. GTU graduated the first class of 33 Master's program students, all of whom completed the 10-credit component covering energy audit training. Taken together, GTU is building long-term capacity investing in the knowledge base.

The GTU Dean and faculty interviewed reported an important additional benefit from the building retrofits. That is, before the retrofits, classrooms were unheated for the most part, with few portable electric space heaters. Classes were cancelled because rooms were too cold to teach. Now, the classrooms are warm. The teaching environment is much more hospitable. Professors to whom we were introduced were very thankful for the funding that enabled this work. They said that now they are happy to come to teach in their building; both students and teachers are more productive. They also reported that without the USAID funding, none of the work would have been done.

c) The Energy Bus Project

The award-winning Energy Bus brought a wealth of information to communities across Georgia, populations that may not have otherwise been exposed to this information. No matter the depth of current knowledge, the 60,000 visitors to the Bus added to their knowledge base. Teachers are incorporating lessons of energy efficiency, environmental protection, and sustainability into their classrooms. These exercises build long-term capacity investing in children and communities.

d) Insurance Companies and the Energy Audits and Passports

NATELI staff conducted Energy Audits and Energy Passports for insurance companies that owned the hospitals and that were charged with building additional capacity. Insurance companies now have experience with the Energy Audits and Passports. Several hospitals received NATELI-funded lighting and upgraded wiring to support the lighting. The insurance companies went on to finance other recommended measures at several hospitals. In the interviews with two companies, informants noted

that they recognize the financial benefit of energy efficient design, and have pledged to utilize the technologies in future construction projects if time and money allow. Time constraints (requirements to complete buildings by a mandated date) and project costs were the largest barriers to implementation.

e) Capacity Building at NATELI's Partner Firms

NATELI partners World Experience for Georgia (WEG), the Sustainable Development and Policy Center (SDAP), and the Sustainable Development Center (REMISSIA) didn't know exactly how to approach their assignments, but all were ready and willing to take on work that expanded their knowledge base. They figured out what to do, did a very credible job (as evidenced by their reports), and can build on this new foundation to continue work and expand services.

In our interviews, all firms stated they are building on their experience gained through their work NATELI:

- WEG employs a student from ISET who is familiar with the GTU Energy Lab and worked with GTU students. This student conducted some of the NATELI audits and calculations for condominiums. He is a member of the newly formed association called *Young Professionals in Energy*. WEG reports that it is continuing policy work and feels this area is a priority in realizing technological changes in energy efficiency and renewable technologies.
- SDAP reports that they were contacted by an insurance company to complete an Energy Passport for a commercial building (neither a hospital nor condominium).
- REMISSIA reports that the key to the successful Sustainable Energy Action Plan (SEAP) was the vision for local capacity building and developing a plan that was appropriate for different regions of the country. The SEAP will develop local capacity as implementers work toward achieving the goal for 20% reduction in carbon emissions by 2020 in the city of Tbilisi.

f) Sustainable Energy Action Plan

On April 12, 2010, the Mayor of Tbilisi signed the Covenant of Mayors, and Tbilisi became the first city in the Caucasus to join an initiative under which Tbilisi should become a "low carbon city" by 2020. By signing the document, the Tbilisi Municipality joined the EU 2010 in the common goal of reducing greenhouse gas (CO^2) emissions by 20% and implementing a steady energy supportive plan.[3] While outside the scope of this evaluation, it is worthwhile to note that with NATELI funding, Winrock and sub-contractors developed the Sustainable Energy Action Plan (SEAP) for the city of Tbilisi. They prepared a methodology for developing an Energy Model and Business as Usual (BAU) scenario applicable to the East Partnership countries (non-annex I countries to the Kyoto Protocol).

They also developed the Baseline Emissions Inventory study for Tbilisi per the Covenant of Mayors requirement. The specific situation of Eastern Partnership and Central Asian countries suggests that choosing 1990 as the baseline year, as is recommended for the EU countries, is not appropriate. Because of the dramatic economic collapse that followed the fall of the Soviet Union, 1990 is not suitable as a reference year and local data availability and reliability is highly questionable.[4]

This was a tremendous amount of work to complete in a very short time. Without NATELI funding, the work would not have been completed successfully. A vision for short- and long-term capacity building within the constraints of Georgia's existing political, economic, social and geographic structure was needed. If the actions proposed in the SEAP are implemented, the overall CO^2 emissions in Tbilisi will be reduced by 24% by 2020. USAID funding through NATELI played a crucial role in developing a methodology for a baseline and BAU scenario for non-annex I countries to the Kyoto Protocol—this is

[3] Winrock, International, NATELI Year 2 Quarter 4 Annual Report, October 2011. Page 9.

[4] Ibid.

a very meaningful accomplishment with potentially far-reaching effects. The methodology was submitted to the Joint Research Centre; Winrock was invited to Brussels to discuss the methods.

The plan to achieve a 20% reduction in greenhouse gas emissions in Tbilisi by 2020 embeds a vision and strategy that address existing barriers to achieving this goal, including ecological barriers, social issues, technology transfer and application of the technologies in ways that are meaningful to Georgians.

Conclusions
The capacity building aspect of the NATELI project has been demonstrated through a variety of activities. These examples all point to NATELI's effectiveness and success which have already led to sustainable actions. The USAID funding was critical in all cases to providing various organizations with the ability to implement a project that would not otherwise have been conducted. In each case, the funding was a catalyst for additional work conducted without USAID funds.

It was important for USAID to provide these funds through the NATELI project. Without them, all of the informants stated that no work would have been initiated as described under NATELI project efforts. It appears that a great amount of work can be done with tangible accomplishments in a short time. As one informant said, "Anything is possible."

At the same time, the underlying political situation and policies slow the implementation of energy efficiency technologies. The poor condition of existing buildings and infrastructure such as electric wiring, lack of access to funding, and lack of building codes that stipulate minimum energy requirements are three examples where policies are needed to affect more widespread change.

Recommendations
We recommend that USAID continue to invest in pilot projects that demonstrate energy efficiency improvements and renewable energy technologies. The demonstration projects uncover the political and technical issues that must be addressed in order to proceed on a larger scale. It is also important to continue working with local government and policymakers as the SEAP methods are put into action. Since USAID already demonstrated their involvement and positive accomplishments with that task, and in a highly political setting, pilot projects may serve as a good mechanism to continue working in the policy arena.

QUESTION 1B): FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Question 1b) asks: *Did the project result in reduction of energy consumption in targeted hospitals, Georgian State Technical University (GTU) buildings, and residential buildings?*

Background
Three classes of buildings were audited and targeted for renovation or new construction, including energy efficiency upgrades: (1) hospitals, (2) buildings on the Georgia Technical University campus, and (3) residential condominiums.

Recommended energy efficiency upgrades were identified in energy audits conducted for existing buildings. Following the building audit, energy savings were computed using two different baselines. The first baseline reflected actual building energy use, calibrated with actual energy bills and consumption data. Under actual conditions, however, buildings or portions of buildings were not heated. Temporary portable electric space heaters were sometimes used. The unheated buildings lead to very uncomfortable conditions. For example, at GTU, informants stated that classes were canceled when it was too cold in the classroom to teach. At hospitals, audit reports stated the building had not been maintained since construction and the heating system was destroyed, and the natural gas pipeline to the building was not connected. Reports noted that the current state of existing windows was very bad or

there that there were no windows at all, and there was no hot water supply to the hospital.[5] Interview informants also stated that rooms were unheated in the winter except for occasional and temporary electric space heaters or a wood stove. Because the actual baseline reflects unreasonable (and uncomfortable) conditions, the energy savings analysis included a second baseline.

The second baseline models the existing building under normal working conditions, assuming local systems for space heating and water heating. The model assumes the building was heated to comfortable conditions, which typically reflects an increase in building energy use. While creating two baselines is not typical practice in the U.S., it is reasonable in this situation where operating conditions are sub-standard. Energy savings are computed as the difference between the second baseline (normal operating conditions) and the proposed building with upgrades. Comparing the proposed building to the actual conditions would not be the correct comparison because the actual conditions do not represent fully functioning buildings.

To determine energy savings in new buildings, building simulations (Energy Passports) computed the baseline by modeling typical construction methods under existing codes. The proposed upgrades were modeled to determine building performance under conditions with the energy efficiency components. Savings were computed as the difference between the baseline (common practice) and the building with all recommended measures installed. Detailed Energy Passport reports describe the building's physical parameters, specify building materials and costs along with thermal properties, conduct the cost/benefit calculations, and compute CO^2 emission reductions. The approach is reasonable and well documented.

For each actual renovation or new construction project, the NATELI team developed a mitigation plan and wrote a corresponding report.

Evaluation Methods

The evaluation team reviewed documentation and conducted on-site visits to three newly constructed hospitals modeled with Energy Passports and that were installing recommended measures. Winrock and the evaluation team jointly selected three hospitals to visit. These were all within a two hours' drive of Tbilisi. An on-site visit was also conducted at GTU.

During the on-site visit, the hospital directors provided a tour of the building and discussed the energy efficiency upgrades. The evaluation team also conducted interviews with the hospital directors and owners to discuss motivations for including, and excluding, the energy efficiency upgrades recommended in the Energy Passport. Directors and owners were asked for energy consumption and energy cost data.

The initial Statement of Work and Task Order for this evaluation envisioned collecting actual post-intervention data and conducting a post-completion energy savings evaluation to confirm the cost benefit analysis of these buildings. Since all buildings were put into operation less than a year ago, short-term indicators, including interviews with building owners and managers, were relied upon to assess energy savings.

The Energy Audits and Energy Passports report energy savings determined from modeling the change in energy use between a baseline building configuration and one with recommended energy efficiency measures. The evaluation team reviewed a number of Audit and Passport reports for reasonableness. The evaluation team used a different software modeling tool to estimate savings. Inputs were derived from the reports.

The following section summarizes findings for the three hospitals and GTU buildings where the evaluation team conducted on-site visits and interviews.

[5] See for example, Energy Audit Report on Dusheti Hospital, pages 5 and 9, 10. This building was being renovated, and the "aim of the energy audit is to estimate the energy consumption and ENCON potential in the building and to develop further recommendations." Page 12.

Findings

a) Model review

The evaluation team modeled the Jo Ann Medical Center and the Marneuli Medical Center using input data described in the Energy Passport. The model inputs were converted to English units. Simulations of Marneuli data showed that minimum (baseline) construction techniques could result in energy costs of about 1,400 GEL. Winter gas use would average about 900 GEL. Using the more energy efficient perlite wall construction would reduce costs by about one-third, down to an estimated 570 GEL, The perlite walls will not affect heat loss associated with any other component (e.g., windows, roofs, and infiltration). Summer electricity use would remain unchanged if perlite walls were used. However, in winter, a small reduction in fan energy could reduce consumption from about 660 to 640 GEL.

Overall, the assessment indicated that the NATELI model inputs and outputs were reasonable. To estimate energy savings attributable to installing recommended measures, the Energy Audits and Energy Passports could be updated using the "as-built" conditions.

b) Cell Technology and Therapy Center

The best documented results showing energy savings are for the Cell Technology and Therapy Center. The hospital started accepting patients in early spring, and was officially opened in September 2012. Dr. Karine Melikidze conducted the original Energy Passport for the building design. She collaborated closely with the building owners and their engineers to design and model the building. This detailed analysis modeled the building very close to "as built" conditions of the building after it was completed. The results show a 44% reduction in energy use compared to the baseline (typical Georgian construction practices). During the interview, Dr. George Loladze, hospital director and co-owner, stated that energy costs have been running below amounts anticipated in the Energy Passport. He anticipated a two-year payback rather than the projected eight-year payback. Dr. Loladze is tracking costs and consumption data and is willing to share the data in the future, once enough data are available for analysis.

NATELI funded $19,945 USD for energy efficient lighting and motion sensors. The total cost of the new hospital constructed with enhanced thermal performance of the building structure is estimated to be 2,830,000 GEL. The director/co-owner stated the additional cost to construct the building with the energy efficient pier block walls was $150,000 USD, which was "nothing" considering the total construction cost. NATELI assisted hospital owners in securing a $1,230,000 loan from Bank of Georgia to finance construction.

The Winrock representative and Dr. Loladze reported that they visited seven financial institutions to seek financing. Three reported they did not work with medical institutions. The other four developed and offered a financial package. Building owners selected the package with the terms that met internal criteria. Initially, interest rates of 18% to 20% were offered. The final loan was secured with 14% interest.

c) Tianeti Hospital

Tianeti Hospital is a 15-bed hospital that opened December 1, 2011. The building was a compact design recommended by the Energy Passport. While the new building is much more compact than the old, it accommodates about the same number of beds. The new building uses coal for heating, which the hospital director reported costs close to the same as natural gas. Tianeti owners did not follow all recommendations in the Energy Passport due to cost constraints. Recommendations not included in construction were the perlite wall blocks which were an expensive component and one that employed non-standard building practices which could delay construction. Not all windows were installed with vinyl frames, and low-e double glazing. The new building replaced an older building that was unheated and used electric space heaters in some of the rooms.

Zura Murgulia, hospital manager, said that monthly energy costs were 600-800 GEL, in the summer and winter periods respectively. The old hospital energy costs were about 2,000 GEL monthly. The Energy Passport anticipated average net monthly savings of 581 GEL if all measures were installed (kWh equivalent).[6] The hospital manager stated there was a large difference in the cost to heat the old building and the new. The very preliminary data indicates the new building saves about 1,200 GEL per month compared to its predecessor. (2,000 GEL old building monthly cost – 800 GEL new building monthly cost = 1,200 GEL savings of the new building's cost over the old building's costs.)

The hospital manager also cited maintenance cost savings from the fluorescent light bulbs (T5 lamps) that last longer than incandescent bulbs. The lamp diffusers reduce glare, producing more pleasant lighting than traditional bulbs. In addition, he reported that people are more comfortable and had a better attitude in the new building.

NATELI funded $9,200 USD for energy efficient lighting. The total cost of the new hospital constructed with enhanced thermal performance of the building structure is estimated to be 1,450,000 GEL. Insurance company GPI financed the energy improvements with the exclusion of the lighting.

d) Marneuli Hospital

Marneuli Hospital is a new 25-bed hospital. Due to time constraints (that is, new hospitals had timelines to complete construction) all recommendations of the Energy Passport were not followed. Primarily, the perlite blocks were not used for the wall construction. The Energy Passport, if followed completely, indicates that gas consumption would be half that of a conventionally constructed building.

The hospital director stated that in the winter period monthly energy consumption costs approximately 600-650 GEL. In the summer period, monthly electricity costs about 400 GEL. In winter, monthly gas consumption was 800-1,000 GEL. In the summer period, gas consumption was about 150-200 GEL. Total energy costs (electric plus gas) range from 550 GEL to 1,650 GEL, or a very rough average of 1,100 GEL. The Energy Passport anticipated baseline energy use of 26,213 m3 gas at a cost of .51/m3.[7] An average levelized baseline monthly consumption can be computed as 1,114 GEL. The Energy Passport anticipated average net monthly savings of 526 GEL if all measures were installed. However, the perlite wall construction was not used at this hospital. Other deviations from the recommended measures in the Passport may have been made as well. This very preliminary data indicates additional analyses are needed to accurately determine the energy savings attributable to energy efficiency measures. This new building also has not been operational long enough to complete a post-intervention evaluation of energy consumption using actual data. However, the "as-built" building could be modeled at any time to produce a new Energy Passport report, providing a more accurate estimate of anticipated energy use and savings. Results from this revised model can be compared to actual building performance to assess the energy savings. We fully expect energy savings from both the lighting system and the thermally improved dual glazed windows.

NATELI funded $8,350 USD for energy efficient lighting. The total cost of the new hospital constructed with enhanced thermal performance of the building structure is estimated to be 3,000,000 GEL. Insurance company IRAO-MEDI financed the energy improvements with the exclusion of the lighting.

e) Georgia Technical University

The NATELI team conducted energy audits of five buildings at Georgian Technical University. The subsequent remediation work was partially funded by NATELI ($53,821 USD) with additional funding from the University and other sources. These buildings were largely unheated, with electric space heaters used in some classrooms. Average monthly savings of $26,857 USD were estimated in the Energy Audits. The baseline was calculated from actual energy usage, prorated by building since the

[6] The baseline was not the old hospital, but a new building of the same dimension, built to code and common practice.

[7] Energy Passport for Marneuli and Gardabani, page 31. Cost reported page 34.

buildings are not separately metered. A second baseline calculation assumed an amount of energy use required to reach a reasonable level of thermal comfort in the classrooms. This second baseline was used to estimate the energy and cost savings from the energy efficiency upgrades.

As noted, GTU buildings are not individually metered for either gas or electricity; actual consumption data per building cannot be obtained. Collecting post-consumption data by building requires special metering, which was not specified in the NATELI scope of work. Interview informants stated that informal monitoring by the University indicates that energy efficiency levels comparable to the energy audits are being achieved. The Dean stated that a 7% reduction in energy use was projected, but it appeared they were achieving a 9% reduction.

NATELI funded $53,821 USD for new wiring and lighting systems in three buildings as well as heating system components (GTU buildings #1, #3 and #4). NATELI and GTU reported total investment for thermal performance upgrades in five buildings was $1.7 million.

Conclusions

NATELI funding resulted in the installation of energy efficient lighting systems at several hospitals and GTU. In all cases, the funding acted as a catalyst, and the building owners were able to invest additional funds to install other measures recommended in the Energy Audit or Energy Passport. Non-energy benefits that are hard to quantify must not be overlooked. These include, for example, added floor area and an additional floor at the Cell Therapy Center, allowing additional services to be offered; heated classrooms at GTU so that winter classes are no longer cancelled; warmer hospital rooms; a change in attitude toward a more pleasant teaching and learning experience at GTU; and a more comfortable hospital stay. Each informant at the on-site visits expressed sincere gratitude and thanks to USAID, to the NATELI project, and to the Winrock team.

The initial energy assessments indicate the buildings reduced energy consumption over the baseline conditions. The NATELI cooperative agreement did not specify that Winrock collect post-intervention consumption data. Therefore, Winrock did not anticipate the need for it and the data were not collected. It is possible to request these data for future analyses, but none of the buildings have been in service long enough to calculate energy savings with actual consumption data and energy bills at this time.

It is possible to model the buildings as-built (generate a new Energy Passport) that will more closely estimate building energy use, along with energy and cost savings. The cost/benefit analyses could be updated with actual construction costs, energy costs, and the real interest rates and inflation rates. The updated Energy Passports will more accurately reflect the payback and profitability of the investment. This will provide a more immediate assessment of the energy savings achieved by these buildings. This information could inform future investments, since the buildings represent a variety of situations where different recommended measures were installed.

Once adequate actual post-intervention consumption data are available, the model results can be compared to actual data and then calibrated.

Recommendations

The evaluation team understands the need to assess energy savings attributable to the NATELI program. In the absence of long-term post-intervention consumption data, and because not all recommended measures were installed, the evaluation team recommends that Energy Passports reflecting the actual as-built conditions be generated to better assess energy and cost savings, payback and profitability.

We also recommend that USAID specify that requisite post-intervention consumption data be collected. We recommend that USAID revisit these buildings at an appropriate time (after one or two years of

operation) and evaluate actual consumption data to establish energy savings attributable to the NATELI effort. We recommend a detailed analysis of the baseline assumptions at the same time.

For future energy efficiency and renewable energy projects, we recommend that USAID consider incorporating post-intervention monitoring and data collection to ensure data are available to determine energy savings resulting from the program activities.

QUESTION 1C): FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Question 1c) asks: *Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users?* To answer this question, we conducted desk reviews of various reports and documentation provided by Winrock, as well as interviews with stakeholders, including NATELI contractors, sub-contractors, hospital and insurance company staff, as listed in Table 1 and Annexes B and C.

In the spring of 2010 the Health Minister of Georgia stressed the role of the insurance industry as a key player in hospital sector development. The Georgian government announced a repeated tender as a part of the hospital sector development program and nine insurance companies took part in the tender, namely, Alpha, GPI Holding, Imedi L, Archimedes Global Georgia, Aldagi BCI, Vesti, IC Group and IRAO-MEDI. It was decided that the winning companies would provide insurance services to beneficiaries all over Georgia and construct a total of 46 hospitals with 1,130 beds.

Findings

Winrock documentation shows that 11 Energy Audits and 11 Energy Passports were produced. There were five hospitals (23%) that implemented at least some of the recommended measures. NATELI funded only lighting and wiring systems in these buildings. However, each of these hospitals that were owned by insurance companies installed additional recommended measures outside of NATELI funding. These included, for example, wall insulation, ceiling and floor insulation, and energy efficient windows (with vinyl frames and double paned low-e glass). Two insurance companies interviewed stated that the barriers preventing implementation of all recommended measures were timing and costs. All of the new hospitals built by the insurance companies were constructed under mandated timelines. Informants stated that changing the building design to incorporate the more unfamiliar measures (e.g., perlite pier block walls) would be costly and take too much time, and they would not be able to complete projects by the mandated completion date.

The NATELI team purchased a drum light bulb crusher and has begun a program to collect used Compact Fluorescent Lamp (CFL) bulbs from hospitals. The mercury is reclaimed and kept out of the landfills.

The privately owned Cell Therapy Center constructed its building to meet the Energy Passport design parameters. Since this Center was working outside of the confines imposed on insurance companies, it appears they had more flexibility. In addition, they invested their own money and were highly aware of payback and the benefit of an energy efficient building on long-term operating costs.

To examine whether the hospital component can serve as a model for replication in non-assisted institutions, we first asked SDAP for the cost to conduct an Energy Audit or Energy Passport. Of course, cost depends on the complexity of the building. However, as a benchmark, the GTU Building 8 Energy Lab audit cost $5,000 US Dollars (USD). We also asked SDAP if insurance companies or private businesses had expressed an interest in the Audits or Passports since the NATELI work. One insurance company is discussing audits of commercial buildings with SDAP. This points to an understanding of the benefits of the audits and interest outside of NATELI efforts.

In the interviews with two insurance companies owning the hospitals visited, representatives stated that they understand the value of the energy efficiency work and will apply the principles to other buildings.

It appears that they can apply general practices or conduct new Audits and Passports. At the same time, the companies noted cost and timing were the primary barriers for companies that did not install all recommended measures.

In the interviews with directors of the two hospitals visited that were owned by insurance companies, we asked if colleagues were interested in the energy efficiency of their building. They, and three participants we interviewed who attended the Green Hospitals seminar, stated that they were not the financial decision makers. While they or their colleagues were interested in changing hospital practices or technologies to be more energy efficient, it was outside of their authority to do so. Also of note, these two new hospitals were staffed after NATELI held the Green Hospital seminar. The directors expressed interest in attending such a seminar and learning more about how to improve their internal processes to become more energy efficient.

For the privately owned Cell Therapy Center, the situation was different. There, the director and owner could take the time to thoroughly investigate the measures recommended in the Energy Passport. They built the building as designed and expect to save 44% over the baseline, had the building been built to current practice. They also expect a much shorter payback than the Energy Passport predicted.

In essence, the financial decision makers need to be involved early in the design process for new buildings. For existing buildings, the education process surrounding energy efficiency needs to be an ongoing process, targeted at the decision makers.

Conclusions

The hospital energy efficiency component can serve as a model for replication by non-assisted institutions, but this process will take time. As the insurance companies gain more experience with the operations of the hospitals where measures were installed, and as they realize the energy savings, we expect that additional buildings will be renovated. At least one insurance company has already expressed interest in an audit for a commercial building. It is also important to note that the owner insurance companies have already completed Energy Audits and Energy Passports have them in hand. They could use this information at any time but may need some follow up contact from NATELI staff involved in the original process.

