



ALLIANCE TO SAVE ENERGY – ARMENIA MUNICIPAL NETWORK FOR ENERGY EFFICIENCY

2006 REPORT

YEREVAN



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Introduction

The earlier three phases of the USAID funded Municipal Network for Energy Efficiency (MUNEE) Program in Armenia and the insight gained over the course of the activities implemented during the past years, have identified and explored several key directions which the Alliance to Save Energy has successfully pursued in the past four years. The chosen approach of work on different levels including national policy for top-down promotion of energy efficiency (EE) and supported with municipal EE capacity building and residential EE awareness programs has proved effective and will be followed over Phase IV.

After the ratification of Armenia's Law on Energy Saving and Renewable Energy (ES&RE) in December 2004, in 2005 the MUNEE - Armenia program has refocused some of the FY05 workplan on responding to the Ministry of Energy request for addressing the technical assistance needs for drafting the secondary legislation and national programs for adequate legal enforcement including the outline of the National Energy Saving Program, the draft operations manual for EE&RE fund and the draft socio-economic policy analysis based on international experience in this field.

In 2006, the MUNEE program continued working on (I) deepening the National policy reform on Energy Saving and Renewable Energy; (II) Building capacity of home-owner associations and municipalities for implementation of building energy efficiency projects; (III) integrating the Armenian partners into the national and regional energy efficiency network; and (IV) providing dissemination and outreach on the developments in the sphere of energy efficiency to the relevant experts.

The activities implemented and some key accomplishments by the Alliance to Save Energy under the MUNEE program during 2006 in Armenia included the following:

- Policy reform:
 - ◆ The *Ordinance on Conducting Energy Examination* for buildings and constructions, thermal insulation, weatherization and other materials, industrial and commercial enterprises and power facilities was developed and adopted by the Government of Armenia in August, 2006
 - ◆ The *CIS Intergovernmental Construction Norms MSN 2.04-02-2004* was translated from Russian and the document is currently in the process of public hearing and adaptation by the Ministry of Urban Development
 - ◆ The *National standard for determining the energy intensity of energy consuming equipment and processes "Method of evaluation of energy intensity in technological energy systems during the production and service provision"* was developed and is being adapted to Armenian conditions
 - ◆ The *National Program on Energy Saving and Renewable Energy (ESRE)* was developed with the assistance of Energy Research Institute (ERI) of Armenia and was adopted by the Government of Armenia in January, 2007 (The whole document is available in Library section on www.munee.org)
- Residential energy efficiency and heating
 - ◆ The Alliance established Building Energy Efficiency Revolving Funds in the cities of Gyumri and Vanadzor. The result of Funds' operation include:

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- ✓ Six projects in Gumri, which included 12 buildings with the total of 544 apartments. Two of the projects were successfully completed in the beginning of 2006 and the whole amount of the loans was repaid (Annex A). The other four projects are still in process.
- ✓ Three projects in Vanadzor, which included 3 buildings with the total of 134 apartments (Annex B). All three of these projects are currently in the process of implementation.
- ✓ The achievements and outcomes of the Funds operation include:
 - Increased building energy efficiency, improved comfort and maintenance of buildings,
 - Extended building lifespan
 - Improved payment discipline of the residents
 - Increased capacity of condominiums in building maintenance and management
 - Long-term availability of the Revolving Funds
 - Increased attractiveness of the city for future larger-scale investments
 - Building credit history of borrowers
- ◆ The Alliance developed Residential Energy Efficient Heating Guide which serves as a step-by-step guide on how to start and organize energy efficient heating systems for multi-apartment buildings. The Guide was further published by UNDP/GEF “Armenia-Improving the Energy Efficiency of Municipal Heating and Hot Water Supply” Project in September, 2006.
- ◆ The Alliance team, as part of the USAID Residential Heat Project consortium provided continuous technical assistance on the establishment and capacity building of condominiums and housing associations
- Regional Studies
 - ◆ The Alliance team has conducted the study on “Addressing Affordability of Utility Services in Urban Housing: Energy and Water Efficiency Solutions” and the “Armenian Urban Heating Policy Assessment”. The final papers were submitted for integration into the regional syntheses and expert peer review
- The Alliance team participated in the following events.
 - ◆ Workshop on Removing Barriers to Residential Energy Efficiency in Central and Eastern Europe, Feb 6-7, 2006, Kiev, Ukraine
 - ◆ Seminar on Renewable Energy Development in Armenia, March 4-5, 2006
 - ◆ National Assembly (NA) Parliamentary Hearings on Energy Security of Armenia, March 16, 2006
 - ◆ Seminar on “Municipal Planning in Armenia”, 27-31 March, 2006
 - ◆ Workshop on Twinning Cities and Municipalities Networks for Sustainable Energy, April 7, 2006, Budapest, Hungary
 - ◆ Black Sea Energy Conference, April 3-5, 2006, Bucharest, Romania