Getting involved early in the design process for new buildings is important. Introducing new technologies or uncommon building practices requires additional time in the design and construction process. Under time and cost constraints, once a project is committed to paper, it is often too late to introduce changes.

Recommendations

We recommend that USAID (via Winrock and SDAP) stay in contact with the companies whose buildings received an Energy Audit or Energy Passport. By providing evidence of savings achieved by hospitals taking action, USAID can reinforce the benefits of installing the energy efficiency technologies. Discussions will need to include the financial decision makers and those who can authorize changes in procedures.

For new buildings, start discussions about energy efficiency and alternative technologies early in the design process. Design assistance through the Energy Passports can be offered early in the building design process. This requires knowledge of the building plan.

QUESTION 1D): FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Question 1d) asks: *What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?* Interviews with stakeholders involved with residential condominiums explored this topic through a number of questions.

Key stakeholders were identified with NATELI's prime contractor Winrock International, who also arranged the interviews.

Findings

Energy Audits focusing on common areas were conducted at twelve condominiums. NATELI earmarked $60,000 USD to contribute to one pilot project upgrading condominium common areas.

The city of Tbilisi expressed interest in renovating an entire building as a demonstration project. Two buildings received detailed feasibility studies for comprehensive renovation of the entire building. The city planned to contribute additional funds to a pilot project, however, after considering several options, it redirected available funds to other projects.

The demonstration projects planned by NATELI were only feasible with the co-financing provided by the city. Therefore, there was no pilot project to upgrade the energy efficiency of common areas at a residential condominium after the city of Tbilisi reallocated the funds initially planned for the rehabilitation. Subsequently, Winrock redirected the $60,000 USD to another energy efficiency demonstration project that renovated a kindergarten classroom.

At the condominiums, other barriers existed:

- The purpose of conducting an energy audit was a new concept for apartment dwellers to understand. The seminars and individual meetings for condominium association members were very helpful in explaining the energy audit purpose and benefits. In the end, members were excited about the anticipated pilot project.
- The condition of existing buildings, the configuration of common spaces, and the wiring within the building posed special design problems.
- The cost to renovate buildings (often poorly built) was high.
- The logistics to arrange and conduct the energy audits had not been done before.
- Physical access to apartments was difficult to arrange.
- Contractors were not experienced in the design of a solar water heating systems that would serve the whole condominium.
- Legal and operational issues were new considerations and had never been addressed before.
- The general low creditworthiness of the apartment owners and the legal arrangements of condominium associations preclude private borrowing.

Several interview informants reported that the city of Tbilisi is offering financial incentives to condominium associations to replace the aging and inefficient elevators with new units, paying 70% of the cost. The city also offers incentives to install efficient lighting in common areas. While these do not address thermal energy losses, these are two areas that will improve the energy efficiency of common areas and reduce the costs of energy that the apartment dwellers pay for common areas.

Conclusions

The sample of condominiums was strategically selected to be representative of the most common buildings found throughout Tbilisi and the country. The Audit information can be applied to any of these buildings. While no pilot project was completed at the residential condominiums, the Energy Audits produced valuable information, not just about the energy use of the building but about how to approach a project of this dimension and type. The feasibility studies produced new information about how to build systems that will meet the building residents' needs. Should these buildings be renovated in the future, information gathered through the Energy Audit and feasibility studies already exists and can guide the interested parties. In terms of capacity building, all those involved with the Audits and Feasibility Study substantially increased their knowledge base and reported that they are applying the new information to other projects.

Recommendations

Renovating condominiums will be a very large undertaking and expensive for any agency, organization, or individual to undertake. Individual apartment owners may upgrade their apartment as personal funds are available. There was interest expressed by interview informants about the city's financial incentives for elevators and common area lighting. We recommend that USAID consider working with the city government to coordinate efforts to (1) educate condominium associations about the benefits of upgrading the energy efficiency of common areas and individual apartments; (2) repackage information gathered in the Energy Audits and Feasibility Studies and disseminate the information to educate apartment dwellers about the things they can do to save energy; (3) encourage condominium associations to take advantage of the elevator and common area lighting incentives offered by the city; and (4) stay in contact with the city decision makers to encourage funding a pilot demonstration project as originally planned.

EVALUATION QUESTION 2

EVALUATION PURPOSE AND EVALUATION QUESTIONS

Evaluation questions to address NATELI's efforts contributing to information dissemination through the Energy Bus activities:

a) What were the effects of Energy Bus operations on target communities?
b) How effective and efficient was this public-private partnership in attaining the planned results?
c) Did the project affect men and women in target communities differently?
d) How is the project perceived by its beneficiaries?

PROJECT BACKGROUND

The Energy Efficiency Program for Georgian Communities—the Energy Bus Project

The Energy Bus, an "energy information center and exhibition on wheels," was a public-private partnership with NATELI and BP Exploration (Caspian Sea) Limited.[8] There were few partnerships of this kind in Georgia, especially with large donors. During NATELI-1, BP funded 70% of the Energy Bus expenditures and NATELI funded 30%. BP owned the bus, supplied the driver, and paid for fuel, funded outside of the project.[9]

BP's contract with partner donors included Azerbaijan International Operating Company (AIOC), the Baku-Tbilisi-Ceyhan Pipeline Company (BTC Co), and the South Caucasus Pipeline Company (SCPC) were signed on April 8, 2010. Partner donors appointed BP Exploration (Caspian Sea) Limited to act as an agent for each of the Partner Donors for the contract with Energy Efficiency Centre (EEC) Georgia.

The three-year project in Georgia focused primarily on rural communities, and included activities and information geared for adults and youth. Its initial goal was to raise awareness of effective usage of energy in the Georgian population, as well as to improve utilization of locally available renewable energy sources to decrease energy poverty and improve indoor environments. The information center provided tools for communicating the best practices in energy efficiency and alternative energy technologies through on-board multi-media interactive displays as well as models of renewable energy and energy efficiency technologies.[10]

[8] Energy Efficiency Center Georgia, The Energy Efficiency Program for Georgian Communities –Energy Bus Project Phase III, annual report June 2012.

[9] Interview with Energy Efficiency Center Georgia.

[10] Energy Efficiency Center Georgia, The Energy Efficiency Program for Georgian Communities –Energy Bus Project Phase III, annual report June 2012.

BP started its activities in Azerbaijan several years ago, then redesigned and refurbished the bus for Georgia, which included the addition of demonstration technologies within the bus.

In October, 2011, the "Energy Efficiency Programme for Georgian Communities-Energy Bus" was selected by the Energy Globe jury from almost 1000 projects from 105 nations and became the National Winner of the Energy Globe Award Georgia.[11]

Energy Bus Activities

By October 2011, the Energy Bus had received almost 55,000 visitors. Of these visitors, about half were adults (28,316) and half were children (26,578).[12]

Reporting Period	Number of adult visitors by gender		Total Number of Adult Visitors	Number of Individual Consults	Number of Kids Visiting the EB		Number of kid visitors	Total number of visitors
	Male	Female			Boys	Girls		
Years 1 and 2			22,782	660			22,045	44,827
April 18, 2011 – July 31,2011	1,716	551	2,267	120	1,259	749	2,008	4,275
Aug 1, 2011 – Oct 30,2011	2,036	1,231	3,267	147	1,441	1,084	2,525	5,792
Oct 31,2011 – Jan 27,2012	1,074	670	1,744	118	882	680	1,562	3,306
Jan 30, 2012 – April 20,2012	1,514	962	2,476	121	1,283	979	2,262	4,738
GRAND TOTAL from start			32,536	1,166			30,402	62,938

**Note: The number indicates consultations provided on the Energy Bus during the visits to regions.*

The annual reports submitted by the Energy Efficiency Center Georgia detail visits by communities, including the number of informational brochures and leaflets distributed. Over one million pieces of literature were disseminated in the two-year period.

In-class training sessions were conducted in local schools across Georgia, providing basic knowledge on renewable energy and energy efficiency applications displayed on the Energy Bus for 13,154 schoolchildren and 1,213 teachers.[13] Each school visited received the package of the brochures, leaflets, posters, and a CD with short video films and computer games. Posters and CDs were distributed primarily through the schools. Detailed materials distributed included the following.[14]

Brochures: Brochure topics included renewable energy; your home's energy use/energy efficiency (containing tips for efficient usage of energy and on home weatherization); how to build a micro hydro; how to build a bio digester on a family farm; how to build a small wind farm; do-it-yourself micro biogas installation; and simple do-it yourself solar devices.

Leaflets: Leaflet topics included energy from the sun; energy from the wind; biomass energy; energy efficient lighting; home weatherization; general energy efficient leaflet; and energy efficient wood stoves.

Posters: There were five types of A2 format posters covering renewable energy (RE) and energy efficiency (EE) technologies (hydro, solar, biomass, wind, efficient lighting).

CDs: CDs contained computer games "Build Your Own House" and "Change the Bulb." They also contained six short video films covering topics pertaining to the following titles: "Change the Bulb,"

[11] Ibid. Page 26.

[12] Ibid. Data derived from report tables.

[13] Ibid. Page 13.

[14] Ibid.

"Some Household Tips to Keep You Warmer in Winter," "Solar Energy," "Biomass Energy," "Biogas Digesters," and "Hydropower."

The Energy Bus project's team sponsored a national annual competition among the journalists for the best article or TV/radio spot on energy efficiency and renewable energy technologies. Eleven TV spots and eight newspaper articles were submitted to the contest under two categories: the best TV/radio spot and the best article.[15]

Sustainable Energy Days were initiated and organized by the Energy Bus project team to draw public attention to renewable energy and energy efficiency technologies. The third annual event invited honored guests and the public, included several exhibitions and presentations of selected project ideas submitted (and presented) by school children, and hosted award ceremonies for a variety of their sponsored competitions.

EVALUATION METHODS AND LIMITATIONS

The evaluation team conducted both desk studies of the Energy Bus reports and materials as well as structured interviews with program partners, target groups and beneficiaries to assess the effects of Energy Bus operations on target communities. Face-to-face interviews were conducted with Winrock, Energy Efficiency Center Georgia (EEC) and BP staff. Due to time and travel limitations, the team chose to visit two communities. These two were selected jointly by the evaluation team, Winrock, and EEC. The communities were within about an hour's drive of Tbilisi and represented apparently different economic situations. EEC arranged the visit through their key contact: the community leader (mayor or administrator) of the community. The key contact arranged the meetings at the school with teachers already on site, preparing for the new school year. The evaluation team met teachers and administrators, conducting small focus groups at each of the schools in Samtavisi and Khidistavi.

The EEC tracks consultations provided to visitors of the Bus. Reports list over 1,100 citizens who consulted with EEC staff after visiting the Energy Bus. The lists provide citizens' names, phone numbers, regions, and topics of interest. A random sample of 10 were selected and contacted by telephone. The short interviews asked citizens about the usefulness of the information they received to determine whether it raised their awareness about the topic, and whether they followed up to utilize locally available renewable energy resources.

In addition to these interviews, EEC reports, training materials, tracking data and photos were reviewed for evidence demonstrating that the Energy Bus raised awareness and encouraged citizens to upgrade the energy efficiency of their homes or to utilize renewable resources.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The National Energy Globe 2011 award-winning Energy Bus brought a wealth of information to communities across Georgia that may not have otherwise been exposed to this information. No matter the depth of current knowledge, the 60,000 visitors to the Bus added to their knowledge base.

Teachers are incorporating lessons of energy efficiency, environmental protection and sustainability into their classroom activities. These exercises build long-term capacity investing in children and communities.

One of the original goals for the Bus was to help community members obtain information on financing for the implementation of identified cost-effective and environmentally friendly projects. Early on, project partners worked with the European Bank for Reconstruction and Development (EBRD) to develop a financial vehicle to assist community members. However, there were issues operationalizing the EBRD component (explained in greater detail in next sections of this document.) This left

[15] Ibid.

communities with a lack of access to financing envisioned by the program. However, this did not detract from the success of the Energy Bus in disseminating information, raising awareness about energy efficiency and environmental protection, and increasing general public awareness.

Findings

a) Public-Private Partnership

The Energy Bus was a public-private partnership with NATELI and BP, along with other donors working with BP. EEC and BP reported that there were few partnerships of this kind in Georgia, especially with large donors. EEC stated that during NATELI-1, BP funded 70% of the Energy Bus expenditures and Winrock funded 30%. Winrock also noted they printed and provided the brochures and leaflets distributed.

BP requested proposals to select a firm to administer the Energy Bus project. EEC submitted their proposal to BP and stated that three years ago they had a vision for the Energy Bus. The Energy Bus activities are administered by EEC. Operationally, EEC reported to both funders, Winrock and BP. EEC coordinated with both BP and NATELI on all decisions for activities and schedules. Daily decisions were made by EEC. Changes in activities and travel itineraries were largely related to weather or political activity. Road conditions could severely restrict travel in remote areas. EEC added Sustainable Energy week to activities they organize and sponsored.

BP stated they contracted with EEC, after the close of NATELI-1, to implement pilot projects around the region. Built upon interest expressed by community members visited by the Energy Bus, BP and EEC are reviewing proposals to select key projects where the community members are involved and dedicated to the proposed project's success. During our interview, BP expressed their interest in receiving continued funding from USAID and their desire to work with Winrock to implement the pilot projects. BP feels these efforts continue to support their corporate responsibility to educate people about energy efficiency and renewable energy. BP also stated another round of Energy Bus tours would likely be less effective than implementing pilot projects to showcase working technologies.

b) Goals and Key Performance Indicators

In 2009, the Bus commenced two full rounds of visits to Georgian communities. There were no specific key performance indicators or targets for numbers of visitors or activities. Winrock and EEC share the view that the goals were to introduce information; to increase awareness about energy efficiency, alternative technologies, and environmental protection; and to change attitudes. BP also stated that the goal of the Energy Bus was to fulfill their corporate responsibility to increase public awareness of energy efficiency issues. BP stated, "Now it is up to the people to do something and to put into practice the things they learned."

The members of the two communities with whom the evaluation team met also stated that they were very happy with the information they received and the involvement of the school children in various activities and contests. Teachers reported that since the Ministry of Education directs their course content, there is no specific course on energy. However, teachers reported that they incorporate the information received from the Energy Bus into their lesson plans, using the brochures and leaflets obtained from the Bus tour in their lessons. Teachers reported that their students have gone on to develop their own projects, demonstrations, videos and lessons. We were also told that learning about the environment and the actions each individual can take to save the environment was very important information. For one school, it was the most important information gained from the Energy Bus project. Broadly speaking, stakeholders feel the goals of the Energy Bus were met.

The random sample of 10 citizens contacted by phone all remember visiting the Energy Bus and requested additional information on a variety of topics, including energy efficiency and several alternative energy sources. All found the information very useful and interesting, and several stated they had no

information before visiting the Bus. It allowed them to determine whether they could install the energy efficiency systems in which they were interested. Nine of the ten citizens interviewed stated that the cost of the system was outside of their financial capabilities. One citizen reported that, with information from the Energy Bus consultants, he became very interested in solar systems, negotiating the installation of 56 solar panels where he works. He also installed CFLs and is interested in a solar water heating system for his home.[16]

c) Energy Bus Activities

The EEC team had two team mobilizers who traveled one week ahead of the Bus to establish the route, road conditions, parking and to meet with local administrators and organizers at each community. The mobilizers advertised the Bus, hung flyers or talked with local media, and met with the local school administrators. They attracted and invited local NGOs. All activities were recorded.

Stakeholders interviewed for this evaluation agreed that most everyone in the community was interested in the Bus and the activities. EEC reports that on average, about 60 people per day visited the bus. Community members interviewed stated that virtually everyone visited the Bus. Stakeholders reported that people were interested in new information, especially in the remote areas of the country, and have a natural motivation to investigate other heating options. Since many burn wood, and wood is expensive, they are interested in other options. In addition, electric transmission and household wiring is in poor shape and electricity can be poor quality. Because of this, people are interested in other means to generate electricity, such as the small solar electric photovoltaic (PV) and wind generators.

Many brochures covering various topics were distributed as noted in the preceding section. Information sheets were provided that listed products and suppliers. However, few can afford the ready-made technologies. Community members and EEC informants stated that more people were interested in the do-it-yourself approach. They were more likely to take this approach to control costs and have a personal investment in the success. The actual number of Energy Bus visitors who installed energy efficiency or renewable energy systems is not known. However, some citizens inform EEC about their projects. A number of these are reported in the two annual reports under "Success Stories."[17]

On the Bus, a TV screen showed different films, tailored to the age of the attendees. Some films were technical and described the steps to build Energy Efficiency (EE) products, and some communities and individuals followed up with EEC for more technical information. Training was offered for alternative and renewable technologies in addition to general energy efficiency tips for daily life. EEC is still fielding phone calls for technical assistance.

Compact Fluorescent Lamps (CFL) were promoted but not handed out. All stakeholders reported a large range in quality of the bulbs available on the market. They noted that people get discouraged when the bulbs fail early. As was aptly stated by EEC, "Without the right technology at the right location, it breaks the attractiveness." Therefore, the Bus provided visitors with information about CFL quality, related performance and how to identify CFLs of higher quality and reliability.

EEC reported that school children were given a CD with an instructional game teaching them how to build an energy efficient house. When school teachers in the two communities were asked if they received the CDs, they did not recall receiving it and stated that the schools do not use it in the classroom. Of note: one community had a better-equipped school with a computer lab classroom; the second school was not equipped with computers.

[16] Interview with Zura Khuskivadze, Baghdadi district, Pirveli Opcha Village. Respondent selected in random sample of citizens receiving private consultations from EEC. See Annex C.

[17] Annual Narrative Reports, *Some Success Stories*. April 2010 and June 2012.

In addition to competitions for school children, including drawing posters and writing essays, EEC sponsored an annual technology exhibition where children developed prototype systems. The exhibition was held at the Trade Center, and key business people as well as the general public were invited. These were well attended.

Other activities sponsored by the Energy Bus included media events and contests. Prior to visiting each district, the EEC team mobilizers informed the local media and NGOs about the coming Bus and activities. TV spots, interviews, and newspaper articles generated interest in the Bus and the information disseminated. These activities fostered goodwill by including the local organizers in the announcements of the Energy Bus.

d) Gender

When asked if the Energy Bus activities affected men and women differently, community members and stakeholders interviewed stated that there was no gender bias. Nearly all community members visited the Bus and anyone could ask for additional technical consultations. Informants noted that the majority of teachers are women, who all brought energy efficiency lessons, based on materials provided by the Energy Bus project, to their classrooms.

EEC noted that gender was only a factor in the sub-region in the eastern part of Georgia where ethnic and cultural characteristics played a part. These were mostly ethnic groups in southern or south eastern Georgia. There, women were not, by culture, encouraged to visit the Energy Bus. However, the men in the community did visit the Bus and were interested in the information offered.

e) Energy Efficiency Financing

Early in the project, EEC planned a large role for EBRD to construct an energy efficiency credit line, offered through local banks. BP supplemented funding with one million USD, intended to provide a 15% rebate on the loan amount to customers. The rebate could only be provided once measures were installed, and with documentation that the product was acceptable (met energy efficiency standards). Stakeholders (EEC, BP, and Winrock) stated that it took six months for EBRD and the local banks to finalize their contract. By then, the Energy Bus activities had to proceed. Once the credit line was available, EBRD did not advertise the credit line for energy efficiency loans. Stakeholders also reported that, when offered, the EBRD process was too bureaucratic and took too long for customers to complete the process. EBRD requested evidence of the product energy efficiency. One stakeholder remarked that it sometimes took three times longer than a regular loan would take to compile the required documentation. EBRD did not offer a better interest rate. The high interest rate could possibly be offset by the BP 15% refund.

EEC, BP, and Winrock stated the EBRD financing component did not work well. It took too long to establish the contract with banks; EBRD did not market the product; loan applications and documentation was onerous; and interest rates and terms were not better than standard loans.

Communities and villagers expressed interest in implementing energy efficiency projects and renewable energy projects. People were interested in loans but could not get them. Citizens interviewed stated that they were interested in a number of different technologies. Several stated that they were willing but not able to install the renewable energy systems because of insufficient financial resources. One stated: "Because the installation of energy efficiency systems is expensive, I could not afford to install them despite the big desire." However, some did install CFLs and insulate their attics. Barriers to utilizing local renewable energy systems include:

1) Expense—first cost can be prohibitive for both household and community systems.
2) Some have not looked into financing once they see the first cost.

3) Others sought information about financing, however, loan terms were not attractive or appropriate for many of these people.
4) People are more likely to construct systems than buy readymade (cost barrier).

f) Barriers to Establishing Energy Efficiency

Stakeholders reported energy efficiency practices are being incorporated into everyday life. For example, CFLs are available and affordable. Energy tips, such as switching off lights, are observed. Others reported villagers insulating attics with plastic bottles.

The two schools visited appeared to be of different economic circumstances. One school was clearly in better shape and better equipped than the other. This school received a prior grant from Energy Saving International (ENSI) and installed a PV and wind system to charge batteries used to power the system distributing heat (a wood-fired system). Informants at this school reported that their building was not only warm when others were cold, but that their school was the only one operating when the power went out at other schools. They were able to continue operations because they generated electricity with the PV and wind systems, and used the battery storage bank. The school teachers and administrators were able to build on their prior knowledge with materials provided by the Energy Bus. This school used the brochures provided by the Bus to assist in the classroom. They also reported one student who used the Bus information to develop a project teaching the kindergarten class about solar energy.

Community members appear to be building on their existing knowledge base. Both communities expressed gratitude for the information and both are incorporating the information into their classrooms. Both groups of informants stated that someone in their community had looked into installing a renewable system, but both were hampered by finances. However, they knew of people who installed a bio digester and one PV system.

The largest challenge to establishing energy efficiency and renewable energy technologies is access to financing. People and community leaders need to know how to finance projects. There is virtually no local credit because people have little credit history and it is hard for the lender to evaluate the credit risk. Loans are not attractive or available. For the lender and borrower, there is no subsidy for energy efficiency, payback is too long, and lenders require a short payback.

g) Sustainable Activities and Capacity Building

Long-term effects of the Bus activities are hard to evaluate at this stage since it is still relatively early. However, people remember and recognize the Energy Bus. There is evidence that awareness of energy issues has increased. Energy efficiency is discussed more frequently now, in schools and in the local media. Students and teachers are incorporating lessons learned from the Bus into daily life and classroom experiences. Citizens remember visiting the Bus and found the information interesting and useful; are continuing to use the information; and some still plan to install the larger renewable systems when they can manage their financial situations.

Also, EEC has a website and a Facebook page for the Energy Bus. EEC reports having over 2000 "friends" on the Facebook page. EEC continues to receive questions and requests for technical support, stemming from information disseminated by the Energy Bus project. EEC provides technical support and responds to questions, providing information by phone and directing callers to appropriate internet sites or other resources as needed.

Conclusions

Overall, the materials reviewed and the interviews with stakeholders and informants indicate that the Energy Bus project was successful. In many ways it exceeded the expectations of the original planners. The Bus was well attended, well received, and provided information that has already been put to use.

Over 60,000 Energy Bus visitors took away practical information for daily use and information that could help them plan future projects. Sustainable Energy Day marked its third annual event, with much publicity and positive reception. School teachers are very proud of their students who participated in the poster and essay contests and boast of their students who won contests or went on to develop in-class projects.

The public-private partnership worked well. All stakeholders cooperated and coordinated the activity-intensive project. With the numbers of communities visited and the materials developed, printed and distributed, this was no small feat.

One indicator of a partnership that has worked well is BP's continuing efforts to fund pilot projects around the region (post NATELI-1 and unrelated to NATELI-2) and to contract with EEC to implement the pilots. BP is interested in working with USAID and Winrock in these ventures. Likewise, when we asked Winrock if they would be interested in such collaboration, they had no hesitations. Had the initial Energy Bus partnership been unsuccessful, this public-private partnership would not have continued in this manner.

None of the stakeholders reported gender bias, and we found no substantial gender bias in other materials reviewed. While there are small ethnic communities where cultural norms exclude women from directly visiting the Energy Bus, this was not widespread. Men and women visited the Bus in nearly equal proportions. The majority of school teachers are women; neither of the two groups interviewed provided any indication that the Energy Bus project affected men and women differently.

The project was successful in all regards but the EBRD financing. The issues with lack of access to financing did not detract from the success of the Energy Bus in disseminating information, raising awareness about energy efficiency and environmental protection, and increasing general public awareness.

Finally, given the prior findings and conclusions, USAID's investment in the Energy Bus project was money well spent. Capacity building and awareness increased through this project. Over time, Georgia should see returns from this investment.

Recommendations

The lack of access to financing is the only area that stands out as one that did not meet expectations. ERBD (or another vehicle) may work if the overall project cost was lower, a loan had attractive terms, and the paperwork and documentation process was streamlined. However, providing access to financing is a larger issue that USAID may not be able to resolve easily. Financing energy efficiency interventions is discussed more fully in the section below addressing Evaluation Question 4.

The Bus has now moved on to Azerbaijan, and this does not diminish any activities in NATELI-1. Funding another round of Energy Bus tours should wait for some time to pass. USAID could build on the energy efficiency component of NATELI-1 by including some energy efficiency pilot projects in NATELI-2 focused primarily on renewables. Working examples of efficiency projects, where communities are invested in their success, could provide tangible case studies for replication. Lastly, BP's request to partner with Winrock and USAID to implement pilot projects in addition to those funded through NATELI-2 may be worthwhile to explore.

EVALUATION QUESTION 3

EVALUATION PURPOSE

The following evaluation questions were posed to address NATELI's efforts to assist GTU in providing energy auditing instruction and in increasing capacity to conduct energy audits:

a) How effective was the curriculum on energy efficiency and energy auditing, as well as the energy auditor's certification programs within GTU?
b) How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?

PROJECT BACKGROUND

Georgian Technical University's Energy Engineering and Telecommunications Program had a Master's program in Energy Management that predated the involvement of NATELI. NATELI funded the writing, by Dr. Karine Melikidze, of the Energy Auditing Manual. Dr. Melikidze is a member of the Civil Engineering Faculty at GTU. NATELI presented this manual at a seminar for the Energy Management faculty where it was suggested that an energy auditing program be established at the school. Of note, Tbilisi's signing of the Covenant of Mayors, and subsequently SEAP's, will likely lead to the need to enlarge the local capacity to conduct Energy Audits and Energy Passports.

Dean Gia Arabidze and other faculty initiated the development of the Energy Audit and Energy Efficiency Program which was incorporated into the Masters of Energy Management degree. This ten-credit program is taught over one semester (15 weeks). It is taught as one course which has broadened the curriculum of the Energy Management Master's degree. The syllabus is based on the table of contents of the Energy Auditing Manual. GTU reported there are 17 lectures that coincide with the Manual's content. The Master's degree is 60 credits over two years. The Dean indicated that the course would be open to students who are not enrolled in the Master's program but who wish to be qualified in energy efficiency and auditing. At this time, only students in the Master's program have completed the ten-credit course. Details of the ten-credit Energy Efficiency and Audit Program as well as the full 60-credit Master's program can be found in in Annex E.

The first class of 33 Students completed this program and graduated last year. Students had not returned for the new semester, so interviews could not be scheduled. The individual graduates are listed along with what is known of their current work activity in Annex F.

EVALUATION METHODS AND LIMITATIONS

The evaluation team conducted structured interviews with program partners and beneficiaries to assess NATELI's efforts to facilitate GTU's efforts to provide the energy auditor training course and certification. Face-to-face interviews were conducted with Winrock staff and GTU staff. The team reviewed course materials and visited the GTU campus, including the Energy Lab. GTU provided details about the course syllabus, and provided information about students who completed the first year's Energy Management program.

The evaluation team planned to conduct a focus group with students in the Energy Auditing course. However, classes were not in session and students were not available for interview. Some knowledge of their background prior to beginning the Master's Degree as well as their perspectives on the course and an indication of their career objectives would have been useful information.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Findings

a) Energy Auditor Certification

This research question asks how effective the program was in creating an energy auditor's certification program. Key informants emphasized that the early contributions from NATELI provided the seed money to initiate the Energy Efficiency and Auditing Program and were critical for its success. NATELI funded the writing of the Energy Audit Manual which was very well written, in English, by a Georgian professor. GTU faculty developed the ten-credit energy efficiency and auditing course that became part of the Masters of Energy Management degree at GTU. In the first year (ending 2012), 33 students completed this program. The end product is much greater than the initial NATELI contribution.

Georgia's law on Higher Education addresses certification and accreditation issues. In addition, there are regulations on accreditation of educational programs. These regulations are used to accredit programs where official certificates or diplomas will be issued that are formally accepted by the Government of Georgia. The GTU Energy Audit Certification course, as a stand-alone course, currently lacks the same legal status as a diploma. For the certificate of accomplishment of this course to have about the same legal status as a diploma issued by the higher educational institutions, the current law would need to be amended. That would secure a wider official recognition of GTU's Energy Audit course certificates. NATELI was not engaged in efforts to refine the legislation on certification or accreditation.

NATELI's intention was to support establishment of a national curriculum that would be properly accredited by the authorized body, the Accreditation Center (a part of the Ministry of Education system). Efforts to gain official state recognition of the certificates issued by the GTU failed, facing two primary barriers. First, there were lengthy procedures to go through the official accreditation of this educational program. Second, during that time, GTU lacked the legal status that would enable it to apply for such an accreditation. In addition, the Accreditation Center claimed that, since GTU's diploma had an overall official recognition, there was no need to apply for the accreditation of this particular Energy Auditing course. In 2009 and 2010 when NATELI began looking into accreditation, it took nearly 20 months to receive accreditation from the Ministry of Education. Interview respondents noted that the current process (in 2012) is much faster and easier.

b) The Energy Lab

Although NATELI did not have any direct involvement in the course development, a parallel activity was the creation of the Energy Lab. Creating the Energy Lab was completed in conjunction with the building efficiency renovations. It was emphasized that the early contributions from NATELI provided the seed money to initiate the Energy Efficiency and Auditing Program and were critical for its success. The energy efficiency remediation work that followed the energy audit resulted in a facility that has adequate heating and lights and is a presentable space to teach the program. Incorporating the energy efficiency aspects of the building, including its wind power and solar energy features, into a working teaching lab provides the students with an innovative tool to learn the practical application of their course work.

The Energy Engineering and Telecommunications faculty were very creative in leveraging the NATELI funding. After the work on the building and lab was initiated, it was much easier to attract additional funding. Equipment manufacturers donated test equipment and other laboratory supplies; the two local manufacturers of energy efficient windows contributed the windows for the building and other outside funding was provided. University funding for construction and maintenance was also used to complete the work.

The Energy Lab has been visited by energy economics students from ISET as well as other groups. Interview informants mentioned that its equipment might be used to run tests for outside parties for a fee.

Conclusions

Georgia has developed a core group of people with the ability to conduct energy audits and energy passports as demonstrated by the work done by NATELI. GTU demonstrated expertise and capabilities by designing and implementing the Energy Efficiency and Auditing Program and funding the Energy Lab. The first year's students completed coursework and the second program year is soon to start. The course work is an integral part of the Masters of Energy Management degree and should be a sustainable program. All indications are that the energy auditing course is a permanent part of that program. NATELI was crucial to getting this program started. With NATELI funding, the faculty had the capacity to go forward on their own, continue building the program, and attract additional outside funding to enhance the Lab and course offering.

Recommendations
GTU staff should continue working toward offering the energy efficiency and auditing course to students who only want to complete the 10 credits to become qualified as energy auditors. GTU should consider working toward gaining accreditation for their energy audit certification course. In the meantime, GTU offers a certificate of course completion that signifies that the recipient understands the requisite responsibilities and skills of an energy auditor.

EVALUATION QUESTION 4

EVALUATION PURPOSE

Evaluation questions to address NATELI's efforts in facilitating greater access to financing of EE interventions:

a) How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects?
b) What are the perceptions of banks and bank seminar participants with regard to the EE workshops designed and delivered in the course of the project?
c) What were the external factors affecting NATELI's success in this area?

PROJECT BACKGROUND

Facilitating the Financial Support for Energy Efficient Interventions
The NATELI-I program implemented several initiatives to facilitate access to financing and funding energy efficiency investments for hospital and condominium associations, with a principal focus on loan financing, and in some cases seeking other funding sources. A number of discussions with banks and financial institutions were completed to review the possibilities of financing energy efficient projects, few of which led to the installation of EE interventions in hospitals partially funded through NATELI grants. Through NATELI's efforts, TBC bank created a new credit line specially aimed at the hospital sector. Finally, NATELI conducted training workshops for EE project financing and hospital management on the implementation of energy efficient measures.

(a) Surveying financial institutions and identifying viable mechanisms of financing EE interventions

Throughout 2010, NATELI-I implemented periodic surveys of Georgian banks to identify (1) financial institutions interested in providing loans to creditworthy owners of hospitals for energy efficiency projects and (2) the interest rates of those willing to finance the EE projects. Nineteen commercial banks and financial institutions were interviewed and 11 of them expressed interest in the NATELI project and in financing EE projects in general.

In response to commercial banks' lack of interest in financing condominium associations for energy efficiency interventions, the NATELI team investigated alternative mechanisms for financing and came up with an idea that the most feasible way to implement energy efficiency at condominiums would be through Energy Service Companies (ESCOs). The NATELI team decided to work together with the only existing energy service company in Georgia, ESCO Georgia, to develop comprehensive methodology for financing EE interventions. The methodology allows effective implementation of energy efficiency at condominiums through replacing conventional light bulbs in apartments with compact fluorescent lamps (CFL).

(b) Bankers Training Workshops in Energy Efficiency Project Financing

The two rounds of workshops referred to as the Bankers' Training in Energy Efficiency Project Financing were held in Tbilisi on May 7, 2010, and November 5, 2010. The goal of the one-day training workshops was to provide representatives of commercial banks, namely credit officers, real estate appraisers and other interested parties with an understanding of the core principles of energy efficiency and with the knowledge, skills and methodology needed for evaluation of energy efficiency projects' technical feasibility and financial viability. The one-day training workshops were attended by 49 participants from all major Georgian banks as well as other interested organizations.

The Bankers' Training in Energy Efficiency Project Financing provided information necessary for participants to understand the core principles of energy efficiency and their impact on various organizations' financial health. The training also provided the participants with: an understanding of current available energy efficient technologies and the process of energy efficient technologies' implementation and respective benefits; the skills to assess risk and evaluate financial viability of energy efficiency projects; and the tools to assess a real market price of a property with and without energy efficient technologies.

A team of trainers composed of representatives of the NATELI-I program, GTU and SDAP designed and delivered the workshop to cover all major topics related to the financing of EE interventions through bank loans, including:

- Introduction to Energy Efficiency: the core principles of energy efficiency, available sources of energy efficiency as well as current energy efficient technologies.
- Energy Efficiency-Political and Technological Aspects: the current status and importance of energy efficiency worldwide and in Georgia.
- How to Assess Risk and Determine Financial Feasibility of Energy Efficiency Projects: evaluating energy efficiency projects' technical feasibility and financial viability as well as reviewing and analyzing results of energy audits conducted by NATELI in various organizations.

The second round of the training workshop was more focused on providing practical examples to participants and covered issues of household energy efficiency and energy efficient rehabilitation of new and existing residential buildings, introducing the programmatic Certified Emission Reductions (CER) "carbon credits" for co-financing projects.

(c) NATELI's efforts to facilitate financing of EE projects by banks and financial institutions

As noted above, the majority of Georgian banks have no significant interest in providing loans to energy efficiency projects. Those that did indicate an interest have provided little actual assistance. During the first two years of NATELI's implementation, Winrock sought to provide help to hospitals that planned to rehabilitate and equip existing buildings with EE technologies. Conducting the Energy Audits and Passports were the first steps: identifying building components that would result in energy savings as well as identifying the costs, benefits, and payback periods were all important steps providing direction in prioritizing approaches to build a more energy efficient building. NATELI supported hospitals when they requested that Georgian banks provide financing for their respective energy efficiency projects, co-financed the projects through grants, completed energy audits of hospital buildings and developed energy passports.

In particular, NATELI's achievements in terms of encouraging the financing of EE interventions could be summarized as follows:

- Through NATELI's analysis and solicitation, EE loans were provided to the Georgian Center of Angeology and Cardiovascular Surgery (BTA Bank) and the Oncology Center (Bank of Georgia).

- NATELI reviewed the financial data and completed a profitability analysis for energy passports developed by NATELI subcontractor SDAP for IRAO-owned Marneuli, Gardabani and Chiatura hospitals.
- Energy audits were developed for new hospitals located in Dusheti districts Kazbegi, Sagarejo and Bakuriani districts (owned by ICGroup).
- Energy passports and cost-benefit analyses were developed for IC Group-owned hospitals in Dmanisi, Bolnisi and Khashuri.
- Energy passports were developed for IC Group-owned hospitals in Tianeti and Borjomi and IRAO-owned hospitals in Zestafoni and Tetritskaro.
- NATELI assisted hospital DIAREZI based in Rustavi in applying for the TBC EnergoCredit loan to finance rehabilitation of the hospital by using the EE technologies.
- EE interventions were supported in hospitals through grants awarded to:
    - The Cell Technology and Therapy Center;
    - The International Insurance Company IRAO (for installing the EE lighting system in Marneuli hospital);
    - The Jo Ann Medical Center (for installing EE lighting bulbs at the hospital premises);
    - Marneuli hospital (for installing EE lighting bulbs); and
    - Tianeti hospital (for installing EE lighting bulbs).
    - A total of $54,345.56 US was allocated for the EE projects supported in local hospitals.
- Discussions were facilitated between banks and USAID partners to find cooperation possibilities with USAID's Guarantee Fund.
- An Energy Efficiency Workshop was organized for management of Georgian hospitals and clinics.

EVALUATION METHODS AND LIMITATIONS

The evaluation team conducted both desk studies and structured interviews with program partners, target groups and beneficiaries to assess the efficiency of NATELI's efforts to facilitate greater access to financing for supporting the energy efficiency projects. Face-to-face interviews were conducted with Winrock staff in charge of organizing or delivering energy efficiency workshops for banks and hospitals, administrating grants programs or assisting the stakeholders to access the financing through bank loans. Due to time limitations, only telephone interviews were held with participants of Bankers' and Green Hospital seminars. A total of 11 telephone interviews were conducted. Three participants from both workshops—the Bankers' Training and the Green Hospital seminar—were interviewed. The evaluator telephoned every fourth participant whose contacts were given in the respective attendee list. In addition, three mid-level managers of local banks and two representatives of local insurance companies were approached at the data collection phase.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

While Winrock designed and implemented a number of initiatives to encourage the financing of EE projects by banks or financial institutions as well as raise the interest among potential clients in energy efficiency loans, there were several major factors beyond the direct control of NATELI affecting the overall efficiency of NATELI's interventions. These limitations are legal, financial and/or social in nature, and have to be taken into consideration while designing further actions with regard to facilitating a greater access to finances or loans for supporting the EE interventions.

Findings

a) Facilitating financing by banks and providing contributions to EE projects

Prior to the NATELI project there was little to no interest among the Georgian banks in financing energy efficiency projects or giving special consideration to energy efficiency in the loan process. As the

periodic banking survey results demonstrate, the number of banks or financial institutions interested in allocating the funds for EE projects did not increase throughout the project implementation. Most of the banks not interested in the EE loans, however, are either affiliates or branches of large European banks or micro-finance organizations providing small-size loans. The banks were more interested in financing hospitals rather than condominium associations. While the number of banks willing to provide EE loans did not change, a small decrease in offered interest rates was observed during the later surveys, but no evidence has been collected by the evaluation team to attribute the decrease to NATELI's efforts.

The banks had practically no interest in directly financing condominium associations for energy efficiency interventions. Lack of creditworthiness and the inflexible legal structure of condominium associations (CA) were quoted as the main reasons for banks' unwillingness to finance. Due to external factors, NATELI was not very successful in assisting the condominium associations in accessing financing for EE projects. With due regard to the limitations, NATELI worked with ESCO Georgia to develop a comprehensive methodology for financing EE interventions at condominium level. The methodology allows effective implementation of energy efficiency at condominiums through replacing conventional light bulbs in apartments with compact fluorescent lamps.

No preferential loan packages are available at the local market to support installation of EE equipment or technologies except for the TBC Bank/Bank of Georgia Energy Credit loans available through the EBRD/GEEP (European Bank for Reconstruction and Development/Georgia Energy Efficiency Project) energy efficiency project. To support the project, BP allocated over $1 million US to the overall loan pool. Although NATELI was interested in cooperating with the GEEP program, due to the time limitations the cooperation was rendered impossible. NATELI's involvement in the EBRD/GEEP project was minimal—NATELI funded advertising of the Energy Credit project for a short period of time (March 2 – March 23, 2011) at two national TV channels (Imedi and Rustavi 2) and three radio stations (Fortuna, Fortuna+ and Ar Daidardo). No marketing campaign was ever undertaken for this product by the local banks or EBRD. BP plans to withdraw their funding (a 15% loan refund) due to the lack of clients' interest in accessing the loans from Energy Credit program, depriving the program of the only advantage it had over other loan products.

In the course of program implementation, NATELI undertook efforts to solicit loans for projects installing energy efficiency equipment or technologies in hospitals. The hospital sector in Georgia underwent a profound reform. The Government of Georgia's strategy to engage insurance companies in rehabilitation and operationalization of hospitals throughout the country apparently had its impact on NATELI's intervention to this end. Due to this decision the program strategy has changed. Thus, apart from financial institutions and private hospitals, NATELI collaborated with insurance companies—IRAO and ICG group—to conduct energy audits and develop energy passports for new or existing hospitals throughout Georgia. While the representative of IRAO insurance company approached by the evaluation team highly values the energy passport developed through NATELI's assistance, some of the recommendations given in the passport could not be executed due to time limitations imposed on the construction of the hospital in Marneuli. No assistance has been sought by IRAO or ICG Group in obtaining finances from NATELI for the renovation of their hospitals. Insurance companies claim to have sufficient funds for the rehabilitation works.

Only private hospitals or clinics have sought NATELI's assistance in obtaining EE loans from banks. While energy audits and passports are essential for the development and support of loan projects, there have not been many occasions where hospitals have requested NATELI's solicitation or assistance in applying for loans. Through NATELI's solicitation, EE loans were provided to the Georgian Center of Angeology and Cardiovascular Surgery and the Oncology Center from the BTA Bank and the Bank of Georgia respectively. NATELI assisted the Oncology Center throughout negotiations with seven banks and the entire loan process. NATELI also consulted other interested hospitals or organizations, including Rustavi-based Diarezi Hospital, in clarifying the terms of energy efficiency loans offered by the

TBC and BoG through EBRD/GEEP. No information is available to indicate whether Diarezi actually applied for the EE loan from either bank.

Apart from soliciting the financing of EE projects, conducting energy audits and developing energy passports, NATELI reviews financing of the EE projects through its grants program as an intervention facilitating greater access to financing. This may be true provided that the financing of EE projects through NATELI's grants are a pre-requisite for obtaining loans from banks or financial institutions. A total of $53,345.56 US was allocated through NATELI's grant program to fund EE energy efficiency measures in five hospitals that also invested their own finances for additional measures. However, NATELI's grant ($19,945.56 USD) for the Cell Technology and Therapy Center was the only instance where the broader project was co-financed (supported by a Bank of Georgia loan) with NATELI's direct assistance.

In efforts to facilitate greater access to financing of EE interventions, NATELI provided a two-day Green Hospital and Energy Management seminar to representatives of the healthcare sector of Georgia to enhance their understanding of energy efficiency and renewable energy technologies in building and managing hospitals and investment opportunities thereto. All of the participants interviewed by the evaluation team found the seminar very useful and interesting. Informants note the importance of conducting the energy audits or developing energy passports for optimizing the costs of the hospitals. However, informants also reported that it is either not within their duties to decide upon conducting the audits or that the hospital lacks finances to implement respective interventions. As noted by the informants, further training workshops on this subject are highly desired.

b) Bankers' Trainings

The main rationale of the two rounds of training workshops was to enhance understanding of core principles of energy efficiency, energy efficient technologies and carbon credit management as well as to provide the knowledge, skills and methodology needed for evaluating energy efficient projects. While Winrock invited the interested banks to participate in the training workshops, the actual participants were selected by the banks. The participants mostly included credit officers from various branches or affiliates of the participant banks.

The participants approached by the evaluation team positively assessed the EE training workshop. The information communicated to the participants was useful and interesting. Furthermore, the seminar participants emphasized the importance of financing the EE projects, and acknowledged the effectiveness of the EE loan programs despite the high investment costs, since the payback period is short.

The evaluation team could not gather evidence of training participants applying the knowledge in their business practices, although one of the participants noted that he used the knowledge in rehabilitating his own apartment. None of the trainees approached by the evaluation team have used the methods for evaluation of energy efficient projects mainly because such an assessment is not within their scope of work.

Again, the participants had no further interaction with the NATELI project after the completion of the training workshops. According to NATELI's reports, only BTA Bank's Credit Department contacted NATELI to discuss the loan application of the Georgian Center of Angeology and Cardiovascular Surgery.

The bank representatives approached by the evaluation team were not specifically engaged in the energy loan projects; therefore, their understandings of the respective banks' business practices in the area of providing energy loans were quite limited. They had some understanding that their banks provide loans to individuals or organizations for energy efficiency interventions, but were not able to specify the number of such loans provided or define the projects supported by the banks. A TBC bank representative noted that his bank had the EnergyCredit project before NATELI's intervention. Again,

training participants from the TBC/Bank of Georgia note that their banks have preferential terms for loans on EE projects and refer to the EBRD/GEEP project, whereas—according to the representatives of ProCredit Bank, KorStandard Bank and Basis Bank—no preferential terms are provided to EE project loans. No countrywide statistics are available regarding the number or value of energy efficiency loans disbursed by commercial banks, although respective data was sought from both the NATELI program and commercial banks. The financial institutions refer to the confidentiality of commercial information in denying access to the data regarding the volume of EE loans allocated to individuals or organizations.

Since the informants were not engaged in the EE loans, most of them could not specify the issues that prevent the banks from providing loans. Borrowers' low income is one of the main reasons for the banks' rejection of the loan applications.

It is noteworthy that, based on their marketing research, ProCredit Bank recently decided to launch an EE loan line. However, according to the respondent from this bank, this decision by the management is not to be attributed to NATELI's efforts. For the time being, ProCredit Bank's staff are being trained and the loan package is being finalized.

c) External factors affecting NATELI's success in the area of facilitating access to financing

There are few financial and commercial initiatives related to developing or financing the energy efficiency initiatives in the country. No national policy is in place that would set the general framework of all EE interventions implemented by private or public sectors and stimulate installation of energy efficient or renewable energy technologies. The government's earlier efforts to formulate national policy in the area of energy efficiency and renewable energy stopped in 2008 for unknown reasons, and the work has never resumed.