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- ◆ Seminar on Design and analysis of fuel consumption coefficients in Thermal Power Plants Taking into Account the Changes in the Energy Sector, September 4-8, 2006, Moscow, Russia
- ◆ Training on Protection of Residential Interests in the Spheres of Multi-Apartment Building Management and Public Services, Gyumri, October 11, 2006
- ◆ Forum on Financing Municipal Energy Efficiency in the Commonwealth of Independent States, November 13-14, 2006, Moscow, Russia

The detailed breakdown of tasks and activities implemented is provided in the sections below, by key workplan task areas.

National Policy Reform

The Secondary Legislation for the Law on ES&RE

As part of the overall effort on development of the secondary legislation (bylaws) the Alliance team has developed the *Ordinance on Conducting Energy Examination for buildings and constructions, thermal insulation, weatherization and other materials, industrial and commercial enterprises* and power facilities according to the requirements of the Laws of RA on Energy Saving and Renewable Energy and the Law on Concordance Assessment and other related legal acts. The structure of the developed document has been agreed with the Technical Policy Department of the Ministry of Energy. The ordinance was then submitted to the Ministry of Energy for governmental circulation among stakeholder ministries. A few comments were received from the other ministries, which were then incorporated in the final version of the document. In August 2006 the Ordinance on Conducting Energy Examination was adopted by the Government of Armenia.

The CIS Intergovernmental Construction Norms MSN 2.04-02-2004 was translated from Russian and the document is currently in the process of public hearing and adaptation by the Ministry of Urban Development.

The Alliance developed the review of current international regulations on gas appliances, building codes, audits and energy efficiency indicators as part of technical assistance to the Ministry of Energy in drafting secondary legislation on state energy examinations

The Alliance team prepared energy consumption benchmarks (Best Available Technologies) for more than 20 industrial and agricultural processes. These were used by the Alliance and its contractor – the Energy Research Institute (ERI) in the development of National Program on Energy Saving and Renewable Energy.

The summary overview paper on energy examination standards, building energy performance norms and building codes that are currently in operation in Russia, EU, USA and Canada was developed.

The Alliance team developed a *National standard for determining the energy intensity of energy consuming equipment and processes “Method of evaluation of energy intensity in technological energy systems during the production and service provision”*. The Russian State Standard N 51751-2001 was consulted, translated into Armenian, and it is being adapted to Armenian conditions. The first draft of the standard is completed.

Development of National Program on Energy Saving and Renewable Energy

In March 2006 a subagreement between the Alliance to Save Energy and the Energy Research Institute (ERI) of Armenia was signed on Development of *National Program on Energy Saving and Renewable Energy (ESRE)* for facilitating the *enforcement of the ESRE Law of the Republic of Armenia*.

The ERI work focused on data collection and desk review of the macroeconomic indices of Armenia during 2001-2004. The collected information was analyzed and summary conclusions for the national program presented for the Alliance review. The information was analyzed in comparison with the macroeconomic indices and development trends for the CIS and advanced industrialized countries 2001-2004 (which were also collected). The

macroeconomic indices of fuel-energy balance of RA of 2001-2004 were collected and the development trends in the electricity sector identified.

For end-use energy data collection, the Energy Institute team worked with the large energy consumer enterprises (with monthly energy consumption of 100,000 kWh and more) to fill out energy passports. This task included 42 largest energy consumers of Armenia.

The Alliance prepared energy consumption benchmarks (Best Available Technologies) for more than 20 industrial and agricultural processes. These were used by the Alliance and its contractor – the Energy Research Institute to set efficiency benchmarks/reference levels, against which the current large energy consumers were screened. The majority of data collected through energy passports was entered into computer software and processed.

The ERI, with the technical assistance from the Alliance, conducted the analysis of energy consumption indices for industrial and residential sectors and evaluation of technologies in place in Armenia's largest enterprises the sphere of economic activities, energy intensive companies and large energy installations/plants.

The ERI team, together with the Alliance staff, collected statistical data on Energy sector of Armenian Economy through official statistics, published resources, energy sector entities, as well as through compilation of energy passports and audits of large energy consumers in Armenia.

On November 21 the Alliance held the sixth session of the Armenian Energy Efficiency Council (AEEC) (Annex C). During the meeting the draft of the National Program on Energy Saving and Renewable Energy was presented which contained unprecedented, interdisciplinary assessment of the energy saving and renewable energy potential in all sectors of Armenian economy, including enterprise-level analyses for all large energy producers. The AEEC members, governmental representatives, NGOs, private and academic institutions provided comments and suggestions for further improvement of the National Program on Energy Saving and Renewable Energy.

Some of the noteworthy sectors with the largest potential estimated in and highest priority assigned are as follows:

- ↳ 40% of national energy saving potential is in building sector. Building weatherization can save up to 30% thermal energy necessary for space heating equivalent to:
 - 3.35 million GCal in residential buildings; and
 - 0.67 million GCal in public/tertiary buildings.
- ↳ 15% energy reduction potential was identified in water supply and irrigation;
- ↳ Optimization of lighting was calculated to save 475 million kWh over the next 10 years;
- ↳ Industrial energy efficiency measures were estimated to reduce energy use:
 - By 5% in mining industries ;
 - By 23% in chemical industry; and
 - By 35-40% in food industry.
- ↳ 210 MW new gas turbine installation and transition to fuel conservation mode would annually save Yerevan Thermal Power Plant (TPP) from 184 to 265 million m³ natural gas;
- ↳ Retrofitting of the fifth unit of Hrazdan TPP would annually save 223 million m³ natural gas; etc.

The National Program proposes 16 categories of energy efficiency measures (including technical, institutional, administrative, financial, etc.) setting a nationwide cut in energy use over 1 million t.o.e. annually.

The National Program also appraises the renewable energy potential in Armenia for hydro-power, biogas, solar, geothermal and wind power installations technically and economically feasible for application by 2020.

The document was then submitted to all the stakeholder ministries and the Government of Armenia for review and in January 2007 it was adopted.

Residential Energy Efficiency and Heating: Working with the Condominium Associations and the Municipalities

Building Energy Efficiency Revolving Fund in the city of Gyumri

In December 2005 the Alliance to Save Energy established a Building Energy Efficiency Revolving Fund in the city of Gyumri. The Fund provides loans with 0% interest rate and 6 months repayment period, and is aimed at developing means and methods for condominiums to increase the energy efficiency of buildings and improve heat conservation in common areas; to improve management and assist condominiums in maintaining the building stock. In order to be awarded a loan from the Fund, the condominiums have to contribute at least 20% of the project cost from their own resources – financial, labor, or materials. The Alliance, together with NACO provides project oversight, while the local NGO in Gyumri - Third Nature NGO conducts day-to-day project management and coordination.

In the first stage of the Fund's operation two condominiums ("Bardzraberd" and "Ghandilyan") were awarded by funds for implementation of EE measures, which included installation/repair of entrance and basement doors and windows as well as gutter pipes. Each of these two condominiums received \$500 loans from the Fund in addition to their own financial and labor contribution. Both condominiums have repaid their loans in time according to the agreed schedules.

The key results of the implemented projects were:

- ↳ Apartments' average indoor temperature was increased, the comfort level was improved and significant energy savings were achieved. According to the residents in the "Bardzraberd" condominium once external doors and basement windows were installed, indoor apartment temperature increased by 2÷3°C. This temperature increase amounts to approximately 8,800kWh in energy savings throughout the entire building, which is approximately \$490 savings during the 188-day heating season. Therefore, during the three remaining months of the heating season after project completion in January 2006, almost half of the initial investment has already been recovered through energy savings. Thus, the average payback period for this kind of projects is one year.
- ↳ The reputation of condominium managers' and trust towards them was increased.
- ↳ The fee collection rate was improved.

- ↳ Participation of residents in joint efforts within their condominiums increased significantly.

After the repayment of the loans by the first two condominiums the second stage of application process took place, in the result of which four condominiums (“Akhtamar”, “Shirak”, “Bardzraber” and “Ghandilyan”) were awarded by loans for implementation of EE projects, which include installation/repair of entrance doors, glazing/repair of entrance windows, installation of basement windows, as well as replacement and thermal insulation of drinking water pipelines.

Expansion Possibilities of Building Energy Efficiency Revolving Fund to Other Cities of the Shirak Marz

Considering the successful implementation of Revolving Fund in Gumry the condominiums and municipalities of neighboring cities - particularly Maralik and Artik -- expressed interest in participating and/or establishing such Fund in their cities.