Other important external factors influencing the NATELI's interventions in the area of facilitating financial support to EE interventions include:

- **The legal status of condominium associations.** The condominium associations are not registered legal persons in public law; therefore, their legal status as unregistered unions prevents them from implementing normal corporate actions, and to a significant extent, negatively affects the willingness of the banks or financial institutions to provide loans for financing EE interventions;
- **High interest rates on loans and short maturity of loan terms.** Georgian banks have higher interest rates on loans compared to financial institutions abroad—this is a major obstacle for condominium associations, individuals or organizations that apply for loans for installing expensive EE or renewable energy technologies. Although 11 Georgian banks are interested in supporting the EE interventions, there are no essential incentives to provide preferential loan terms on these projects.
- **High costs of EE technologies and limited financial capacities of potential clients to install EE technologies.** Energy efficient appliances are expensive compared to the ordinary equipment used by individuals or organizations in their apartments or premises. Heavy socio-economic conditions apparently affect the motivation of potential clients to apply for EE loans, even though they may benefit from the installation of EE technologies in the longer term. Low income households cannot afford the EE technologies. Although businesses show increasing interest in EE equipment and technologies, due to limited access to low interest rate loans, they prefer to hire energy auditors or managers to optimize their costs.

Conclusions

Overall results of the NATELI project do not specifically demonstrate improved access to funds due to a number of factors that are beyond NATELI's scope. These external factors include limitations which are political, legal, financial, and social in nature as discussed above. Apparently, a more comprehensive

approach is required to address the issue. Emphasis needs to be made on assisting the government and a wider range of stakeholders to formulate national priorities in the area of energy efficiency.

Still, NATELI was effective in responding to the applications or requests submitted by the wider range of stakeholders. A large number of meetings and discussions were held with beneficiaries, target/interest groups, banks and partners on financing issues. Hospitals and condominiums were assisted in conducting energy audits and developing energy passports for their respective premises. Due to time limitations, however, not all recommendations presented in the energy passports were implemented.

The institutional arrangement of the hospital sector in Georgia has an impact on the need or motivation of hospital owners to apply for loans. On the one hand, hospitals owned by insurance companies do not absolutely need the loans, since the owners have enough funds to finance the rehabilitation and installation of EE technologies. On the other hand, other private clinics are reluctant to apply for the loans for financial reasons, fearing that they will not be able to cover the high interest rate loans in the short period of payback time allowed by the financial institutions.

NATELI's efforts to facilitate greater access to financing for condominium associations were less effective. It would have been very optimistic to expect better results in this area, given the legislative framework governing condominium associations (CA) and loan interest rates.

The bankers' training seminars had mixed success. It enhanced participants' understanding of energy efficient technologies as well as communicated useful information in regards to evaluating EE projects and applications for loans; however, the audience selected for this intervention was not fully relevant. Although the actual selection of participants was done by the banks, a clearer message should have been communicated to the bank managers to engage those staff who are specifically responsible for EE loans or project evaluations. A one-day training workshop can be appropriate for building a basic understanding of EE issues, but it is apparently insufficient for communicating comprehensive information to participants. Most importantly, prior to approaching the credit officers, the NATELI team should have considered possibilities for conducting basic EE workshops for senior- or middle-level managers of financial institutions to raise their interest in EE loans.

Recommendations

With due regard to the above findings and conclusions, USAID should consider initiatives that facilitate the formulation of a national policy that would provide incentives to encourage public-private partnerships and the allocation of finances to EE initiatives. Those policy formulation efforts could concentrate on developing a regulatory framework (i.e., drafting laws or regulations on energy efficiency or renewable energy, drafting building codes to stipulate EE building practices, etc.) as well as on elaborating the government's strategy or action-plans in this regard.

Capacity building and awareness measures should be primarily targeted at senior- or middle-level managers of financial institutions and hospitals to raise their understanding and interest in EE interventions. Apparently, incentives laid down in the national policy on energy efficiency will be of critical importance for stimulating banks' engagement in this area.

Finally, mechanisms for financing the condominium associations need to be developed. This requires adjustments in the regulatory framework governing the condominiums' operations. It may be worthwhile to continue discussions with ESCO Georgia and other stakeholders to further refine the methodology for financing EE interventions at the condominium level.

LESSONS LEARNED

This section provides summary conclusions and lessons learned that apply across all of the research questions examined in this evaluation.

SUSTAINABILITY

The best indicator of the sustainability of the NATELI project is that Georgian counterparts participated, and in many cases took the lead, in most of these activities. Much of the NATELI work was completed by local sub-contractors, indicating a core competency is available in-country. The energy efficiency and auditing program will strengthen and broaden this competency. Where financing is available, Georgians have readily accepted and recognized the financial benefits of energy efficiency. Improving the availability of financing will broaden the sustainability of energy efficiency and renewable energy technologies in Georgia.

NON-QUANTIFIABLE AND INTANGIBLE BENEFITS OF NATELI

This project had significant benefits that are intangible or non-quantifiable within the scope of this evaluation.

The remedial work on the residential condominiums was not undertaken as planned due to a change in funding by the city of Tbilisi. However, the energy audits conducted for the condominiums and the two detailed feasibility studies offer solid data supporting the benefit of improving the energy efficiency of these buildings. The housing units sampled for the energy audits represent typical housing, found throughout Tbilisi and elsewhere, that will need significant renovation in the future. The work completed under the NATELI program serves as an excellent guide to describing the energy efficiency improvements that can be made.

The Cell Therapy Center saw an unexpected benefit from switching to the lighter energy efficient wall system. Using perlite blocks rather than traditional construction material reduced the wall thickness from nearly one-half meter to around one-fifth meter. This created an additional 1,200 square meters of useable floor space. In addition, the lighter walls allowed a sixth floor to be added to the building. This hospital was actually rebuilt after gutting the original building down to the structural frame. In the case of completely new construction, a lighter structural framework probably could be used, reducing costs that would partially offset the cost of energy efficient materials.

The Energy Bus will have a long-lasting, positive impact on the rural areas it visited. School children actively participated in drawing contests and other activities promoted by the Energy Bus. Their teachers said that the children attained an awareness of the importance of energy efficiency. This awareness is reinforced through Energy Bus materials obtained by teachers who now include it in their classroom instruction. Interest was also expressed in methane digesters and weather proofing homes, but action by homeowners has been limited due to lack of funds.

HINDRANCES TO ENERGY EFFICIENCY AND RENEWABLE ENERGY INVESTMENT IN GEORGIA

There are a number of issues affecting the adoption of energy efficiency technologies and renewable energy technologies. This section summarizes barriers identified by stakeholders interviewed for the evaluation.

a) Financial Barriers

Primary among the barriers is the lack of access to financing with attractive and reasonable terms. This topic was a persistent theme throughout the conversations with stakeholders and beneficiaries.

- Hospitals, which are mainly owned by insurance companies or private investors, took the opportunity to increase profitability by following the recommendations of the energy passports and energy audits in lowering energy costs. The insurance companies have access to lower-cost external funds which enabled them to undertake these projects. However, project cost and time constraints are still factors hindering insurance companies. Not all hospitals with Audits or Passports received the energy efficiency upgrades. There is remaining potential in this area.

- GTU, within the limits of their budget, was also able to act on the energy audit recommendations. GTU leveraged NATELI funding to secure additional internal funds and other donor contributions to finance the larger renovation projects. Completed projects are excellent examples of what can be done to improve thermal comfort in the old buildings. There is much more work that could be done at GTU.
- Remediation work could not be undertaken for a pilot project at a residential condominium after the city of Tbilisi reallocated the funds initially planned for the rehabilitation. The general low creditworthiness of the apartment owners and the legal arrangements of condominium associations preclude private borrowing.
- Small scale or individual efforts, such as for a methane digester, could not be undertaken by the rural inhabitants who visited by the Energy Bus. In general, informants reported that high first costs either stopped them from investigating financing or that the loan terms to finance such projects were unacceptable (for example, high interest rates, short maturity, and no grace periods).

Financing energy efficiency projects is a very complex issue. The Georgian financial sector consists primarily of 21 commercial banks (these were parent banks, with branch locations across Georgia). NATELI conducted quarterly surveys with these banks and asked about their willingness to provide loans to creditworthy owners of hospitals for energy efficiency projects.[18] According to their responses to the initial Banking Survey conducted by NATELI, a few of the banks appear to be subsidiaries of European banks. The other banks are local commercial banks with the normal focus on business clients.

The structure of the financial sector probably contributes to the high interest rates, but there are other factors as well. Monetary policy targets fairly high base rates. The banks' fairly high interest rate spreads on their loans is probably to compensate for perceived risk partly induced by institutional factors. Throughout the NATELI quarterly and annual reports to USAID, high interest rates are noted. High interest rates were also reported during interviews conducted for the evaluation.[19] Loans of 14% or 15% were considered "good" by various informants.

The creation of a secondary banking sector, such as savings institutions and credit unions found in the U.S., might be a solution. For smaller loans, it might be possible to establish revolving loan accounts, or micro loans, possibly with EBRD money. However, their administration would need to be much simpler than the EBRD lending program that was connected to the Energy Bus.

b) Lack of Understanding

Stakeholders stated that on a policy level, a change in awareness is needed and that reliable information needs to reach the market, consumers and policy makers. The lack of understanding about the principles of energy efficiency, why it is important, and the benefits of investment is a barrier mentioned by many interviewees. In general, the stakeholders pointed to high costs, institutions that are not prepared to loan based on energy efficiency, a lack of any Energy Service Companies (ESCOs) that could carry the initial financial risk, and a lack of financial models to follow to implement upgrades in condominium common spaces.

NATELI's educational seminars with members of the CAs, the Banker Seminars, Green Hospital Seminar, and the Energy Bus Project activities all successfully built understanding and awareness. Still, it

[18] NATELI, Survey of Financial Institutions, conducted quarterly in 2010 and 2011. NATELI submitted five reports. Each lists 11 banks with interest or experience offering loans recognizing energy efficiency or for the purpose of completing an energy efficiency project. The NATELI survey lists another 10 banks that report no interest in making energy efficiency related loans. Two institutions, CREDO and FINCA, are micro finance institutions. HSBC has one branch; it is Chinese owned with major operations in Europe. The US, Zirart Bank is Turkish. The First British Bank is not a Georgian owned institution.

[19] Interest rates reported in NATELI's quarterly surveys with financial institutions range from 15% to 24%. Loan terms last from three to ten years. Grace periods extend from three months to 12 months, but all are negotiated on a case-by-case basis.

will take time for general awareness of energy efficiency to become part of everyday life and financial decision making.

c) The Electric Distribution System

Some stakeholders discussed the general condition of the electricity transmission grid and wiring in the homes and buildings. New wiring was installed with all the NATELI-funded lighting systems.

Informants noted that there are large differences and fluctuations in the quality of delivered electricity, particularly in remote areas. One person reported that some rural areas are not paying for electricity, but will start paying in 2013. Particularly where electricity is unreliable, communities are exploring local renewable technologies to produce power.

d) Existing Building Conditions and Practices

The condition of existing buildings and the wiring within the buildings pose a barrier to action. Though not insurmountable, the cost to renovate buildings (often poorly built) is high. Changes in standard building practice will be needed for energy efficient construction to become more widespread. Changes in practice take time. Building codes do not currently specify that buildings meet energy efficiency performance standards, for example, minimum consumption per square meter. However, before a change in building code can be successful, the building methods must be both understood and standard building practice.

Changes in building practice require an educated workforce. One of the reasons the hospitals chose not to install the perlite walls was time. Since the owners were under time constraints to complete a building, introducing new building materials and new methods would take more time to construct than the known standard construction techniques. The extra time meant construction deadlines could not be met.

e) Appropriate Technologies

Stakeholders also pointed out that technologies must be adapted to work with the local circumstances and characteristics. Some new technologies transferred to market are not yet adapted to local needs. Additional research and access to technologies are needed. For example, rural communities may have many cows and ecological problems related to cattle manure. Methane digesters, either thermophilic biodigesters (that operate in temperatures above 50 °C) or mesophilic biodigesters (that operate in temperatures between 20°C and about 40°C) are two potential solutions with different operating requirements. Community demographics and characteristics as well as ethnic and cultural norms may dictate different solutions to meeting needs. In the end, the systems must meet local conditions. It may be that as the population ages and individuals become less physically able, community-sized digesters are a more appropriate option than those sized for individual households. Meeting local needs involves (among other things) educating the public about their options.

f) Agriculture Sector

More than one informant stated that the agriculture sector in Georgia needed attention, from production through delivering products to market. The agricultural sector is an area where renewable technologies and energy efficiency work well and could be developed to assist this market.

g) Georgia's Evolving Politics

Lastly, stakeholders mentioned the evolving political situation in Georgia, where particularly those who lived under the Soviet regime must change their ways of thinking. Georgians are rebuilding their country and facing difficult economic and political times. A comprehensive approach is required to address the issues surrounding the adoption of energy efficiency technologies. Emphasis needs to be made on assisting the government and a wider range of stakeholders to formulate national priorities in the area of

energy efficiency. Commitment by city governments and the country as a whole is needed to demonstrate the importance of improving energy efficiency.

CONCLUSIONS

USAID chose an area that needed attention and designed a program to impact a wide range of stakeholders. In general, timing was very good. NATELI provided the seed money and the catalyst necessary to get the Energy Efficiency and Auditing Program at GTU underway. Hospitals were able to take advantage of the recommendations of Energy Passports and Energy Audits as well as the partial funding for energy efficiency remediation efforts.

Winrock International did an excellent job as the implementing organization, demonstrating flexibility with changing needs. One of their most important contributions was assembling an outstanding array of local sub-contractors. At times, these local sub-contractors had to grow with their responsibilities, but this led to increased in-country capacity and ability to provide services in the energy efficiency arena.

The Georgian stakeholders involved with this project also deserve substantial credit. NATELI did not just bundle these projects and hand them to the Georgians. Georgians were actively involved in the work at all stages and made significant co-financing contributions. For example, NATELI funded the writing of the Energy Audit Manual which was very well written, in English, by a Georgian professor. The faculty developed the 10-credit Energy Efficiency and Auditing course that became part of the Masters of Energy Management degree at GTU. In the first year, 33 students completed this program. The end product is much greater than the initial NATELI contribution.

The government's earlier efforts to formulate national policy in the area of energy efficiency and renewable energy stopped in 2008 for unknown reasons, and the work has never resumed. NATELI tried to overcome this lack of policy and improve access to financing for energy efficiency projects. Overall results do not specifically demonstrate improved access, due to a number of factors that are beyond NATELI's scope. These external factors include limitations which are political, legal, financial, and social in nature. There are few financial and commercial initiatives related to developing or financing the energy efficiency initiatives in the country. No national policy is in place that would set the general framework implemented by private or public sectors and stimulate installation of energy efficient or renewable energy technologies. Still, NATELI was effective in restarting the dialogue, providing training seminars, and responding to the applications and requests submitted by the wider range of stakeholders.

RECOMMENDATIONS

- To determine the energy savings attributable to the NATELI program, a pre- post-intervention analysis could be conducted using actual energy consumption data. This would require one or two years of post-intervention data. Results could be compared to the baseline and the savings estimated in the initial Audit and Passport. It would be useful for NATELI II or another designee to stipulate data elements that should be tracked and collected to conduct the analysis in the future.

- For a more immediate assessment of energy and cost savings, an updated Energy Passport could be generated, using specific inputs of the as-built conditions, construction costs, interest rates, and inflation rates.

- Collect post-intervention energy consumption and cost data for the buildings built or renovated under the NATELI program. These buildings will be good case studies and models that demonstrate achievable savings.

- To facilitate the new building design process and introduce energy efficiency technologies, it is important to get involved early, with enough time to incorporate and fund design changes. Consider exploring ways to work with building architects and engineers to improve designs and demonstrate reduced energy use.

- Stay in touch with insurance companies owning buildings that received Audits and Passports. While there were time and cost constraints barring uptake of recommendations, this may not always be the case. Keeping this experience and information in mind will encourage building owners to take action in the future.
- USAID should consider the benefits of seeking accreditation for the energy auditor certification course offered through GTU.
- This evaluation pointed out the need for small-scale financing that is readily accessible at a reasonable cost. It would be useful for USAID to look at this issue in more detail, although it may need to be undertaken within a broader financial sector project.
- We recommend that USAID continue to invest in pilot projects that demonstrate energy efficiency improvements and renewable energy technologies. The demonstration projects uncover the political and technical issues that must be addressed in order to proceed on a larger scale. It is also important to continue working with local government and policymakers as the SEAP methods are put into action. Since USAID already demonstrated their involvement and positive accomplishments with that task, and in a highly political setting, pilot projects may serve as a good mechanism through which to continue working in the policy arena.

ANNEXES

ANNEX A: STATEMENT OF WORK

SECTION C - DESCRIPTION / SPECIFICATIONS/STATEMENT OF WORK

MID-TERM PERFORMANCE EVALUATION OF THE NEW APPLIED TECHNOLOGY EFFICIENCY AND LIGHTNING INITIATIVE (NATELI) PROJECT

1. Summary

1) Name of the Project (to be evaluated): The New Applied Technology Efficiency and Lighting Initiative (NATELI)
2) Project Number: AID-114-A-00-05-00106
3) Project Dates: October 1, 2009 - June 30, 2013
4) Project Funding: $2,176,238 (For the activities performed between October 1, 2009 through September 30, 2011)
5) Implementing organization: Winrock International
6) AOR: David Tvalabeishvili

The New Applied Technology Efficiency and Lighting Initiative (NATELI) is USAID sponsored activity implemented by Winrock International from October 1, 2009 through June 30, 2013. During October 1, 2009 through September 30, 2011, the NATELI program was designed to promote energy efficiency and, to a lesser extent, renewable energy applications in Georgia. The objective of the program was to promote energy efficiency to the Georgian public and business sectors, and to design financial, technical, and operational frameworks to foster the development and implementation of energy efficiency projects. During this period, NATELI focused on some of Georgia's larger energy consumers, hospitals and condominium associations, and helped them implement energy efficiency measures, decreasing their energy consumption and therefore energy costs. This work also included public outreach and environmental activities.

NATELI has contributed directly to USAID' s Assistance Objective 4 - Enhanced Energy Security and Intermediate Result - Increased Efficiency in Energy Use.

The proposed mid-term project performance evaluation of NATELI project for the period of October 1, 2009 through September 30, 2011 will be carried out in mid-2012 and will assess the extent to which the intended results of the project have occurred, what was the effect of NATELI's energy efficiency interventions on targeted sectors and/or communities and how sustainable different interventions were.
The evaluation will also look at the major impediments to achieving some of the results, and how the interventions and results are perceived by beneficiaries.

II. Background

The NATELI project is implemented by a team of international and local organizations and independent experts led by Winrock International. Winrock's implementing partners include Tetra Tech, Energy Efficiency Centre (EEC), World Experience for Georgia (WEG), Sustainable Development and Policy Center (SDAP), Sustainable Development Center REMISSIA, and

other local partners and international experts. NATELI's activities from October 1, 2009 through September 30, 2011 were organized around three major foci:

- Help large institutions reduce their energy consumption with a special focus on hospitals.
  - NATELI performed energy audits, examined financial costs and benefits of various energy efficiency improvements, assisted hospitals with implementation on a limited basis, taught local stakeholders how to manage their energy consumption, evaluated the financial viability of energy efficiency improvements, facilitated access to financing for energy efficiency interventions, and promoted energy efficiency.
- Supported pilot projects that promoted residential energy efficiency.
  - NATELI worked with the Tbilisi Municipality and condominium associations. Additionally, NATELI worked with the Georgian State Technical University (GTU) to incorporate energy efficiency material into their curriculum and to implement energy efficiency retrofitting in several GTU buildings.
- Continued support to the Energy Bus, in conjunction with British Petroleum (BP) Georgia.
  - The Energy Bus toured Georgian communities and educated Georgian citizens about energy efficiency and renewable energy in general, as well as the practical application of energy efficiency technologies.

By the end of September 30, 2011, the major results achieved by NATELI are the following:

- Conducted energy audits for selected hospitals, condominium associations and buildings GTU.
- Provided energy efficient compact fluorescent bulbs, fixtures, and wiring systems to five hospitals located in different regions of Georgia, benefiting a total of 180 patients and 250 medical personnel. As a result of the implementation of energy efficiency measures, electricity consumption will be reduced by approximately 1,671,589 kWh/annually, resulting in the reduction of CO2 emissions by 380,000 tons/year. Furthermore, if and when NATELI's recommendations are undertaken by all hospitals (23) for which energy audits were performed, the total savings under the project will amount to 5,603,351 kWh/annually, resulting in CO2 reductions by 2,015,000 tons/year.
- Supported GTU in establishing a curriculum on energy efficiency and energy auditing and in equipping an energy efficiency-testing laboratory.
- Supported GTU with Energy Effective Heating Systems with Integrated Solar Energy Collectors for the Training Laboratory at the Faculty of Power Engineering and Telecommunications.
- Established an energy auditor's certification program with GTU.
- Approximately 2,516,288 kWh of energy will be saved annually as a result of the grant financing for the lighting and heating systems provided to GTU. In total, GTU annually will avoid the estimated 518,000 metric tons of carbon dioxide emissions.
- Supported engagement of the Government of Georgia in promoting energy efficiency reforms. As a result, Tbilisi municipality signed the EU Covenant of Mayors, committing to lower CO2 emissions by at least 20% in the capital city where one third of the nation's population resides.

The project also:

- Provided assistance to the condominium associations of the city of Tbilisi to improve residential living conditions and reduce energy bills by decreasing energy consumption

through application of energy efficient techniques and technologies. The USG produced full scale energy audits of a number of residential buildings in Tbilisi.
• Promoted the development and dissemination of renewable energy and energy efficiency technologies in Georgia supporting the Energy Bus project jointly with BP. Energy Bus is a mobile showroom of small-scale energy efficient equipment and building materials which travels around Georgia disseminating information and educating the population about the benefits of reduced energy waste, energy conservation, and various technologies that minimize fuel wood and gas consumption and offset the use of fuels needed to produce power in the winter months.
• Identified financial mechanisms to support energy efficiency projects.
• Conducted environmental assessments for energy efficiency interventions.
• Implemented a public awareness campaign to promote energy efficiency.

In terms of producing energy audits and energy passports, NATELI focused on 23 hospitals, five buildings of GTU, and 12 residential buildings in Tbilisi.

Documents will be available in advance to the evaluation team to do a desk-review prior to arriving to Georgia. These documents are:
• Implementing Partner Quarterly Reports;
• Implementing Partner Annual Reports;
• Project Monitoring Plan (PMP) indicator tables (showing target and actual values of relevant indicators submitted annually by NATELI);
• Energy Audit Reports for targeted facilities (identifying energy saving potential of existing facilities and providing baseline information as appropriate);
• Energy Passports for targeted facilities (designing a thermal performance of structural components of facilities to be constructed, identifying energy saving potential and providing baseline information as appropriate);
• Implementing Partner Training Reports including information on training topics and attendees.

III. Purpose of the Evaluation and Its Intended Use
The purpose of this mid-term project performance evaluation is to assess:
a) whether the NATELI project has achieved its stated objectives;
b) what were the main effects of the project on target sectors (hospitals, GTU buildings, residential buildings);
c) whether the energy efficiency interventions are sustainable; and
d) what are the main impediments to further promoting energy efficiency in targeted sectors.

The results of the evaluation will be used by USAID/Caucasus in designing and/or implementing current and new programs in energy efficiency.

IV. Evaluation Questions
Key evaluation questions are:
1. How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas described above? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency

component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

2. What were the effects of Energy Bus operations on target communities? How effective and efficient was this Public-Private Partnership in attaining the planned results? Did the project affect men and women in target communities differently? How is the project perceived by its beneficiaries?

3. How effective was the curriculum on energy efficiency and energy auditing, as well as energy auditor's certification programs within GTU? How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?

4. How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

The evaluation team will be expected to develop an evaluation design to answer each of the evaluation questions identified above. Suggested changes to the evaluation questions may be proposed in the evaluation design. Also, the evaluation team will propose evaluation methodology and discuss evaluation methodology with USAID/Caucasus' Office of Energy and Environment (EE) and seek its concurrence.

The data collection methodology outlined below for each evaluation question is only illustrative and the Offeror can suggest and justify in their proposals methodology that they deem most appropriate to minimize bias and provide strong evidence. Overall data collection is expected to include both quantitative and qualitative data.

Answer to the question #1 may be obtained through a combination of data collection methods such as:
• project documentation;
• reviews of official energy consumption records of assisted institutions and official country statistical information;
• interviews and site visits regarding energy consumption in assisted institutions;
• targeted surveys and site visits of comparable non-assisted institutions regarding replication;
• interviews of key informants in the government, private, and non-profit sector and key stakeholders in the project regarding effectiveness and sustainability;
• focus group interviews with residential condominiums regarding challenges and obstacles.

Answers to question #2 may be obtained through focus groups with Energy Bus beneficiaries, and a representative sample household survey of individuals in targeted and comparable non-targeted communities. Interviews with the implementing partner and BP representatives will also be useful.

Answers to question #3 may be obtained through key informant interviews with GTU personnel, focus group discussions with professors and students, and mini-surveys and/or knowledge tests of program participants.

Answers to question #4 may be obtained through project documentation, official documentation key informant interviews.

V. Logistics

USAID Mission will not be responsible for arranging logistics for the evaluation team, however it will advise on the fieldwork plan prior to the start of the fieldwork. The evaluation team will also receive all relevant reports and documentation in advance furnished by the mission. USAID/Caucasus will also place the team in contact with those representatives of Winrock International who worked on the NATELI project.

VI. Estimated Timeframe

Documents review: July 2-16, 2012
In country work: July 16 – August3, 2012
Draft report due to USAID: Within a seven workdays after departing the country
USAID Comments due to the contractor: Within seven workdays after receiving the draft report
Final report: Within five workdays after receiving USAID's comments

END OF SECTION C

ANNEX B: FINAL RESEARCH MATRIX

Final Research Matrix: Planned Evaluation Approach and Differences from Planned Approach

		Evaluation Question	Type of Answer Needed	Data Collection Method(s)	Data Source(s)	Sampling or Selection Criteria	Data Analysis Method
1	Energy audit & passports	How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas?	• Descriptive • Comparative • Cause-and-Effect	• Project documentation • Reviews of official energy consumption records of assisted institutions and official country statistical information • Interviews and site visits regarding energy consumption in assisted institutions • Interviews of identified key informants in the government, private, and non-profit sector as well as key stakeholders in the project regarding effectiveness and sustainability of energy efficiency interventions	• Project records, site visit documentation, structured interviews • Collect primary data from NATELI managers • Interviews with key informants	• Identified key stakeholders and completed projects	• Quantitative assessment where supportive data are available, qualitative interpretation, content analysis
1	Differences from planned approach		• No changes to planned approach	• We conducted site visits at GTU and 3 hospitals completing measures. • Post-remediation data collection was outside the scope of the NATELI project. No official records of energy consumption were available from informants. We received one spreadsheet for monthly consumption and cost for GTU building 1 (months and year were not labeled). During interviews with hospital directors, they checked their records of consumption and reported typical weekly or monthly energy costs since the building was constructed (these were all new buildings).	• Primary consumption and cost data were not available. • NATELI managers provided all other information requested	• No changes to planned approach	• No primary data are available to conduct quantitative assessments of GTU pre and post energy consumption. No recorded consumption or energy cost data are available from the new hospitals. • Data was not requested from renovated hospitals.
2	Energy audit & passports	Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and	• Quantitative	• Review of audit reports and energy passports • Confirm audit assumptions; review analytic spreadsheets if available	• Program records, customer bills, on-site verification	• Sample of buildings for deep energy analysis • Possible census for	• Quantitative

		Evaluation Question	Type of Answer Needed	Data Collection Method(s)	Data Source(s)	Sampling or Selection Criteria	Data Analysis Method
		residential buildings?		• Review pre- and post-installation consumption records • Engineering best practices; deemed savings assessment		on-site verification of completed projects	
2	Differences from planned approach		• Qualitative; document review and interviews	• Winrock reports NATELI-1 was not involved in the monitoring of the post consumption data, because it was not specified in the scope, the project is over, and time was needed for implementation of the energy audit findings. They did not foresee the need for post consumption monitoring. • No post installation data were available. • Requested inputs for sample of Energy Passport report to review assumptions and inputs; received information included in submitted reports.	• Onsite verification was conducted at three hospitals and the GTU. Visits verified measure installation and actions taken based on the Audit and Passport recommendations. • GTU buildings are not separately metered and GTU was not able to provide monitoring data. • Cell Therapy Center reports 44% reduction in energy use over the baseline	• Post-installation consumption data were not available to conduct a deep energy analysis • Time constraints prevented on-site verification at a census of building. All GTU buildings and 3 new hospitals were visited.	• Qualitative; document review and interviews
3	Energy audit & passports	Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users?	• Descriptive • Cause-and-Effect	• Structured interviews	• Interviews with participant hospitals, lending institutions	• Directed sample	• Qualitative
3	Differences from planned approach		• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach • Interviews were conducted with the GTU Deans, professors, and the Director/Owner of the Cell Therapy Center • Interviews with 2 hospital directors and their respective	• No changes in planned approach

		Evaluation Question	Type of Answer Needed	Data Collection Method(s)	Data Source(s)	Sampling or Selection Criteria	Data Analysis Method
						insurance holding company	
4	Energy audit & passports	What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?	• Descriptive • Cause-and-Effect	• Structured interviews (key informants)	• Interview data	• Directed sample; indirect measures of history, barriers and intentions	• Qualitative
4	Differences from planned approach		• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach
5	Energy Bus	What were the effects of Energy Bus operations on target communities? How is the project perceived by its beneficiaries?	• Descriptive • Cause-and-Effect	• Individual or group interviews with Energy Bus beneficiaries • Interviews with the implementing partner (EEC) and BP representatives • Phone interviews with random sample of citizens receiving consultations	• Structured interviews; group interviews	• Key informant discussions; nonprobability sample • Directed sample; indirect measures of history, barriers and intentions	• Qualitative
5			• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach
6	Energy Bus	How effective and efficient was this public-private partnership in attaining the planned results? Did the project affect men and women in	• Descriptive • Cause-and-Effect	• Individual or group interviews with Energy Bus beneficiaries • Interviews with the implementing partner (EEC) and BP representatives • Documentation and records reviews	• Structured interviews; group interviews • Program records review	• Key informant discussions; nonprobability sample • Directed sample; indirect measures of history, barriers and intentions	• Qualitative

		Evaluation Question	Type of Answer Needed	Data Collection Method(s)	Data Source(s)	Sampling or Selection Criteria	Data Analysis Method
		target communities differently?					
6	Differences from planned approach		• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach
7	Curriculum	How effective was the curriculum on energy efficiency and energy auditing, as well as energy auditors' certification programs within GTU?	• Descriptive • Cause-and-Effect	• Key informant interviews with GTU personnel • Focus group discussions with professors and students (if logistics are possible) • Training materials review	• Structured interview; group interviews	• Key GTU staff available • Convenience sample of students	• Qualitative
7	Differences from planned approach		• No changes in planned approach	• School was not in session. Students were not available for a focus group discussion. • Interviews were conducted with the Dean of Faculty of Power Engineering and Telecommunication, Dean of Civil Engineering, Associate professor and energy audit instructor, and comments were provided by other professors as we conducted the site visits.	• Structured interviews were conducted with GTU staff • Students were not available for a focus group discussion.	• Key GTU staff were interviewed • Students were not available for a focus group discussion.	• No changes in planned approach
8	Curriculum	How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?	• Descriptive • Cause-and-Effect	• Key informant interviews; identify key indicators of success; assess short term indicators	• Interviews; program records review	• Nonprobability sample	• Qualitative
8	Differences from planned approach		• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach
9	Financing	How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects?	• Descriptive • Comparative • Cause-and-Effect	• Project documentation • Key informant interviews	• Interviews; program records review	• Nonprobability sample	• Qualitative
9	Differences from		• No changes in	• No changes in planned approach	• No changes in planned	• No changes in	• No changes in

		Evaluation Question	Type of Answer Needed	Data Collection Method(s)	Data Source(s)	Sampling or Selection Criteria	Data Analysis Method
	planned approach		planned approach		approach	planned approach	planned approach
10	Financing	What were the external factors affecting NATELI's success in this area?	• Descriptive	• Structured interview; literature and project document review; key informants	• Key informant interviews	• Nonprobability sample	• Qualitative
10	Differences from planned approach		• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach	• No changes in planned approach

ANNEX C: KEY INFORMANT LIST AND PURPOSE

Organization	Person	Position
Winrock	1. Inga Pkhaladze 2. Giorgi Giorgobiani 3. Nino Lazashvili 4. Lasha Chantladze 5. Giorgi Ketelauri	1. Chief of Party 2. Deputy Chief of Party 3. Rural Clean Energy Activity Manager 4. Business Development Specialist 5. Energy Efficiency Activity Engineer
GTU	1. Gia Arabidze 2. Zurab Gedenidze 3. Karine Melikidze	1. Dean of Faculty of Power Engineering And Telecommunication 2. Dean of Civil Engineering 3. Associate Professor of Civil Engineering
EEC	1. George Abulashvili 2. Liana Garibashvili	1. Director 2. Head of Analytical-Informational Department
Cell Technology and Therapy Center	George Loladze	Director and Co-Owner
Sustainable Development And Policy Center (SDAP)	Karinea Melikidze	Director
Bus Community, Samtavisi School	1. Lela Cherkezishvili 2. Zaqaria Tatunashvili	1. Director of The Samtavisi Public School 2. Head of the Samtavisi Local Government (Trustee of the Village) We also met with about six teachers for a group discussion.
Bus Community, Khidistavi School	1. Beso Tsertsvadze 2. Revaz Giorgadze	1. Director of the Khidistavi Public School 2. Head of the Khidistavi Local Government (Trustee of the Village) We also met with about 12 teachers for a group discussion.
World Experience For Georgia (WEG)	1. Murman Margvelashvili 2. Giorgi Mukhigulishvili	1. Director 2. Researcher, Energy Studies
Marneuli Hospital, IRAO Group	1. Mamuka Rekhviashvili 2. Eduard Khijakadze	Director We met with Eduard, Technical Director
Sustainable Development Center Remissia	1. Marina Shvangiradze 2. Anna Sikharulidze	Project Manager
Tianeti Hospital GPI Holding	Zura Murghulia	Director
Tbilisi City Hall	Zviad Archuadze	Head of Office His Assistant Was Also Present
BP	Girogi Gongliashvili	Programme Coordinator, Energy &

		Enterprise Development
IRAO Group/Insurance Company	Sandro Gelenidze	Project Manager
GPI Holding/Insurance Company	Koba Tskhadadze	Project Manager

Financial Institutions		
Bank of Georgia	Giorgi Cherkezishvili	Director of VIP Banking at Corporate Department
TBC Bank	Irakli Diasamidze	Senior Corporative Banker
Procredit Bank	David Demetradze	Head of Corporative Regional Group
Banking Seminars		
KorStandard Bank	Levan Machaidze	Manager of Corporative Relations
Bank of Georgia	Irakli Abuashvili	Sales Coordinator
Basis Bank	Giorgi Makatsaria	Chief of Client's financial analyze department
Green Hospital Seminar		
LEPL Aladashvili University Hospital	Giga Chedia	Medical Equipment specialist
Jhvania pediatric hospital	Andro Tskhadadze	Electric engineer
Heart and Vascular Diseases Center	Maia Barnabishvili	Financial Manager

Citizen Interviews: Visitors to the Energy Bus		
Region	**Name**	**Technology**
Khashuri District, village Osiauri	Vaja Nozadze	Solar water heater
Keda district	Manana Tsintsadze	Biogas Application
Kutaisi	Amirani Giorgadze	Energy efficiency
Lanchkhuti District	Merab Turkia	Solar water heater
Sachkhere district, Sareki village	Eka Mikaberidze	Hydro Application
Zestaphoni district, Qvemo saqara village	Dzotsenidaze Kakha	Solar water heater
Baghdadi district, Pirveli Opcha Village	Zura Khuskivadze	Solar water heater
Samtredia district, Bashi Village	Levan Tkamladze	Wind Energy
Khoni dsitrict, Kutiri village	Kote Cherkezia	Solar water heater
TSkhaltubo district, Gumbrini village	Charkseliani Eldar	Biogas

Key Informant Interviews: Purpose and Number Interviewed

Key Informant	Purpose	Final number interviewed
Interview key staff at Winrock International and USAID	At an initial meeting we will discuss the project background, USAID requirements, key indicators of success, and the status of all projects. We will identify projects where energy efficiency measures have been installed following energy audits and energy passports. We will request and collect project data and determine the need for follow-up meetings and data requests. We will collect contact data for key decision makers at participant facilities and lending institutions and ask for suggestions (and contact information) for other key informants from government, private, and non-profit sectors and other stakeholders in the project. We will interview key partner companies including EEC (discussed under the Energy Bus), and the firm conducting the energy audits and energy passports.	USAID – 3 Winrock – 5 EEC – 2 SDAP – 1 Remissia – 2 WEG - 2
Interview key informants from government, private, and non-profit sectors	USAID and Winrock will be asked to identify key informants from government, private, and non-profit sectors. A small number of interviews with selected people will inform evaluation questions about program successes, barriers and challenges, and the sustainability of program efforts. We will explore whether any of the NATELI components can serve as a model for replication by non-assisted institutions and/or other industrial users. One agency identified by USAID is the Municipality of Tbilisi. We will work with Winrock to identify key staff and for contact information.	City of Tbilisi-2
Interview key staff at completed projects (number depends on total number of completed projects)	One meeting with key staff at the site of each completed project targeted will occur under this evaluation. We will review the project and discuss NATELI's contributions to their project as well as the overall process, successes, challenges, and plans to take action on additional recommended measures (if not all were installed in the first project). We will ask about the financing process and any gaps, barriers, and challenges to it. We will confirm the project cost and financial data to compute the NPVQ for the completed project.	Cell Therapy -1 Marneuli – 2 Tianeti -1 IRAO and GPI Holding Insurance companies - 2
Identify and interview key lenders or bankers who attended the banking seminars	In-person or telephone interviews with identified lenders who attended a NATELI financial training session. Interviews will focus on the effectiveness of NATELI's effort in facilitating access to financing designed to support energy efficiency projects.	Banking seminars - 3 Green hospital seminar -3
Identify and interview key lenders who are interested in making financing available for energy efficiency projects	In-person or telephone interviews with banks that indicated an interest in making energy efficiency loans. Interviews will focus on access to financing and the external factors affecting NATELI's success in this area. Questions will explore ways that lenders match potential borrowers to lenders (current practices or suggestions for the future).	Bank of Georgia-1 TCB-1 Procredit Bank-1
Identify and interview key lenders who are lending funds to NATELI projects	In-person or telephone interviews with lenders negotiating or who have offered financing. Interviews will focus on access to financing and the external factors affecting NATELI's success in this area. Questions will explore ways that lenders match potential borrowers to lenders (current practices or suggestions for the future).	Bank of Georgia-1
Interview key GTU personnel (administration and/or faculty) offering the auditor training	One meeting with key informants conducting the GTU energy auditor training and certification to discuss their perspective on the successes and challenges of establishing sustainable in-country capacity to conduct energy audits. (If not already provided, gather logistical information to organize the focus groups with students.)	GTU personnel – 3 Professors (introductions and passing comments) - 3
Interview students who attended GTU energy auditor training	One focus group (if they can be identified and located) with students who received training with the energy audit curriculum. These interviews will gain the students' perspectives on the training they received and the successes and challenges of establishing sustainable in-country capacity to conduct energy audits. We will also talk about the work they have done or plan to do in the energy efficiency field.	None; School was not in session
Interview key staff at Energy Efficiency Center Georgia (administering the Energy Bus activities)	One meeting with key staff of Energy Efficiency Center Georgia administering the Energy Bus project, along with Winrock staff involved with the Energy Bus. Discuss their perspectives on the objectives, successes, challenges, and effects of the Energy Bus. Gather logistical information to organize the visits to two communities.	EEC - 2
Interview key staff at other partner donor organizations	One meeting with key staff of BP Exploration (Caspian Sea) Limited administering or involved with the Energy Bus project as an agent for each of the partner donors, discussing their activities and involvement with the project and their perceptions of the Bus activities and information.	BP - 1

Key Informant	Purpose			Final number interviewed
If it is possible to coordinate this visit and interviews: Visit one or two communities near Tbilisi representative of other communities visited by the Energy Bus	1 to 3 meetings per community discussing effects of Energy Bus operations on target communities, and their perceptions of the Bus activities and information received	Meeting 1: Group discussions with local authorities or community mobilizers	Meeting 2 & 3: Group discussion with school teachers, children and Energy Bus visitors. Possible meeting with a family or community that did follow-up project.	Two communities visited Town Administrator and about 6 teachers at first community School director and about 12 teachers at second community Ad hoc discussions with others interviewed about their experience with the Energy Bus

ANNEX D: FINAL INTERVIEW GUIDES

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Financial Institutions & Realtors
Attending Banking Seminars

Key Research Questions

How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

Background: NATELI Banking Seminars

NATELI offered seminars (May and November 2010) to representatives of commercial banks (namely credit officers), real estate appraisers, and other interested parties. The goal of the training was to further understanding of core principles of energy efficiency, energy efficient technologies and carbon credit management and with the knowledge, skills and methodology needed for evaluating energy efficient projects.

Discussion Topics Overview

- Goals and objectives of evaluation
- Banking Seminars
- Before Attending the Seminars
- Energy Efficiency Financing Challenges
- Closing

Introduction: Goals and Objectives of Evaluation

Introduction:

Hello, my name is _____ from PMCG. I am calling on behalf of USAID and the NATELI project. We have been asked to evaluate the NATELI project and the energy efficiency training seminars that Winrock presented in [May/Nov 2011]. I would like to talk with you for about 10 minutes about your perceptions of the training and about considerations of energy efficiency in the lending practices. Is this a good time to talk? If not, could I call you back?

Schedule a time to call back if needed.

Banking Seminars

1. We understand that you attended one of these seminars? Is that correct?
2. First, can you please tell us where you work and your position?
3. Can you please tell us what information was the most useful?
4. How did the seminar change your understanding of methods to evaluate energy efficient projects?
5. Did you incorporate any of the methods to evaluate energy efficient projects into standard business practices?
6. In addition to attending the seminar, have you talked more with NATELI about financing energy efficiency projects?
7. What is your institution doing differently since attending the seminar or working with NATELI?
8. Will you continue these practices?

Questions for Lenders

9. How many loans has your institution made for energy efficiency projects?
10. Do loans for energy efficient buildings (new projects or retrofit) receive reduced interest rates or other preferential loan terms?
11. Were there any loans discussed or negotiated but not closed?
12. If so, what were the issues that prevented closing the loans? From the bank's perspective? From the client's perspective?

Questions for Realtors

13. How do you assess the energy efficiency of properties before selling them?
14. How do you discuss the value of energy efficiency with your clients when you sell properties?
15. Do you discuss energy efficiency with your client's lenders to negotiate better loan terms?
16. Are your clients and lenders interested in the value of energy efficiency?

Before Attending the Seminar

17. Before you attended the NATELI banking seminar:
    a. Did your institution place any particular emphasis on energy efficiency?
    b. Was the energy efficiency of buildings considered in the financial package (e.g., interest rates or other loan terms)?
    c. Did your institution finance energy efficiency projects or building upgrades to improve energy efficiency?

Energy Efficiency Financing Challenges

18. Does your bank face any particular challenges providing loans for energy efficiency projects?
19. From your perspective, what are the challenges that customers face, i.e., what makes it difficult for them to secure a loan for their energy efficiency projects?
20. Are there other external factors that affect financing energy efficiency projects?

Closing

21. Lastly, do you think this was an effective seminar that provided useful information? Explain.
22. Would you recommend more of these kinds of seminars? Why/why not?

a. For other lenders/realtors?
b. For other topics? What are they?

We'd like to be sure we thoroughly understand how institutions have changed the way they think about energy efficiency as a result of working with NATELI. Are there any other things you would like to add? (Successes, challenges)
Thank you for your time.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
The Energy Bus Activities -- Community Visits

Key Research Questions

What were the effects of Energy Bus operations on target communities? How effective and efficient was this Public-Private Partnership in attaining the planned results? Did the project affect men and women in target communities differently? How is the project perceived by its beneficiaries?

Background

The Energy Bus sub-grant Agreement is between Winrock International and Energy Efficiency Center Georgia (EEC), signed in April, 2010.The implementing agency for the Energy Bus is the Energy Efficiency Center Georgia. Their annual reports state Partner donors are Azerbaijan International Operating Company ("AIOC"), the Baku-Tbilisi-Ceyhan Pipeline Company ("BTC Co"), and the South Caucasus Pipeline Company ("SCPC"). Partner Donors appointed BP Exploration (Caspian Sea) Limited to act as an agent for each of the Partner Donors for the contract with the EEC Georgia.

Discussion Topics Overview

- Goals and objectives of evaluation
- Community Perceptions about the Bus
- Personal Experience
- Future Assistance

Introduction

(Explain USAID evaluation)

Community Perceptions about the Bus

1. Do you remember the Energy Bus visiting your community?
2. What was their involvement organizing the Energy Bus visit to your community?
3. Do you know which agencies sponsored the bus? (brought the bus to your community)
4. Did people come to visit the bus?
5. What was the reception / perception of various community groups? Teachers, students, business people, farmers, others
6. What was the general level of knowledge about energy before the Bus arrived?
7. What was the most useful information to community members?
8. Did the experience with the Bus information change people's attitudes about energy use?
9. Did teachers add instruction on energy use to their lessons? Where did they get the lesson plans or materials?
10. Do you see any changes in the school children's' attitude about energy use?
11. Did the bus information change attitudes about energy use?
12. Did people make changes in their daily life to use less energy?
13. Has anyone from the community come to you for additional information or follow-up on things they saw or learned at the Bus?
14. Do you know if anyone in the community built a methane digester, or small hydro, or weatherize/insulate their house as a result of visiting the bus? What can you tell me about that?

15. Do you know people who are interested in these projects but need the financial help before they can continue? What are the challenges securing financing?

Personal Experience

16. Did you tour the bus yourself (Who in the group toured the bus?)
17. What was it like?
18. What activities did you participate in?
19. What is most useful information?
20. Did the bus information change your attitudes about energy use?
21. Did you make changes in their daily life to use less energy?

Future Assistance

22. Have you contacted the EEC for more information on any topic introduced by the Bus?
23. Is there an interest in more general information or follow up by the Bus?
24. Is there interest in more technical information for any particular technology?

Thank you for your time.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Key Stakeholders & Informants
City of Tbilisi

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

Background

In June 5, 2009 the Tbilisi City Council adopted a Strategic Plan for Future Development of the Capital City (thereafter called the Strategic Plan of Tbilisi). Since 2005, the rehabilitation of existing and construction of new urban infrastructure has been underway in Tbilisi. In particular, the capacity of transport infrastructure has been increased, which has resulted in enhanced traffic flow. The construction sector has become a major contributor to the development of the local economy, but at this point they have no significant energy efficiency measures in use.

While implementing the SEAP for Tbilisi, it will be essential to preserve the cultural and historical heritage and identity of the city, to involve all interested parties (private, public, city government) into the planning and implementation process of the Plan, to raise awareness/change behavior of citizens, especially while introducing new carbon technologies in the energy consumption sector.

The SEAP outlines short, medium and long term goals in each sector to meet the 2020 goals.