A Memorandum of Understanding between the ASE, Maralik Municipality, NACO and Third Nature NGO on Cooperation in the Area of Building Energy Efficiency was signed on December 1, 2006. According to the MOU, the Maralik municipality agreed to provide general supervision, social assistance to low-income families and overall support to the building EE measures. The application was received from “Miadzuil” condominium of the city of Maralik, which is currently being reviewed by the Alliance, Third Nature NGO and NACO. The Alliance received a letter from the mayor of Maralik confirming municipal assistance for investment on behalf of low-income families in the upcoming building EE project.

The possibilities of EE Revolving Fund expansion to the city of Artik are currently under the discussion.

Building Energy Efficiency Revolving Fund in the City of Vanadzor

In August, 2006 the EE Revolving Fund was established in the city of Vanadzor. A memorandum of understanding was signed between the Alliance, Municipality of Vanadzor, NACO and the Lori Marz Condominium Center regarding cooperation in the field of building energy efficiency in multi-apartment buildings in the city of Vanadzor.

After announcing the program launch and meeting with the condominiums in Vanadzor a number of applications were received and three condominiums - “Kayaran”, “Narek” and “Satar” condominium were awarded loans for implementation of EE measures in their buildings, which included installation/repair of entrance and basement doors and windows as well as thermal insulation of drinking water and sewage pipelines.

As a result of implementation of projects in the aforementioned condominiums 30 entrance doors and 50m² of entrance windows were either refurbished or newly installed. Partial renovation of roofs was done and 70m of drinking water pipeline was insulated. Besides the EE measures, some general repair work was implemented in the entrances of the buildings.

All three condominiums report that as a result of the implemented work significant improvements were achieved in the overall condominium operation:

- ↳ Increased fee collection rate (the residents started to pay their debts);
- ↳ Increased trust towards the condominium managers;

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- ↪ According to the residents of the buildings where the projects were implemented, the temperature in the entrances has risen by 2-4°C.

Box 1. Results of Building EE Micro-Loan Revolving Funds

2005

- GUMRI: 2 projects
[2 HOAs, 2 buildings, 4 entrances, 142 apartments, 426 people]

2006

- GUMRI: 4 projects
[4 HOAs, 9 buildings, 24 entrances, 402 apartments, 1200 people]
- VANADZOR: 3 projects
[3 HOAs, 3 buildings, 10 entrances, 134 apartments, 506 people]

FINANCING

- Alliance contribution to the revolving funds: \$3,150
- Leveraged investments from residents: \$ 500
- Municipal investment on behalf of low-income: \$ 350
- Revolved Funds from the first phase: \$1,000

TOTAL INVESTMENT TO DATE: \$5,000

year	Annual Savings (MWh)	Financial Savings (if gas heating)	Financial Savings (if electric heating)
2005 (\$1100 invested)	17.6	\$ 326	\$1,667
2006 (\$3900 invested)	156.2	\$2,895	\$10,358
2007 (expected)	350.8	\$6,503	\$23,262

Other achieved and expected outcomes include:

- Increased building energy efficiency, improved comfort and maintenance of buildings,
- Extended building lifespan
- Improved payment discipline of the residents
- Increased capacity of condominiums in building maintenance and management
- Long-term availability of the Revolving Funds
- Increased attractiveness of the city for future larger-scale investments
- Building credit history of borrowers

The repayment of the loans is done by all three condominiums according to the agreed schedules.

Some of the lessons learned in this work included the following:

- ↪ Awareness and explanatory work crucial
- ↪ Involvement of municipalities in building EE projects necessary to eliminate low-income barrier
- ↪ Social funds used to reduce utility bills (instead of covering them)
- ↪ Gradual increase of lending to each borrower helps build confidence in this fragile lending sector
- ↪ Role of champions instrumental (e.g. saga of Aparan city)
- ↪ Try to design more bullet-proof schemes
- ↪ Experience can be replicated to design a larger building EE lending facility

Building Energy Efficiency Revolving Fund in the City of Aparan

Unfortunately, after the change of local government, the new municipal administration as failed to build the healthy relationship with the building managers and, regardless of the long period allowed by the Alliance for adaptation and familiarization of the new officials with the revolving fund affairs, the city did not show enough interest in operating of the Revolving Fund. After almost a year of training and assistance to condominiums and the Municipality of Aparan in preparation of necessary documentation and applications for implementation of EE measures, it became evident that the condominiums are not showing any initiative and that the residents themselves are not ready for borrowing money from the Revolving Fund. Thus it was decided to recall the MUNEE program funds allocated from the revolving fund.