Discussion Topics Overview

- Goals and objectives of evaluation
- City of Tbilisi role
- Challenges to SEAP
- Capacity building

Introduction: Goals and Objectives of the Evaluation

(Present introduction to evaluation objectives)

The primary focus of our evaluation is not on the SEAP, but we do want to understand the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies. In particular, we were asked to look at challenges for the residential buildings and hospitals, which were the primary focus of the NATELI project. We'd like to focus on the residential housing and Condominium Associations in particular.

City of Tbilisi

I understand that in 2009 the Tbilisi City Council adopted a Strategic Plan for Future Development of the Capital City (Strategic Plan of Tbilisi). And in 2010, signed the Covenant of Mayors, and Tbilisi City Hall joined an initiative under which Tbilisi should become a "low carbon city" by 2020. First we want to congratulate you on that effort.

1. Would the City have undertaken this effort without the funding and involvement of the NATELI sub-contractors?
2. Did the City also contribute funds toward the SEAP?
3. What were the main challenges in the process to write the Sustainable Energy Action Plan.
4. What were the main challenges to adopting the SEAP?
5. What is the municipality currently doing for energy efficiency and carbon reduction?
6. What kind of impact have the NATELI activities had on the City's work?
7. When did the City begin undertaking activities to improve energy efficiency?

Condominium Associations

8. We'd like to talk about the work done for the Condominium Associations and the energy audits. So that we understand the relationships, are the condominiums owned by the city or by the tenants?
9. What are the city obligations toward the condominium associations? (relationship of condominium association with the city)
10. Were the energy audits and the feasibility studies useful to the City?
11. What was the most important information from these studies?
12. Do you think the City will conduct additional EA in the future?
13. If more audits were done in the future, would you change anything in the way you work with the Condominium Associations or the City?
14. Is the process replicate able in the future?
15. Did you or someone from your office attend condominium association training? What was reception of participants?
16. How did you the City use the information?
17. Would you recommend the training for other Condominium Associations?

Decisions to Implement Recommendations for Condominiums

1. Which entities were involved in decisions to implement recommendations of the audits? City and condo association? What factors affected those decisions?
2. What were the primary factors leading to the decision not to fund the recommended upgrades?
3. Does the City have plans to follow up and implement recommended measures?
4. What were the limitations on cost considerations?
5. Feasibility study: Were there any limitations in the scope of the whole building feasibility study?

Motion Sensors and Elevators

1. We understand that the City may be providing partial funding for motion sensors for lights in common areas and to upgrade elevators. Were either of these decisions a result of the work with NATELI?

   Lighting in common areas Common areas include elevators; city financing to pay for 70% new elevator; 30% paid by residents of the building

Challenges to SEAP

1. While the audits and feasibility studies were completed, and the training sessions held with condominium associations, no measures were actually installed. What were the main challenges or factors that hindered adoption of the energy efficiency technologies?
   a. Social
   b. Policy
   c. Economic
   d. Financial
2. For the SEAP as a whole, with the short, medium and long term goals within each targeted section, what were the main challenges or factors that hindered adoption of the energy efficiency technologies?
   a. Social
   b. Policy
   c. Economic
   d. Financial
3. What are the next steps are to implement the SEAP recommendations to meet short, medium, and long term goals?

Background

In 2010, by signing the Covenant of Mayors, Tbilisi City Hall joined an initiative under which Tbilisi should become a “low carbon city” by 2020 - a goal that will be reached through the support of social and economic development of the city.
In order to achieve this goal, the Tbilisi City Hall elaborated on the Sustainable Energy Action Plan for Tbilisi.
The process of development of the SEAP implied

- development of an overall strategy for the reduction of energy consumption in the capital development of a Baseline Emissions Inventory (BEI) and Business as Usual (BAU) Scenario for Tbilisi
- development of a sustainable energy action plan with selected energy efficiency measures for the period until 2020
- acknowledgement of the role of Tbilisi City Hall as the main administrative driving force in carrying out responsibilities addressing all activities related to energy consumption
- and use of renewable energy in transport, buildings and municipal infrastructure sectors that can’t be implemented without municipality support
- -raising public awareness by promoting information about the application of energy saving measures.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Completed Projects

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas described above? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

Completed Projects

There were three classes of buildings that were audited and targeted for work; (1) hospitals; (2) buildings on the Georgia Technical University campus; and, (3) residential condominiums. We will conduct on-site visits and interviews at a sample of facilities with completed projects.
In the spring 2010 the Health Minister of Georgia stressed the role of the insurance industry as a key player in the hospital sector development. The Georgian government announced a repeated tender as a part of the hospital sector development program and nine insurance companies took part in the tender, namely, Alpha, GPI Holding, Imedi L, Archimedes Global Georgia, Aldagi BCI, Vesti, IC Group and Irao MEDI. **It was decided that the winning companies would provide insurance services to beneficiaries all over Georgia and construct a total of 46 hospitals with 1130 beds.**

Winrock International confirmed following grant financed projects:

- GTU: Four buildings and the Energy Lab
- Hospitals: Seven installing lighting measures (number needs confirmation) Of the hospitals treated, XX were new construction (Cell Therapy, Tianeti, Maneuli,
- Condominiums: Audited but no measures installed

Discussion Topics Overview

- Goals and objectives of evaluation
- NATELI's role
- Energy efficiency project decision making
- Data collection for completed projects

NATELI's Role

First, we would like a little background about NATELI's role .

1. What role did NATELI play in your facility's decision to conduct the energy audit?

2. How much technical assistance did NATELI provide:
    a. During and after the energy audit process?
    b. During your decisions to determine which measures to install?
    c. After measures were installed?
3. What role did NATELI play in your decision making process about which recommended measures to install?

Energy Efficiency Project Decision Making

1. How and why did your facility decide to conduct the energy audits?
2. Once the energy audits of the buildings were completed, how was the decision made to select the recommended measures to implement?
3. Was your facility planning to conduct an energy audit before NATELI conducted the audit?
4. Was your facility planning to upgrade the energy efficiency of these buildings before the NATELI project?
5. If so, in what time frame?
6. Would your facility have upgraded the efficiency, doing the same work, without NATELI funding? All the work? Some of the work?
7. Did your facility install recommended measures that were not funded by NATELI?
8. Will your facility consider installing recommended measures that were not installed this time?
9. In what timeframe?
10. What are the key considerations in the decision to install additional measures?

Financing

11. Did your facility obtain financing to implement the energy efficiency project?
12. If yes:
    a. For which measures?
    b. Did NATALIE assist you to access financing?
    c. Was the financing obtained outside of NATELI's assistance? (e.g., self-funded, foreign banks, etc.)
    d. Was energy efficiency reflected in the terms of the loan? (lower interest rate, better terms)

Challenges

13. What are the largest obstacles or challenges implementing energy efficiency measures?

Green Building Training Workshop

14. Did anyone at your facility attend NATELI's 2 day Green Hospital training seminar?
15. If so, how did the seminar change your/your facility's understanding of methods to evaluate energy efficient projects?
16. What was the most useful information?
17. What is your institution doing differently since attending the seminar or working with NATELI?
18. Will you continue these practices?

Future Work

19. Will your facility conduct audits or upgrade energy efficiency without funding from NATELI?
20. Have any colleagues or peer facilities asked you about the energy efficiency upgrades with an interest in doing this kind of work at their facility?

Completed NATELI-funded projects

We would like to visit the buildings that completed energy efficiency projects with NATELI funding. This is part of the evaluation and verification of energy savings.

Data Collection for Completed Projects

For each of the buildings upgraded with NATELI funding, we will analyze the achieved energy savings and conduct the cost/benefit analysis. For this, we will need documentation. Who is the best person to talk to for this information? Documentation includes:

- Detail of energy efficiency measures installed in each building
- Detail of baseline conditions
- Actual project costs by building (differentiated by energy efficiency related and other costs, e.g., rehabilitation, painting, etc.)
- NATELI's funding and in-kind contributions
- Financing
- Energy consumption data (pre and post-retrofit) for these buildings
- energy cost data (pre and post-retrofit) for these buildings
- Expected useful life of installed measures

Notes

Marneuli Hospital

Within the hospital sector development program company "IRAO MEDI" has obligation to build four hospitals in Marneuli, Gardabani, Chiatura and Zestaphoni with 25 inpatient capacity each as well as hospitals in Tsalka and Tetri- Tskaro each with 15 inpatients capacity. "IRAO MEDI" decided to build hospital buildings with basements in Marneuli, Gardabani and Zestafhoni as well as hospital building in Chiatura without a basement.

New construction; 8.9 year payback. Perlite block wall construction; specified R value for walls, ceilings, floors. Specified windows. Gas heating.

Tianeti Hospital

Winrock International has already provided assistance to GPI Holding - CURATIO in conducting energy audits in the existing hospital buildings of Bakuriani, Dusheti, Sagarejo, as well as Kazbegi-Stephantsminda. This current work is considered as a continuation of assistance to the hospital sector development program provided by Winrock International to GPI Holding - CURATIO that is in line with NATELI project's scope of work.

New construction; 7 year payback. Perlite block wall construction; specified R value for walls, ceilings, floors. Specified windows. Gas heating.

NATELI will support GPI Holding to install 238 pieces of high quality closed fixtures with low-noise regulated luminaires. This „Armstrong" lighting system will be installed in Tianeti hospital halls and corridors. (T5).

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
The Energy Bus Activities
EEC & BP

Key Research Questions

What were the effects of Energy Bus operations on target communities? How effective and efficient was this Public-Private Partnership in attaining the planned results? Did the project affect men and women in target communities differently? How is the project perceived by its beneficiaries?

Background

The Energy Bus sub-grant Agreement is between Winrock International and Energy Efficiency Center Georgia (EEC), signed in April, 2010.The implementing agency for the Energy Bus is the Energy Efficiency Center Georgia. Their annual reports state Partner donors are Azerbaijan International Operating Company ("AIOC"), the Baku-Tbilisi-Ceyhan Pipeline Company ("BTC Co"), and the South Caucasus Pipeline Company ("SCPC"). Partner Donors appointed BP Exploration (Caspian Sea) Limited to act as an agent for each of the Partner Donors for the contract with the EEC Georgia.

We would like to discuss EEC perspectives on the objectives, successes, challenges, and the effects of the Energy Bus on community members, including the scope of any individual consultations and the extent of the technical assistance provided by the Bus outreach. We will also work with the EEC to gather logistical information to organize the visits to two communities.

Discussion Topics Overview

- Goals and objectives of evaluation
- NATELI's role with the Energy Bus
- Scope of the Energy Bus activities
- Successes
- Challenges
- Logistics for community visits

NATELI's Role

First, we would like a little background on the beginnings of the energy audit curriculum and NATELI's role.

1. What is the scope of NATELI's role with the Energy Bus activities?
2. What percentage of overall project funding is provided by NATELI?
3. Does NATELI provide direction or advice in addition to funding?
4. What materials does NATELI provide? (e.g., brochures and hand-outs)
5. What is BP's role in the Energy Bus activities?

Scope of the Energy Bus activities

1. What are the objectives of the Energy Bus activities?
2. What is the level of technical assistance provided through the Energy Bus activities?
3. How did you approach community leaders to organize the Bus activities in their town?
4. How involved were the community leaders?
5. How involved were the school teachers?
6. What were teachers most interested in? Students? Community members?
7. Was there any special emphasis on drawing women in to the Bus activities and information dissemination?
8. What materials were given away?
9. Can/were CFLs be given away?
10. The reports show that the bus staff assisted community members with larger projects like methane digesters, small wind, and micro hydro. Is that correct, and can you tell us about this?

Successes

1. What were the successes that came out of the Energy Bus activities?
2. What are the short term effects of the Bus?
3. What are the long term effects?
4. Do you see evidence of lasting impacts of the Energy Bus?

Challenges

1. What were the greatest obstacles to teaching people about energy efficiency through the bus activities?
2. Were there any differences working with men and women?
3. Did you see any evidence that the Bus activities affected men and women differently?

Logistics for community visits

The large geographic territory and diverse population touched by the Energy Bus present challenges to an evaluation of the effects of Energy Bus operations on target communities. Because there are limited time and funds available, the assessment will take a case study approach. For this case study, we would like to identify two communities nearby to Tbilisi that we can visit. We would like to work with you to identify the best candidates and seek your assistance with arrangements.

We anticipate talking to the community leaders involved with the Energy Bus, school teachers and school children (if they participated in Energy Bus curriculum), and some visitors to the Energy Bus. These discussions will focus on the benefits of the information provided by the Energy Bus, how the visitors used that information in daily life, and if they took additional action as a result of participating in Energy Bus activities.

What events took place in these communities? Were there any individual or community projects that resulted, e.g., micro hydro, small PV, small wind, bio digesters? Were there school-based activities?

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Green Hospitals
Training Seminars

Key Research Questions

How effective was NATELl's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

NATELI Green Hospital and Hospital Energy Management Seminar

NATELI offered seminars (July 2011) to representatives of hospitals. The goal of the seminar was to provide representatives of the healthcare sector of Georgia with an understanding of energy efficiency and renewable energy technologies in building and managing hospitals and investment opportunities.

Discussion Topics Overview

- Goals and objectives of evaluation
- Banking Seminars
- Before Attending the Seminars
- Energy Efficiency Financing Challenges
- Closing

Introduction: Goals and Objectives of Evaluation

Introduction:

> Hello, my name is _____ from PMCG. I am calling on behalf of USAID and the NATELI project. We have been asked to evaluate the NATELI project and the energy efficiency training seminars that Winrock presented in [July 2011]. I would like to talk with you for about 10 minutes about your perceptions of the training and about considerations of energy efficiency at your facility. Is this a good time to talk? If not, could I call you back?
>
> *Schedule a time to call back if needed.*

Banking Seminars

1. We understand that you attended the Green Hospitals seminars? Is that correct?
2. First, can you please tell us which hospital you work for and your position at the hospital.
3. Can you please tell us what information was the most useful?
4. How did the seminar change your understanding about using energy more efficiently at your facility?
5. What is your institution doing differently since attending the seminar or working with NATELI?
6. Will you continue these practices?
7. Do you remember talking about the Energy Audits and Energy Passports?
8. Do you think your facility will conduct an audit to identify areas where energy use can be reduced?
9. Does your facility (does the insurance company) plan to expand your facility? Do you think (the appropriate people at your facility) will partnership with architects or designers and conduct the building simulation modeling (Energy Passport)?

Before Attending the Seminar

1. Before you attended the NATELI banking seminar:
    d. Did your facility place any particular emphasis on energy efficiency?
    e. Did your institution discuss changes in daily practices or building upgrades to improve energy efficiency?

Energy Efficiency Challenges

1. Has your facility faced any particular challenges to improving energy efficiency in daily practices or procurements?
2. Are there other external factors that affect energy efficiency projects or practices?

Closing

1. Lastly, do you think this was an effective seminar that provided useful information? Explain.
2. Would you recommend more of these kinds of seminars? Why/why not?
    a. For other hospitals?
    b. For other topics? What are they?

We'd like to be sure we thoroughly understand how the Green Hospital seminar might have changed the way hospitals think about energy efficiency. Are there any other things you would like to add? (Successes, challenges)

Thank you for your time.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
GTU Curriculum

Key Research Questions

How effective was the curriculum on energy efficiency and energy auditing, as well as energy auditor's certification programs within GTU? How successful was the project in establishing a sustainable in-country capacity to conduct energy audits?

Discussion Topics Overview

- Goals and objectives of evaluation
- NATELI's role
- Scope of the energy auditing curriculum at GTU
- Status of certification process
- The Energy Lab
- Sustainable in-country capacity
- Logistics for student focus group
- Arrangements for walk-through of buildings with completed NATELI funded projects
- Energy efficiency project decision making
- Data collection for completed projects

NATELI's Role

First, we would like a little background on the beginnings of the energy audit curriculum and NATELI's role.

1. How did the energy audit curriculum and certification process come about?
2. What role did NATELI play in the energy audit curriculum development?

Scope of the Energy Auditing Curriculum

1. What is the scope of the energy auditing curriculum at GTU?
2. We also understand there is an energy auditing manual. What role did GTU play in developing the manual?
3. Is the curriculum based on the energy auditing manual?
4. How does the manual fit in the overall energy curriculum at GTU?
5. How many separate courses are in the energy audit curriculum?
6. What was your direct role in developing the energy auditing curriculum?
7. Who else on the faculty was involved?
8. How many professors teach in this specific area?
9. Is there a copy of the syllabus we could have?
10. What has been the most challenging aspect of providing this training?

Status of Auditor Certification Process

1. We understand from our conversation with Winrock yesterday that the Certification process is not yet in place. Can you tell us how this has evolved?
2. What are GTU's plans to put the Certification in place?

The Energy Lab

1. What role did NATELI play in funding or developing the Energy Lab? What did they fund?
2. How did the Energy Lab start?
    a. Was there an existing lab that was upgraded?
    b. Did GTU upgrade a building and integrate features knowing in advance that you wanted a working lab?
    c. Or, in the process of the building upgrades, did GTU decide to incorporate the features into an Energy Lab?
3. What does the Lab include? (e.g., energy contributions to the school, working models used for teaching)
4. How is the Energy Laboratory integrated into the Energy Audit Curriculum?
5. How else is the Energy Laboratory used at the University?
6. Has there been interest from other universities in the Energy Lab and your approach incorporating it into the curriculum?
7. Has the concept of integrating the Energy Lab into the curriculum been replicated elsewhere at GTU or other universities that you know of?

Sustainable Capacity

1. How many students have completed the Energy Audit Curriculum?
2. Do you know if any have worked in or been involved with energy auditing?
3. What, if any are the future plans for teaching energy auditing courses at GTU?
4. Has the curriculum expanded since it was introduced? Expanded in this course, or to other courses.
5. What do you see as the short term impacts of offering the training?
6. What are the long term impacts of offering training in energy auditing and energy efficiency?
7. What are your perspectives about the role of energy auditing and certified auditors in the market place? Do you see interest and work in this area?
8. How would you define the key indicators of success for the energy auditing or energy efficiency curriculum?
9. What are the key successes of this program in building capacity of people who can provide energy efficiency services?
10. What challenges do you see for establishing sustainable in-country capacity to conduct energy audits?

Logistics for Student Focus Group

We would like to conduct a small focus group or group discussion with students to understand their perspective on the training they received and the successes and challenges of establishing sustainable in-country capacity to conduct energy audits. We will also talk about the work they have done or plan to do in the energy efficiency field.

1. Do you know if students who attended the course last year are continuing course work this year? Or do you know how we might reach some of the students to talk with them about their experience?

Energy Efficiency Project Decision Making

1. How and why did GTU decide to conduct the energy audits of various buildings?
2. Once the energy audits of the buildings were completed, how was the decision made to select the recommended measures to implement?
3. Did GTU decide to audit and upgrade additional buildings after seeing the results of the first building?
4. Was GTU planning to upgrade the energy efficiency of these buildings before the NATELI project?
5. If so, in what time frame?
6. Would GTU have upgraded the efficiency, doing the same work, without NATELI funding? All the work? Some of the work?

Completed NATELI-funded projects

We would like to visit the Energy Lab and the buildings that completed energy efficiency projects with NATELI funding. This is part of the evaluation and verification of energy savings. We will need to come back to visit. Who should we speak with to make these arrangements?

Data Collection for Completed Projects

For each of the buildings upgraded with NATELI funding, we will analyze the achieved energy savings and conduct the cost/benefit analysis. For this, we will need documentation. Who is the best person to talk to for this information? Documentation includes:

- Detail of energy efficiency measures installed in each building
- Detail of baseline conditions
- Actual project costs by building (differentiated by energy efficiency related and other costs, e.g., rehabilitation, painting, etc.)
- NATELI's funding and in-kind contributions
- GTU funding
- Energy consumption data (pre and post-retrofit) for these buildings
- energy cost data (pre and post-retrofit) for these buildings
- Expected useful life of installed measures

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Key Stakeholders & Informants
REMISIA

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

REMISIA

The NATELI sub contractors SDAP and REMISIA elaborated SEAP, which at this stage discusses three main CO2 emitter sectors for Tbilisi: transport, buildings, and infrastructure (municipal waste and waste water management treatment, street lighting, electricity and gas distribution networks and green spaces). Based on the Baseline Emission Inventory for 2009 and the projection of the increase in CO2 emissions by 2020 conducted in the framework of the Tbilisi SEAP, strategies and main actions for each sector were elaborated.

With NATELI funding, Winrock and sub-contractors developed a methodology (BAU) and Sustainable Energy Action Plan (SEAP) applicable for the East Partnership countries (non-annex 1 countries to the Kyoto Protocol).

Discussion Topics Overview

- Goals and objectives of evaluation
- REMISIA'srole
- Challenges to SEAP
- Capacity building

Introduction

(Present introduction to evaluation objectives)

The primary focus of our evaluation is not on the SEAP, but we do want to understand the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies. In particular, we were asked to look at challenges for the residential buildings and hospitals, which were the primary focus of the NATELI project.

REMISIA's Role

1. We understand your firm played a large part in writing the SEAP for City of Tbilisi. Please explain a bit about your role with NATELI (Winrock) and the City to develop the SEAP.
2. Was this an effective partnership?

3. Do you think the SEAP would have been completed without the funding through the NATELI program?

Capacity Building

4. Were you involved in any discussions with the City about implementing recommendations from the audits and feasibility studies for condominiums?

Challenges to SEAP

5. While the audits and feasibility studies were completed, and the training sessions held with condominium associations, no measures were actually installed. What were the main challenges or factors that hindered adoption of the energy efficiency technologies?
    a. Social
    b. Policy
    c. Economic
    d. Financial
6. For the SEAP as a whole, with the short, medium and long term goals within each targeted section, what were the main challenges or factors that hindered adoption of the energy efficiency technologies?
    a. Social
    b. Policy
    c. Economic
    d. Financial
7. What do you think the next steps are to implement the SEAP?
8. Are you continuing to work with the City to implement SEAP recommendations to meet short, medium, and long term goals?

Background

In 2010, by signing the Covenant of Mayors, Tbilisi City Hall joined an initiative under which Tbilisi should become a “low carbon city” by 2020 - a goal that will be reached through the support of social and economic development of the city.

In order to achieve this goal, the Tbilisi City Hall elaborated on the Sustainable Energy Action Plan for Tbilisi.

The process of development of the SEAP implied

- development of an overall strategy for the reduction of energy consumption in the capital development of a Baseline Emissions Inventory (BEI) and Business as Usual (BAU) Scenario for Tbilisi
- development of a sustainable energy action plan with selected energy efficiency measures for the period until 2020
- acknowledgement of the role of Tbilisi City Hall as the main administrative driving force in carrying out responsibilities addressing all activities related to energy consumption
- and use of renewable energy in transport, buildings and municipal infrastructure sectors that can’t be implemented without municipality support
- -raising public awareness by promoting information about the application of energy saving measures.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Key Stakeholders & Informants
SDAP

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

SDAP

NATELI subcontractor NGO Sustainable Development and Policy Center (SDAP) has prepared energy audits and energy passports with cost benefit analysis for the hospitals. SDAP developed a methodology (BAU) and Sustainable Energy Action Plan (SEAP) applicable for the East Partnership countries (non-annex 1 countries to the Kyoto Protocol). Developed the SEAP for residential buildings (condominiums).

Discussion Topics Overview

- Goals and objectives of evaluation
- SDAP'srole

SDAP's Role

6. How did you become involved with NATELI (providing audits & passports)?
7. Explain SDAP business services; number of energy audits before, during and after NATELI
8. Because of NATELI, how much new business was generated?
9. What short and long term changes were caused by NATELI?
10. Did SDAP employ students trained through curriculum to do the audits?
11. SEAP process; how did it come about; what was SDAP's role? What happened?
12. Are you conducting Energy Passports for any new construction interests? Who (type of business and how many) are the clients?
13. Were you involved in any of the work on Cell Therapy – negotiating with their engineer? Describe that process; what were the challenges?
14. Is there potential to work with projects early in construction phase? How would you approach this?

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Key Stakeholders & Informants
WEG

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

WEG

NATELI subcontractor foundation "World Experience for Georgia" (WEG) conducted the energy audits for the common areas of the selected 12 residential buildings (condominiums). Special training for the Condominium Associations was provided by the project, during which the findings and recommendations were presented to CAs and the Tbilisi Municipality. As a result of interest in the topic the municipality requested additional assistance in preparing full feasibility studies for the two Kruschovka type residential buildings (out of 12), as well as 2 design projects for the Solar and Geothermal heating systems for these selected 2 buildings.

This project is the first to address the problems of common areas in the buildings. With many poorly lit and unprotected entrances and inefficient old elevator systems in Tbilisi, lessons learned from this project can be extended to thousands of other buildings. The goal of the project is also to support collective efforts of condominium associations created under the Georgian Law on Condominiums (2007) to reduce their energy expenses and improve the living conditions in their common property.

Discussion Topics Overview

- Goals and objectives of evaluation
- WEG's role
- Conducting the audits
- Decisions to Implement Recommendations
- Capacity Building

Introduction

(Present introduction to evaluation objectives)

WEG's Role

15. We understand you audited the condominiums and conducted additional research on other topics, including insulation and geothermal, for example. Did WEG participate in any of the training sessions, or work with the city?
16. What was your relationship with the City of Tbilisi and the Condominium Associations?
17. For background: why was the focus on common areas and not the whole building?
18. Who owns and is responsible for operating elevators in common areas and maintaining lighting. Is that correct?
19. If they are independently owned (outside of the condominium association) why would NATALI or city pay for the upgrades benefitting a contractor?
    a. Was the owner/contractor (of elevator) obligated to contribute funds to the project if the work went forward?
    b. Does the contractor pass the energy savings on to the tenants in the form of lower payments?

Conducting the Audits

20. Did WEG employ students trained through curriculum to do the audits? In what capacity? Were these GTU energy audit training students?
21. What were the challenges to conduct the EA of common areas? How were they addressed?
22. Summarize the diversity of buildings and related challenges auditing the various condominiums.
23. Was the approach to conducting these audits and working with the Condominium Associations, Winrock, and the City effective?
24. If you were to do this again, what would you change?

Decisions to Implement Recommendations

25. Which entities were involved in decisions to implement recommendations of the audits? City and condo association? What factors affected those decisions?
26. What were the limitations on cost considerations?
27. Feasibility study: Were there any limitations in the scope of the whole building feasibility study?

Capacity Building

28. Explain WEG business services; number of energy audits before, during and after NATELI
29. If more audits were done in the future, would you change anything in the way you work with the Condominium Associations or the City?
30. Is the process replicate able in the future?
31. Because of work with NATELI, was any new business generated?
32. What needs to change to make audit standard practice?
33. And to go forward to implement measures?

Thank you for your time

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Lenders and Financial Institutions

Key Research Questions

How effective was NATELI's effort in facilitating access to financing designed to support energy efficiency projects? What were the external factors affecting NATELI's success in this area?

Discussion Topics Overview

- Goals and objectives of evaluation
- NATELI's role
- Banking Seminars
- Challenges
- Successes
- Closing

NATELI's Role

First, we would like a little background on NATELI's role working with your bank to facilitate access to financing for energy efficiency projects.

NATELI offered seminars (May and November 2010) to representatives of commercial banks (namely credit officers), real estate appraisers, and other interested parties. The goal of the training was to further understanding of core principles of energy efficiency, energy efficient technologies and carbon credit management and with the knowledge, skills and methodology needed for evaluating energy efficient projects.

4. Did you or someone from your institution attend either of these seminars?
5. Did someone from NATELI visit your bank to talk about energy efficiency considerations in the loan process (reflected in loan terms)?
6. In other words, how did the discussions of financing energy efficiency projects first come about?
7. Before you started talking with NATELI representatives:
    a. Did your institution place any particular emphasis on energy efficiency of the building when considering a loan candidate?
    b. Was the energy efficiency of buildings considered in the financial package (e.g., interest rates or other loan terms)?
    c. Did your institution finance energy efficiency projects or building upgrades to improve energy efficiency?

NATELI Banking Seminars

Earlier you said that you or someone from your bank attended the training.

1. How did the seminar change your understanding of methods to evaluate energy efficient projects?
2. What was the most useful information?

3. Did you incorporate any of the methods to evaluate energy efficient projects into standard practice?

Energy Efficiency Financing Challenges

1. Does your bank face any particular challenges providing loans for energy efficiency projects?
2. From your perspective, what are the challenges that customers face, i.e., what makes it difficult for them to secure a loan for their energy efficiency projects?
3. Are there other external factors that affect financing energy efficiency projects?

Energy Efficiency Financing Successes

1. In what ways did NATELI facilitate access to financing for energy efficiency projects?
2. What is your institution doing differently since working with NATELI?
3. Will you continue these practices?
4. Do loans for energy efficient buildings (new projects or retrofit) receive reduced interest rates or other preferential loan terms?
5. How many loans has your institution made for energy efficiency projects?
6. Are others being negotiated?
7. Were there any discussed but not closed?
8. If so, what were the issues that prevented closing the loans?

Closing

We'd like to be sure we thoroughly understand how institutions have changed the way they think about energy efficiency as a result of working with NATELI. Are there any other outcomes of working with NATELI (successes or challenges considering energy efficiency in financing) we have not talked about? Thank you for your time.

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Winrock

Key Research Questions

How effective and sustainable were NATELI's specific energy efficiency interventions in the targeted areas described above? Did the project result in reduction of energy consumption in targeted hospitals, GTU buildings, and residential buildings? Did the hospital energy efficiency component serve as a model for replication by non-assisted institutions and/or other industrial users? What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?

Discussion Topics Overview

- Goals and objectives of evaluation
- Background processes
- Project Status
- Completed Projects
- Condominium Association Projects
- GTU curriculum
- Lenders and Financial Institutions
- Energy Bus
- Partner Agencies
- Government Agencies & Other Key Informants

Project Status

1. Review status of all projects
2. Develop a spreadsheet listing each of the sites with EA and EP

    Include:
    1. Project name
    2. Sector (hospital, GTU, residential, condominium)
    3. Audit type (EA, EP, CA common area, Feasibility study)
    4. Status Sept 2011
    5. Current status
    6. NATALIE grant funding received (month/year, $)
    7. Other institutional funding received (month/year, $, lender)
3. Provide list of completed projects
4. Provide contact information
5. Provide supporting data

Completed Projects

1. We will ask about the financing process and any gaps, barriers, and challenges. We will confirm the project cost and financial data to compute the NPVQ for the completed project.
2. Which sites completed work? Confirm 5 sites in report; identify other sites
3. For each completed project, what were NATELI's contributions?
4. What were the challenges faced by the facility when considering plans to take action on recommended measures?
5. What kind of technical support did Winrock provide to the facilities to help them make a decision about which measures to install?
6. Who are the contact people at each site:
    i. for on-site verification
    ii. project decision makers
7. What consumption data are available? Winrock has? Winrock will obtain?
8. What are the expectations for performance monitoring after measure installations?
9. How is performance monitored after measures are installed?

The 2011 Annual report issued by Winrock International indicated the following were grant funded projects:

1. Two projects at GTU where NATELI contributed a boiler, combined fuses, and an expansion tank for the heating system of both buildings # 3 and # 4, costing NATELI USD 29,990. GTU contributed funds of USD 131,734. (Total project cost = USD 161,724)
    a. the complete replacement of the lighting and wiring system of the # 18 electromechanical laboratory located in Building #4 of GTU
    b. the installation of a boiler, expansion tank, and combined fuses for the heating system of GTU Buildings # 3 and # 4
2. NATELI funded the installation and complete replace of lighting systems at three hospitals:
    a. Cell Technology and Therapy Center, (Prof. Mardaleishvili Clinic). In February 2011, Winrock signed an in-kind grant agreement of $19,946 to finance installation of lighting (CFLs) and motion sensors at the Cell Technology and Therapy Center. Money was transferred to the Cell Technology and Oncology Center in March, 2011.
    b. Marneuli Hospital (25-patient), under the management of the Insurance Company IRAO, received a grant in the amount of $8,350, submitted Aug. 2011.
    c. Jo Ann Medical Center in the amount of $ 12,200, transferred Sept. 2011.

Condominium Association Projects

There may have been some follow up work with condominiums where audits were conducted for common areas or for the two sites with more comprehensive feasibility studies. We will confirm follow on work with Winrock to confirm whether any work was conducted under this NATELI project, or, under another effort. If work was completed for a condominium under the NATELI project, we will interview (a small number of) the condominium association leadership.

1. What is the status of the condominium association projects? Were any measures installed after the audit of common spaces?
2. Which buildings? What measures?

3. What were the issues the condominium associations faced when deciding which measures to install?

GTU curriculum

1. Who are the key GTU personnel (administration and/or faculty) offering the energy auditor training and certification at GTU?
2. Did the energy auditor training and certification produce auditors? Did you work with any of them? How skilled were they?
3. What were the successful outcomes of the auditor training and certification?
4. Looking forward, what are the challenges of establishing sustainable in-country capacity to conduct energy audits?
5. Are there barriers that a change in the curriculum or training could remove?

Lenders and Financial Institutions

The 2011 Annual report issued by Winrock International indicated the following lenders and financial institution training and activity:

- Two bankers' training sessions presented energy efficiency project financing: May and November 2010. Winrock reports the first training had 26 participants, and the second training had 23 participants. Participants represented all major Georgian banks including TBC Bank, Bank of Georgia, Bank Republic, and ProCredit Bank. Participants also included heads of credit departments, credit officers and real estate assessment agents.
- A presentation of the new credit line for the Hospital Sector of Georgia, in cooperation with TBC Bank and USAID HSSP project representatives. 60 people attended the presentation.
- NATELI team and TBC Bank representatives were working with customers to discuss financing options at the time of the 2011 Annual report. These meetings were with:
    - Insurance Company IC Group Ltd discussed the guarantee fund and its term; IC Group is interested in funds to rehabilitate and construct hospitals under their ownership (Feb 2011).
    - Georgian Center for Angeology and Vascular Surgery representatives to discuss the guarantee fund and its terms (Feb 2011).
    - Representatives of USAID's Health System Strengthening Project to discuss possible collaboration between the three parties within the framework of USAID's Guarantee Fund (March 2011).

The evaluation will address these three groups separately: (1) those negotiating and perhaps securing financing; (2) seminar participants; (3) interested financial institutions.

1. How are facilities that want to implement projects identified in the EA and EP paired with financial institutions?
2. What do you do to help facilities secure financing?
3. Describe the infrastructure that has been developed to ensure financial institutions can provide funding for energy efficiency projects after NATELII project expires, i.e., is this sustainable?
4. What are the barriers that are difficult for facilities seeking financing to overcome?
5. What are the barriers that financial institutions face when they would like to finance energy efficiency projects?

6. What is the status of the three facilities negotiating financing listed in the 2011 Annual report?
7. Has Winrock had requests from hospitals asking for energy audits or passports as a result of any of the training for the hospital sector?
8. We will interview a number of participants in each of the three trainings offered to bankers and to the hospital sector. Interviews will focus on the effectiveness of NATELI's effort in facilitating access to financing designed to support energy efficiency projects. Do you recommend specific lenders who attended a NATELI financial training session that we should interview? Do you know who has provided financing for energy efficiency projects?
9. Please provide an electronic list of attendees and contact information for each training session.

Energy Bus

1. What was Winrock's involvement with the Energy Bus Activities?
1. Who is the key contact at EEC of Georgia with whom we should speak?
2. Who is the key contact at BP representing partner donors with whom we should speak?

Partner Agencies

We would like to interview the primary contact at the firm conducting the energy audits and energy passports. Is that Sustainable Development and Policy Center (SDAP)? And did Energy Efficiency 21, conduct energy audits and inspections at selected apartment complexes? The key questions for these firms relate to their experience with the program and whether there is a sustainable in-country capacity to conduct energy audits.

1. Who are the key contacts at these firms?
2. Are there other firms with whom you think we should speak?

Government Agencies & Other Key Informants

We will interview a small number selected people to inform evaluation questions about program successes, barriers and challenges, and the sustainability of program efforts. We will explore whether any of the NATELI components can serve as a model for replication by non-assisted institutions and/or other industrial users.

1. One agency identified by USAID is the Municipality of Tbilisi. We will work with Winrock to identify key staff and for contact information. Who is the key contact person?
2. Do you have suggestions (and contact information) for other key informants from government, private, and non-profit sectors and other stakeholders in the project?

Background

1. What are the key program successes that have been made toward facilitating implementation of energy efficiency measures and projects?
2. What were the main challenges and obstacles related to social, policy, economic, and financial factors hindering the adoption of energy efficiency technologies in residential buildings?
3. Are there any components of the NATELI project that can serve as a model for replication by non-assisted institutions and/or other industrial users or hospitals? What are they?
4. Has Winrock had requests from hospitals asking for energy audits or passports as a result of any of the training for the hospital sector?
5. Which aspects of this project do you think are self-sustaining?

6. In every project , there are usually certain groups or community members who are trusted and who the participants will listen to about participating in a project like this. Who were the key groups that were instrumental in moving the institutions to complete projects? To obtain financing?
7. What was the expectation for how many EA and EP would be converted to implemented measures?
8. How many projects did NATELI anticipate funding ?
9. How many did NATELI anticipate securing institutional financing?
10. What is the definition of the Energy Passport? Is it the report generated when buildings are modeled, as opposed to a walk-through energy audit?
11. Describe the process after the Energy Audit and Energy Passport are completed.
12. How do you identify projects interested in moving forward?
13. Which projects have the Environmental Monitoring and Mitigation Plan developed? Is this only for facilities that go on to implement an energy efficiency project?

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Additional Questions for EEC

Background for Interviewers

These questions seek additional information to provide evidence that the Energy Bus information actually raised awareness or that utilization of locally available renewable energy sources was improved.

Questions for EEC

Introduction

Thank you for providing information about the Energy Bus activities. We would like to include additional information in our report to document that the Energy Bus activities raised awareness about energy efficiency and helped citizens to utilize locally available renewable energy sources.

1. There is a table that totals the number of individual consultations among the visitors of the Energy Bus. The total is 1166. Do you think that is a complete count?
2. One of the files that Winrock and EEC provided was contact information for citizens who received consultations and information about different topics. The spreadsheet lists citizens by district. Are these the same people who are listed in the summary table? (1166)
3. Is there documentation to show whether any of these people followed up and were able to utilize locally available renewable energy sources?
4. If these are not the 1166 mentioned in the summary table for consultations, have these data been compiled and summarized to list all citizens in one spreadsheet so we can get a quick count of the total number of citizens who received consultations?
5. Have these data been summarized for a count by topic (solar water heating, weatherization, biodigesters, etc.) (Please provide the summary spreadsheet or let us know if it is in the data provided.)
6. The annual reports for the Energy Bus provide some “success stories” about citizens who took actions after consultations. Has this information been summarized to document the total number of known cases where customers took action? (Please provide the summary spreadsheet or let us know if it is in the data provided.)
7. Are there other examples we can provide to document that the Energy Bus activities raised awareness about energy efficiency and helped citizens to utilize locally available renewable energy sources? (Please provide.)
8. We were thinking about calling a few citizens who received consultations. Do you think they would tell us what they did to follow up after the consultation if we called them?

NATELI Mid-term Evaluation (2009-2011)
Interview Summary
Phone Interview with Citizens Visiting the Energy Bus
And Receiving Consultations

Please adjust the introduction so that it is appropriate for these respondents.
The spreadsheet used to generate the random sample provides customer name, phone number and technology discussed.

Introduction

Hello, my name is _____ from PMCG. We are calling to learn more about the Energy Bus activities sponsored by EEC, USAID, and BP. We would appreciate knowing more about whether the Energy Bus raised awareness about energy and using locally available renewable energy sources.

1. The Energy Bus visited your community about [fill in quarter from spreadsheet]. Do you remember visiting the Energy Bus?
2. We would like to know more about the information you received. Did you ask for information about renewable energy or energy efficiency? [refer to technology listed in the spreadsheet]
3. Was the information helpful to you, your family, or community?
4. Were you able to use this information to build [a renewable energy system or make your home more energy efficient—check the spreadsheet or follow-up on conversation]?
5. Please tell me what you [your family, or community] did to use the information received from the people at the Energy Bus.

Thank you for your time. We appreciate knowing more about whether the Energy Bus helped people improve energy efficiency.

ANNEX E: GTU ENERGY EFFICIENCY AND AUDIT PROGRAM DETAILS

GTU Course Descriptions

This Appendix summarizes the GTU course descriptions and content for the Master of Concentration in Energy Management and the inclusive course for Energy Auditing. The Georgian Technical University is a 60 credit master training on Energy Auditing and a 60 credit master training on a concentration in Energy Management, that includes a10 credit course on Energy Auditing.
The 60 credit course on Energy Auditing meets 270 hours of coursework (120 contact hours +150 independent work hours).
The 10 credit course requires two study days (4 hour in a day). During a typical eight hour week, the course includes: 2 hours Lecture; 2 hours Practical work; 2 hours Lab work; 2 hours course project. The course is taught by one professor and an assistant of professor.

Table 1. Content of the 60 credit Master of Concentration in Energy Management course

#	Study Course	ECTS Credits
	First Semester	
1	Foreign Language	5
2	Energy Generation, Transformation and Consumption Technologies	10
3	Principles of Energy Management	5
4	Energy Consumption Demand Side Management	5
5	Renewable Energy Technologies	5
	Second Semester	
1	Foreign Language	5
2	Energy Generation, Transformation and Consumption Technologies	10
3	Principles of Energy Management	5
4	Energy Consumption Demand Side Management	5
5	Renewable Energy Technologies	5
	Total	60

A brief description of the courses follows.

Energy production, conversion and utilization technologies

1. Mediums of heat energy - steam, hot water, compressed air and others. Thermal dynamic features, options, and usage of energy careers - industrial, domestic, commercial and public users.
2. Thermal energy distribution systems and components - steam and hot water supply, condensate return, air supply schemes, thermal transmission equipment, pipelines, fittings (valves, clasps, etc.), measurement and control devices.
3. Thermal energy generation equipment for boilers and fire systems analysis, combustion efficiency, the most important details in order to achieve maximum efficiency, fuel and energy related issues, the latest technology, fuel selection and utilization management.
4. The use of waste heat and cogeneration (combined production of electrical and thermal energy). The potential use of waste heat, energy cascade utilization circuits and systems; Thermal transmission machines, waste heat utilization technology and economics; thermal energy conservation (accumulation), conservation methods, systems, and economics.

5. Cogeneration systems, circuits, systems analysis, and computer programs; technical capabilities of Cogeneration and the use of effective assessment and examples of projects Cogeneration.
6. Power consumption management. Technology of electricity consumption in the industrial, residential, commercial and public targets. Electricity quality, consumer categories, and use load charts. Basic Principles and electrical resistance. Energy consumption of equipment - Engines (Motors), Suspension (drivers), pumps, compressors, lighting systems, cooling devices, Heating - Ventilation - Air Conditioning (HVAC) and more. The criteria for their selection, operation modes, loads of optimization and technical - economic efficiency.
7. Energy Equipment Services (Maintenance). Planning and service schedules, service procedures, equipment and materials, transportation services, diagnosis and measurement tool.

The principles of energy management

1. Energy management, and financial aspects of energy audits. General characteristics of equity investments, resources, funds, taxation, time value of money, project cost estimate, energy audit services, methods and equipment, industrial, municipal and household objects energy audit, rational use of energy (saving) capability assessment and recommendations for decision-making; Monitoring energy audits examples and projects, their critical analysis.
2. Project Management. Energy management programs, organizational structure, Energy Management Planning, Enterprise Energy Action Plan, training, planning, strategic planning, accounting, main requirements for achieving success.
3. Risk analysis methods and minimization measures, diversification of energy supply, force majeure, emergency management energy, sustainable energy, providing technical and financial resources, energy security, energy security, economy, and energy management.
4. Energy consumption Ecology. Energy consumption equipment, environmental features / characteristics of air quality standards for buildings, limit emissions and penalties; industrial waste management (chaste management), green certificates or discounts; Climate Change Action Plan.

Energy demand side management

Energy saving methods, energy demand, supplies and basic charts, fluctuations, energy consumption rates, demand management and consumer culture; Thermal losses of buildings, reduction methods (Building Envelope), heat-insulating building materials; weatherization; Thermal losses of management of industrial enterprises; thermal insulation of the main aspects; insulation materials, their selection and technical - economic indicators; energy savings lighting systems and decision-making criteria for rational use of energy, energy efficiency analysis, methods and computer programs to monitor energy consumption.

Renewable Energy Technologies

Renewable energy resources, solar, wind and river power, Oceans and Seas wave energy, geothermal energy, biomass and secondary energy, heat and cold conservation, renewable energy resources and the experience of working machines, special requirements and restrictions.

Textbooks

The textbooks used in the Master course include the following.

1. **Industrial Energy Audit**. Authors: Gia Arabidze; Maka Gudiashvili; Omar Kighuradze; I. Lomidze; Tengiz Jishkariani
2. **Energy Audit**. Author; Temur Miqiashvili.

3. **Principles of Energy Management**. Authors: Maka Gudiashvili; Gia Arabidze; Tengiz Jishkariani.
4. **Renewable Energy Resources**. Author: Baadur Chkhaidze.
5. **Introduction to Energy Management**. Authors: Gia Arabidze; Tengiz Jishkariani; Temur Miqiashvili; Maka Gudiashvili; Omar Kighuradze.

GTU provided the following additional course details.