Building Energy Efficiency Revolving Fund in the City of Hrazdan

In June 2006, the ASE staff had two meetings with the municipality and condominium managers in the city of Hrazdan to discuss the issue of establishing the Building EE Revolving Fund introduced the program specifics, loan application process, repayment, eligibility and evaluation criteria etc. The Municipality has expressed a strong interest in implementing the program and willingness to provide financial support to the low-income households in building EE projects, and the condominium managers have also showed their commitment, conducted initial meetings with residents. It was agreed that the municipality of Hrazdan will coordinate the condominiums for taking the further steps, but unfortunately there was no follow-up in this process. A number of conversations with the Deputy Mayor of the city were held, but by the end of the year no further steps were taken by the Alliance as a result of inertness of the condominiums.

Assistance to Heating Advisory Services office within the framework of “Armenia-Improving the Energy Efficiency of Municipal Heating and Hot Water Supply” Project, UNDP/GEF/00035799

The Alliance provided continuous support to the Heating Advisory Services office. The Alliance participated in a number of meetings in the framework of the Heating Advisory Services. The existing heat supply and institutional/management problems were identified and discussed during the aforementioned meetings with boiler house leasing condominiums, private energy supply companies, donor funded organizations and other interested parties.

The Alliance developed Residential Energy Efficient Heating Guide which serves as a step-by-step guide on how to start and organize energy efficient heating systems for multi-apartment buildings. The Guide was further published by UNDP/GEF “Armenia-Improving the Energy Efficiency of Municipal Heating and Hot Water Supply” Project in September, 2006.

USAID Residential Heating Project (RHP): Technical Assistance on the Establishment and Capacity Building of Condominiums and Housing Associations

The Alliance team, as part of the RHP consortium provided continuous assistance to the project. During the project lifetime the Alliance team accomplished the following:

- ↳ Prepared the report on analysis of the lessons learnt from the residential heating pilot projects (2 successful and 2 unsuccessful);
- ↳ Participated in a number of field trips to different cities of Armenia within the scope of its activities;
- ↳ Developed a paper on community meetings’ framework, translated into Armenian;
- ↳ Developed a paper on possible topics for community meetings; summary translation was produced and discussed;

- ↪ Prepared and made a presentation on energy efficiency in residential sector for the staff of the RHP, per request of the RHP management;
- ↪ Prepared the Community Outreach Action Plan in MS Project format;
- ↪ Participated in the Roundtable discussion on "Legal Barriers in Heating Sector";
- ↪ Participated in the site visits (together with RHP engineers);
- ↪ Participated in organizing the First Exhibition of Heating Technologies held on March 15-17, 2006;
- ↪ Developed the EE Heating course and EE awareness materials for the residents of project sites;
- ↪ Participated in the team meetings regularly.

Networking and Outreach

Events

Workshop on Removing Barriers to Residential Energy Efficiency in Central and Eastern Europe, Feb 6-7, 2006, Kiev, Ukraine

The workshop was organized by the Alliance to Save Energy and Renewable Energy and Energy Efficiency Partnership program under USAID funding. The alliance team from Armenia has made the following presentations during the workshop:

- ↪ *Armenia's Ongoing Energy Efficiency Reform and Its Promotion: Energy Efficiency Law and the National Energy Efficiency Program*, Astghine Pasoyan, Program Manager
- ↪ *Survey Analysis of Barriers to Residential Energy Efficiency in Armenia and Ways to Address Them*, Arusyak Ghukasyan, Program Consultant
- ↪ *Building Energy Efficiency Revolving Fund: Assistance Program for the cities of Aparan and Gyumri*, Tigran Parvanyan, Program Consultant

Seminar on Renewable Energy Development in Armenia, March 4-5, 2006

The seminar was organized by the "Energyinvest PIO" State Institution in the framework of the WB/GEF. The WB/GEF Grant Project aimed at assisting to the increase of the share of renewable energy production by the recipient through development of a self-sustaining and market-based financial mechanism. The Agenda covered the Project implementation progress, introductory remark about Renewable Resources and Energy Efficiency Revolving (R2E2) Fund, the barriers of the Renewable Energy Development in Armenia, "one window" implementation for development of renewable energy projects, evaluation of local manufacturers in the field of renewable energy, etc. At the end of the Meeting an interesting discussion between Armenian Governmental officials and donor funded organizations' representatives on renewable energy development priorities.