Course Outcomes

After completion of the course students will be able to conduct energy audit in the different types of energy facilities, will be able to work out an optimal decision-making capacity and energy development plan, would become a successful member of the group of power management unit (management)	
N	**Competence**
I	**Knowledge and awareness –** Has ability Conducting energy audits of industrial enterprises and has deep knowledge of optimal decision-making, which gives the opportunity to develop new ideas. Is awareness of solving to conducting energy audit problems
2	**Ability to apply knowledge to practical situations -** Able to action in multi-disciplinary environment and unintended effects, and conducting energy audits and searching of optimal decision making fresh, original ways, including research methods and approaches to implementation
3	**Ability to make relevant conclusions through analysis** - Critical analysis of the complex and incomplete information can establish a well-founded conclusions about energy audits and investment projects

Course Content

Lecture	
N	**Topic and Content**
1	The importance of energy conservation, dependence on energy consumption and energy expenditures. Necessary steps to monitor the task of organizing and setting direction. Energy research holding methodology
2	Measuring equipment and measurement methods. Temperature, flow, pressure, relative humidity, lighting and Electrical conductivity measurements. Electrical measurements. Analysis of the composition of the smoke gases
3	Basics in Combustion of fuel. The energy and mass balances in Industrial enterprises. The purpose of drawing up an energy balance. Energy transformation. Mass balance. Basic temperature. Energy and mass balance calculation
4	To increase efficiency boilers of Industrial enterprises. Factors of Boiler efficiency: the incomplete burning, excess air, the temperature of the smoke gases, boiler load, air and feeder water temperatures, heat losses
5	Steam systems. General information about Steam. Steam production. Energy saving opportunities. Secondary fermentation steam. Condensate return. General recommendation for the use of steam for the energy economy
6	Insulation. Insulation material of their choosing. The use of insulation. Insulation of pipes. Insulation of industrial buildings. The insulation thickness, insulation economy
7	Electrical systems. Power factor correction in industrial production. Low-power ratio affects the customer. Reactive power compensation. Calculation of the required capacity capacitors. Occupancy and demand management
8	Energy savings in energy engines. Electric operation and maintenance. Losses in energy engines. Electric coefficient calculation. High-efficiency electric motors. Practical recommendations for improving the efficiency of electric motors. Time to start the equipment. Voltage regulation
9	Energy-saving in pumps. Increasing the efficiency of pumps. Energy-saving in pumps through lower productivity, lower productivity through pump droseling, reducing operating wheel diameter, decline speed of the rotational. Productivity adjustment of centrifugal pumps
10	Energy saving in ventilating equipment. Reduction of fan productivity. Adjusting mechanism with wings. Adjustable fan speed. Fan characteristics. Optimization of ventilation systems.
11	Electric Engines systems. Variable load. Variable speed. Determination of operational costs. Low cost energy saving measures. Frequency - adjustable e Electric Engines. Voltage Amplitude - adjustable converting. Voltage and power inventors. Adjustable rotation speed engines
12	Electrical warm up. Electric stoves construction. Electric stoves work. Infrared warm up. Induction warm up. Energy saving s events
13	Energy-saving in lighting systems of Industrial enterprises. Lighting systems. Uniform lighting and local lighting. Specialized lighting. Equal moderation lighting. The importance of the flow of light colors. Color sampling rate. Color temperature. Color codes
14	Lighting devices. Design luminaries. Requirements of lighting devices. The potential for energy saving lighting systems. Lighting control methods. Automatic transformation system. Advice to customers
15	Compressed air. Air compressors. Choosing the correct compressor. Compressors control systems. Compressed air distribution scheme. Accumulation of compressed air. Compressed air quality. Compressed air leaks. The primary role of energy-efficient in the air

Practical Work	
N	**Topic and Content**
1	Relationship between energy consumption and energy costs. Energy research methodology. The theoretical part of the solution of the task
2	Measuring equipment and measurement methods. Solution of the task Relevant of The theoretical part
3	Industrial enterprises in the energy and mass balances. Elaborating of Energy balance sheet. Solution of the task Relevant of The theoretical part
4	Increase efficiency boilers of Industrial enterprises. Factors affecting the efficiency boilers. Solution of the task Relevant of The theoretical part
5	Steam systems, steam production, energy saving opportunities. Solution of the task Relevant of The theoretical part
6	Insulation of industrial buildings. The insulation thickness, insulation economy. Solution of the task Relevant of The theoretical part
7	Low-power ratio affects the customer. Calculation of the required capacity capacitors. Solution of the task Relevant of The theoretical part
8	Losses of electric engines. Electric motors efficient coefficient calculation. Solution of the task Relevant of The theoretical part
9	Energy-saving pumps. Increasing the efficiency of pumps. Solution of the task Relevant of The theoretical part
10	Energy saving in ventilators. Reduction of fan productivity. Solution of the task Relevant of The theoretical part
11	Electric drive systems. Determination of operational costs. Solution of the task Relevant of The theoretical part
12	Electrical worming uu. Electric stoves construction. Electric stoves work. Power-saving measures. Solution of the task Relevant of The theoretical part
13	Energy-efficient lighting systems in the industry. Lighting systemsc Color codes. Solution of the task Relevant of The theoretical part
14	Lighting devices. The potential for energy saving lighting systems. Solution of the task Relevant of The theoretical part
15	Air compressors. Compressors control systems. Compressed air distribution scheme. Accumulation of compressed air. The role of primary energy saving in air. Solution of the task Relevant of The theoretical part

Lab Work	
N	**Topic and Content**
1	Relationship between energy consumption and energy costs. Energy research methodology. The theoretical part of the solution of the task
2	Measuring equipment and measurement methods. Solution of the task Relevant of The theoretical part
3	Industrial enterprises in the energy and mass balances. Elaborating of Energy balance sheet. Solution of the task Relevant of The theoretical part
4	Increase efficiency boilers of Industrial enterprises. Factors affecting the efficiency boilers. Solution of the task Relevant of The theoretical part
5	Steam systems, steam production, energy saving opportunities. Solution of the task Relevant of The theoretical part
6	Insulation of industrial buildings. The insulation thickness, insulation economy. Solution of the task Relevant of The theoretical part
7	Low-power ratio affects the customer. Calculation of the required capacity capacitors. Solution of the task Relevant of The theoretical part
8	Losses of electric engines. Electric motors efficient coefficient calculation. Solution of the task Relevant of The theoretical part
9	Energy-saving pumps. Increasing the efficiency of pumps. Solution of the task Relevant of The theoretical part
10	Energy saving in ventilators. Reduction of fan productivity. Solution of the task Relevant of The theoretical part
11	Electric drive systems. Determination of operational costs. Solution of the task Relevant of The theoretical part
12	Electrical worming. Electric stoves construction. Electric stoves work. Power-saving measures. Solution of the task Relevant of The theoretical part
13	Energy-efficient lighting systems in the industry. Lighting systems Color codes. Solution of the task Relevant of The theoretical part
14	Lighting devices. The potential for energy saving lighting systems. Solution of the task Relevant of The theoretical part
15	Air compressors. Compressors control systems. Compressed air distribution scheme. Accumulation of compressed air. The role of primary energy saving in air. Solution of the task Relevant of The theoretical part

Course Paper/Project	
N	**Stage performance**
1	The energy and mass balance sheets of industrial objects
2	Opportunities to increase the efficiency of boilers and industrial facilities
3	The industrial units in the vapor and air distribution systems optimization
4	The thermal insulation materials for industrial facilities, thickness of insulation, thermal insulation of economic calculation
5	The industrial facility electrical systems. Power factor correction. Reactive power compensation.
6	Industrial energy-efficient electric Suspension in a given object. Performance and operation of electric motors. Losses in electric engines
7	The determination of efficiency of coefficient the standard electric motors in industrial objects. The selection of high-efficiency electric motors. Practical recommendations for improving the efficiency of electric motors
8	Increasing the efficiency of the industrial units in the pumps. Lower productivity by reducing the pump rotational speed
9	The productivity adjustment in centrifugal pumps of industrial units. Adjustable fan speed
10	Operational costs of the industrial units in the electric drive systems. Electrical warming up. Electric furnaces for construction
11	The industrial enterprise energy-saving lighting systems. Uniform lighting and local lighting. Specialized lighting.. The importance of the flow of light colors. Color sampling rate. Color temperature. Color codes
12	Lighting equipment for the industrial unit. The potential for energy saving lighting systems. Lighting control methods
13	Industrial air compressors for proper selection of a given object. Compressed air quality. Compressed air leaks
14	The industrial units in the low-potential heat regeneration
15	Energy saving projects in the industrial units in the economic analysis and final report

Teaching Format and Methods

☒ Lecture ☐ Seminar ☒ Practical Work ☒ Lab Work ☐ Practice
☒ Course Paper/Project ☒ Independent Work

Study methods

☒ Analysis method ☒ Synthesis method ☒ Discussion - Debates

Forms and methods for interpreting the results of studies included educational programs, as well as the University's web - site www.gtu.ge

Student knowledge assessment system

Below are the appropriate forms of assessment methods, criteria and scales such description has been approved by the University Academic Council Resolution № 732 dated July 6, 2012, which included educational programs, as well as the University's web - site www.gtu.ge

Evaluation of a 100-point scale.
A positive assessment will be considered:
• (A) - excellent - a maximum of 91% or more;
• (B) - very good - a maximum of 81-90%;
• (C) - excellent - a maximum of 71-80%;
• (D) - satisfactory - a maximum of 61-70%;
• (E) - enough - a maximum of 51-60%;
Negative assessment include:
• (FX) - do not pass - a maximum of 41-50%, which means that the student needs to work more and get a warrant to an additional test at the right time.
• (F) - FAIL - Maximum of 40% or less, which means that there is not enough work done by the student and the subject of a new study
Evaluation forms:
• Weekly intermediate grades;
• Mid-term exam;
• Final exam.
Assessment methods:
• Testing of open issues;
• Testing of closed issues;
• Written survey;
• homework

ANNEX F: GTU ENERGY EFFICIENCY AND AUDIT PROGRAM GRADUATE LIST

GTU provided the following information about their course graduates.

2010/2011 Year

#	Last Name	First Name	Place of employment/Organization
1	Arabidze	Khatia	Is not known
2	Burduladze	Marika	Is not known
3	Goduadze	Davit	GTU
4	Gotua	Lado	Telasi (Power Distribution Company of Tbilisi)
5	Kikabidze	Besiki	Is not known
6	Lomidze	Salome	Bank of Republic
7	Malichava	Beqa	GTU
8	Marsagishvili	Giga	Is not known
9	Sikharulidze	Nikoloz	Is not known
10	Shinjikashvili	Temur	Is not known
11	Shermazanashvili	Vano	Is not known
12	Shermazanashvili	Giorgi	Is not known
13	Qetelauri	Giorgi	Winrock Int./Nateli
14	Tshxadashvili	Hamlet	Energo-Pro Georgia
15	Todua	Tamar	Is not known
16	Javshanashvili	Nikoloz	Telasi (Power Distribution Company of Tbilisi)

2012 Year

#	Last Name	First Name	Place of employment/Organization
1	Arghvliani	Gela	Is not known
2	Badzgaradze	Teimuraz	Work Internships in Georgian State Energy system GSE
3	Bughadze	Vano	Is not known
4	Bondarev	Kiril	Work Internships in Georgian State Energy system GSE
5	Bogveradze	Alexandre	Work Internships in Georgian State Energy system GSE
6	Gugulashvili	Levan	Work Internships in Georgian State Energy system GSE
7	Gogichaishvili	Beqa	Work Internships in Georgian State Energy system GSE
8	Dvali	Giorgi	Is not known
9	Kuchava	Zurab	Is not known
10	Kakulia	Nikoloz	Is not known
11	Korotashvili	Elene	Is not known
12	Kaxadze	Gaga	Is not known
13	Rizhamadze	Razha	Work Internships in Georgian State Energy system GSE
14	Rcheulishvili	Amiran	Is not known
15	Shirimiani	Giorgi	Is not known
16	Chxetiani	Giorgi	Work Internships in Georgian State Energy system GSE
17	Khachidze	Giorgi	Is not known

ANNEX G: AUDIT PASSPORT SUMMARY

Project name	Sector	Organization	Passport / Audit	Mitigation Plan Complete & Signed	Status as of Sept 2011	Current status (Sept 2012)	Number of beds or students	Heated area m²	Expected Net savings		Investment [GEL]	Payback [year]	CO2 emission reductions (t/year)	Measures NATELI funded					Measures installed that were recommended	Other institutional financing received	NATELI was instrumental in helping the facility to secure financing GEL	Total project cost GEL
									kWh/yr	GEL/yr				Type	Date	Amount $ USD	Expected Saving KWh/yr	Expected Saving GEL/yr	Type			
Building 8 / EA Lab	University	GTU	Equipment	NA	Grant allocated and equipment supplied	In operation								Measuring device	Feb-11	$44,011			Supply of EE testing eqipment for Energy Audit Laboratory			
Building 8 / Hertz lab	University	GTU	Equipment	NA	Grant allocated and in operation	In operation								Heating demonstrating stand	July 2011	$8,655			Energy Effective Heating systems with integrated Solar Energy Collectors for the training laboratory			
Energy Audit Report of the #1 Georgian Technical University Building	University	GTU	Audit	Oct-11	Audit completed and grant allocated	In operation	3,000	30,354	1,438,318	179,907	$486,372	2.7	295	Heating system partially in building with demonstration stand	July 2011	$18,421			Installation of modern heating system; Installation of the separate local modern space heating system on two storeys of the building wing; Partual renovatiion of the lighting system.			
The #18 Laboratory of Electro Mechanics Located in the #4 GTU's Building	University	GTU	Audit	Sep-10	Audit completed and grant allocated	In operation	30	441	6,429	7,614	$22,416	2.9	1.32	Lighting system	Aug-10	$5,500	353	133	Installation of modern heating system Installation of the new lighting system			
Energy Audit Report of the #3 & #4 Georgian Technical University Buildings	University	GTU	Audit	Nov-10	Audit completed and grant allocated	In operation	700	12,137	141,509	134,765	$318,429	2.4	28.04	Heating boiler	Nov-10	$29,900	139,916	126,575	Installation of modern heating system (Boiler for the heating system) Installation of the new lighting system			
Energy Audit Report of Georgian Technical University Building 10	University	GTU	Audit		Audit completed	In operation	900	9,977	663,153	41,977	$331,748	7.9	136.4						Installation of a Modern Heating System; Substitute Building Windows with Modern Metal-Plastic Mini Package; Partial Renovation of Building Lighting System; Thermal Insulation of Building Walls			
Energy Audit Report of the #9 Georgian Technical University Building	University	GTU	Audit		Audit completed	In operation	600	2,875	266,879	59,343	$545,281	9.2	56.4						Installation of modern heating system; Installation of the double glazed metal plastic windows; Insulation of roof Renovation of the lighting system.			
St. Joachim and St. Ann Maternity Hospital	Hospital	LTD St. Joakim and Ann Maternity House	Audit		Audit completed and grant not allocated	Grant allocated and in operation	50	5,906	591,808	57,281	$306,720	5.4	134	Lighting and wiring system	October 2011	$4,650	33,510	5,361	Insulation of walls; Insulation of ceiling; Installation of a new lighting system; Helio System; Partial replacement of the windows.			
Energy Audit Report of the JO ANN Medical Center	Hospital	JO ANN Medical Center	Audit	Oct-11	Audit completed and grant allocated. Building operational and reconstruction works of building going on; final stage of lighting systems installation	Building under operation and reconstructio n works of building still going on and will be fully	50	12,349	633,807	62,771	$202,970	3.2	159	Lighting system	September 2011	$12,200	81,838	13,094	Insulation of walls; Insulation of ceiling; Installation of a new lighting system.			$3,500,000
Designing the Thermal Performance of the Building Structure with an Enhanced Energy Efficiency Level Developing an Energy Passport for the Hospital Building in Tianeti	Hospital	GPI - Insurance company	Passport	Oct-11	Passport completed and grant not allocated	Grant allocated and in operation	15	1,466	127,903	6,969	$49,040	7.0	28	Lighting system	October 2011	$9,200			Enhanced thermal performance of the building structure			$1,450,000
Designing Thermal Performance Structure With The Enhanced Energy Efficiency Level Developing The Energy Passport For The Type Design hospital Buildings In Marneuli	Hospital	IRAO MEDI - Insurance company	Passport	Sep-11	Passport completed and grant allocated. Delivering of lighting system equipment for Marneuli hospital was rescheduled from September to October and installation works were completed in November	In operation	25	1,958	115,911	6,316	$55,874	8.9	23	Lighting system	August 2011	$8,350			Enhanced thermal performance of the building structure			$3,000,000
Designing Thermal Performance Structure With The Enhanced Energy Efficiency Level Developing The Energy Passport For The "Cell Technology And Therapy Center LTD." in Tbilisi	Hospital	"Cell Technology and Therapy Center Ltd." (private ownership)	Passport	Sep-10	Passport Completed. Final stages of interior rehabilitation and internal systems installation	In operation	40	4,045	172,309	9,389	$79,252	8.4	35	Lighting system with motion sensors	March 2011	$19,946			Enhanced thermal performance of the building structure	Loan from BOG	$1,230,000	$2,830,000
Energy Audit Report of the Dusheti General Hospital	Hospital	GPI - Insurance company	Audit		Audit completed	In operation	30	2,250	113,620	11,627	$33,476	2.9	29									
Energy Audit Report of the Municipal Hospital Building in Stepantsminda	Hospital	GPI - Insurance company	Audit		Audit completed	In operation	15	1,490	120,350	9,338	$22,548	2.4	30									
Energy Audit Report of the Sagarejo General Hospital	Hospital	GPI - Insurance company	Audit		Audit completed	In operation	15	1,676	72,538	7,570	$23,046	3.0	20									
Energy Audit Report of the Municipal Hospital Building in Mestia	Hospital	Insurance company	Audit		Audit completed	In operation	20	2,123	340,412	26,179	$183,130	7.0	15									
Energy Audit Report of Oni Hospital	Hospital	Insurance company	Audit		Audit completed	In operation	15	1,200	145,918	29,071	$60,145	2.1	399									
Energy Audit Report of Khashuri Hospital	Hospital	Insurance company	Audit		Audit completed	In operation	31	3,845	206,202	23,802	$105,336	4.4	51									
Energy Audit Report of Tsageri Hospital	Hospital	Insurance company	Audit		Audit completed	In operation	25	1,989	185,632	36,930	$81,721	2.2	492									
Energy Audit Report of the Academic O.Ghudushauri National Medical Center	Hospital	O.Ghudushauri National Medical Center	Audit		Audit completed	In operation	148	36,682	1,507,037	128,358	$1,214,592	9.4	342									
Designing the Thermal Performance of the Building Structure with an Enhanced Energy Efficiency Level Developing an Energy Passport for the Hospital Building in Borjomi	Hospital	GPI - Insurance company	Passport		Passport completed	In operation	25	2,333	218,344	11,897	$81,826	6.9	44									

Project name	Sector	Organization	Passport / Audit	Mitigation Plan Complete & Signed	Status as of Sept 2011	Current status (Sept 2012)	Number of beds or students	Heated area m²	Expected Net savings		Investment [GEL]	Payback [year]	CO2 emission reductions (t/year)	Measures NATELI funded					Measures installed that were recommended	Other institutional financing received	NATELI was instrumental in helping the facility to secure financing GEL	Total project cost GEL
									kWh/yr	GEL/yr				Type	Date	Amount $ USD	Expected Saving kWh/yr	Expected Saving GEL/yr	Type			
Designing a Thermal Performance Structure with an Enhanced Energy Efficiency Level Developing an Energy Passport for the Hospital Building in Gurjaani	Hospital	GPI - Insurance company	Passport		Passport completed	In operation	70	5,171	254,942	13,891	$110,492	8.0	52									
Designing Thermal Performance Structure With The Enhanced Energy Efficiency Level Developing The Energy Passport For The Type Design hospital Buildings In Gardabani	Hospital	IRAO MEDI - Insurance company	Passport		Passport completed	In operation	25	1,958	119,859	6,531	$55,874	8.7	24									
Designing Thermal Performance Structure with the Enhanced Energy Efficiency Level Developing the Energy Passport for the Type Design Hospital Building in Chiatura	Hospital	IRAO MEDI - Insurance company	Passport		Passport completed	In operation	25	1,470	116,648	6,356	$50,592	8.0	24									
Designing a Thermal Performance Structure with an Enhanced Energy Efficiency Level Developing the Energy Passport for the Hospital Building in Tetritskaro	Hospital	IRAO MEDI - Insurance company	Passport		Passport completed	In operation	15	1,137	117,358	6,395	$50,240	7.9	24									
Designing a Thermal Performance Structure with an Enhanced Energy Efficiency Level Developing the Energy Passport for the Hospital Building in Zestaponi	Hospital	IRAO MEDI - Insurance company	Passport		Passport completed	In operation	25	1,958	99,774	6,437	$55,550	8.6	20									
Designing a Thermal Performance Structure with an Enhanced Energy Efficiency Level Developing an Energy Passport for The Hospital Building in Bolnisi	Hospital	IC Group - Insurance company	Passport		Passport completed	In operation	25	2,175	120,536	6,568	$45,072	6.9	24									
Designing Thermal Performance Structure with an Enhanced Energy Efficiency Level Developing an Energy Passport for the Hospital Building in Dmanisi	Hospital	IC Group - Insurance company	Passport		Passport completed	In operation	20	1,601	154,871	8,439	$45,763	5.4	31									
Energy Audit Report of the General Hospital Building in Bakuriani	Hospital	GPI - Insurance company	Audit		Audit completed	In operation	5	662	67,572	10,222	$12,258	1.2	16									
Total			230				5,939	150,567	8,052,067	905,720	$4,617,505	152	2516			$116,822	255,617	145,163			$1,230,000	$10,780,000

ANNEX H: CONFLICT OF INTEREST AND NON-DISCLOSURE STATEMENTS

SOL-1 14-12-000005

ATTACHMENT 3

CONFLICT OF INTEREST AND NON-DISCLOSURE STATEMENT

With respect to proposals submitted in response to the subject USAID solicitation the undersigned hereby agrees and certifies to the following:

1. I will use the proposals and all information therein other than information otherwise available without restriction, for evaluation purposes only. I will safeguard the proposals, and will not remove them from the site at which the evaluation is conducted unless authorized by the Contracting Officer. In addition, I will not disclose them, or any information contained in them (other than information otherwise available without restriction), except as directed or approved by the Contracting Officer.

2. I will ensure that any authorized restrictive legends placed on the proposals by prospective contractors or subcontractors, or USAID, will be applied to any reproduction, or abstract of information, made by me.

3. Upon completing the evaluation, I will return all copies of the proposals, and any abstracts thereof, to the USAID office that initially furnished them to me.

4. Unless authorized by the contracting officer in advance in writing I will not, whether before, during, or after the evaluation contact any prospective contractor or subcontractor, or their employees, representatives or agents, concerning any aspect of the proposal.

5. I have carefully reviewed my employment (past, present and under consideration) and financial interests, as well as those of my household family members. Based on this review, I certify, to the best of my knowledge and belief as of the date indicated below, that I either (1) have no actual or potential conflict of interest, personal or organizational, that could diminish my capacity to perform an impartial and objective evaluation of the proposals, or that might otherwise result in an unfair competitive advantage to one or more prospective contractors or subcontractors, or (2) have fully disclosed all such conflicts to the contracting officer, and will comply fully, subject to termination of my evaluation services, with any instructions by the Contracting Officer to mitigate, avoid, or neutralize conflicts(s). I understand that I will also be under a continuing obligation to disclose, and act as instructed concerning, such conflicts discovered at any time prior to the completion of the evaluation.

SIGNATURE _____ DATE May 13, 2012

CONFLICT OF INTEREST AND NON-DISCLOSURE STATEMENT

With respect to proposals submitted in response to the subject USAID solicitation the undersigned hereby agrees and certifies to the following:

1. I will use the proposals and all information therein other than information otherwise available without restriction, for evaluation purposes only. I will safeguard the proposals, and will not remove them from the site at which the evaluation is conducted unless authorized by the Contracting Officer. In addition, I will not disclose them, or any information contained in them (other than information otherwise available without restriction), except as directed or approved by the Contracting Officer.

2. I will ensure that any authorized restrictive legends placed on the proposals by prospective contractors or sub-contractors, or USAID, will be applied to any reproduction, or abstract of information, made by me.

3. Upon completing the evaluation, I will return all copies of the proposals, and any abstracts thereof, to the USAID office that initially furnished them to me.

4. Unless authorized by the contracting officer in advance in writing I will not, whether before, during, or after the evaluation contact any prospective contractor or subcontractor, or their employees, representatives or agents, concerning any aspect of the proposal.

5. I have carefully reviewed my employment (past, present and under consideration) and financial interests, as well as those of my household family members. Based on this review, I certify, to the best of my knowledge and belief as of the date indicated below, that I either (1) have no actual or potential conflict of interest, personal or organizational, that could diminish my capacity to perform an impartial and objective evaluation of the proposals, or that might otherwise result in an unfair competitive advantage to one or more prospective contractors or sub-contractors, or (2) have fully disclosed all such conflicts to the contracting officer, and will comply fully, subject to termination of my evaluation services, with any instructions by the Contracting Officer to mitigate, avoid, or neutralize conflicts(s). I understand that I will also be under a continuing obligation to disclose, and act as instructed concerning, such conflicts discovered at any time prior to the completion of the evaluation.

Anne West

_____ June 6, 2012

SIGNATURE

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