National Assembly (NA) Parliamentary Hearings on Energy Security of Armenia, March 16, 2006

The representatives of international and public organizations, as well as interested parties expressed their viewpoints. A. Pasoyan, the Program Manager of Alliance to Save Energy - Armenia made a presentation on Energy Saving Potential and National Energy Efficiency Program of Armenia.

Seminar on “Municipal Planning in Armenia”, 27-31 March, 2006

The program was sponsored by the Federal Ministry for Economic Cooperation and Development on behalf of the Government of Germany. The seminar covered National and Municipal Development Planning in Armenia, SWOT – Analyses and Project Identification and Project Planning.

Workshop on Twinning Cities and Municipalities Networks for Sustainable Energy, April 7, 2006, Budapest, Hungary

A. Pasoyan participated and presented on the *MUNEE Program in Armenia* at the in the workshop on “Twinning Cities and Municipality Networks for Sustainable Energy” workshop, organized by the REEEP RS for CEE & Turkey, where REEEP secretariat gathered together the representatives from the major municipal networks active in sustainable efficiency field in Central and Eastern Europe. Activities of the networks, needs of municipalities and their best practices were presented at the meeting; discussions were focused on the needs for cooperation and coordination of the activities of the networks. The meeting meant to:

- ↳ Share the experiences and best practices of municipality networks and networking initiatives on improving energy efficiency;
- ↳ Identify the needs of the networks and municipalities in the fields of sustainable energy policy and financing mechanisms on local level;
- ↳ Enhance cooperation among sustainable energy related municipal initiatives for synergetic effects;
- ↳ Explore the niche for and added value of REEEP to contribute to town twinning in CEE/Turkey and Russia/CISM.

Black Sea Energy Conference, April 3-5, 2006, Bucharest, Romania

A. Pasoyan participated and presented at the Energy Access and Affordability Panel at the Black Sea Energy Conference. The key topics covered by the Conference were set consistent with the South East European Energy Community Treaty, including:

- ↳ evaluating the current situation;
- ↳ attracting investors in developing grounds for regional energy exchanges;
- ↳ identifying challenges and opportunities;
- ↳ investment projects and their attractiveness;
- ↳ preparing a matrix of key steps toward developing Black Sea regulatory harmonization;
- ↳ analyzing legal / regulatory limitations and constraints for each country and developing a list of subjects for the regional seminars / workshops to be convened in the future.

Within the Conference a number of workshops were dedicated to energy regulatory systems, transmission and affordability issues were organized and funded by USAID Romania Mission.

Seminar on Design and analysis of fuel consumption coefficients in Thermal Power Plants Taking into Account the Changes in the Energy Sector, September 4-8, 2006, Moscow, Russia

The Alliance consultant participated in the seminar on Design and analysis of fuel consumption coefficients in Thermal Power Plants taking into account the changes in the energy sector. A number of documents (methodologies) were obtained which were analyzed in order to determine their applicability for Armenia.

Training on Protection of Residential Interests in the Spheres of Multi-Apartment Building Management and Public Services, Gyumri, October 11, 2006

A one-day seminar was organized in Gyumri for the staff of the Third Nature and some condominium managers from Vanadzor. The purpose of the seminar was to train the staff of the Third Nature on Energy Efficiency measures so that they can assist other condominiums in preparation and implementation of energy efficiency measures in their buildings.

Forum on Financing Municipal Energy Efficiency in the Commonwealth of Independent States, November 13-14, 2006, Moscow, Russia

The Armenian delegation consisting of the Mayor of Qajaran, Head of Staff of Kapan, president of NACO, and UNDO/GEF Heat project experts attended the forum on Financing Municipal Energy Efficiency in the Commonwealth of Independent States, November 13-14, 2006, Moscow, Russia. *The Armenian delegation made three presentations on building EE revolving funds, UNDO/GEF CHP project preparation and Kapan street-lighting project.*

Public Outreach

The Alliance team collected the Armenian and Regional energy-related news CLIPS, reviewed and compiled in newsletters, which were disseminated to over 80 stakeholder organizations, partners and international energy experts on weekly basis.

Regional Studies

The Alliance team has conducted the study on “Addressing Affordability of Utility Services in Urban Housing: Energy and Water Efficiency Solutions” and the “Armenian Urban Heating Policy Assessment”. The final papers were submitted for integration into the regional syntheses and expert peer review.

For questions and comments contact:

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Annex A: EE Revolving Fund Program in Gumri

PROJECT HIGHLIGHTS

- The Alliance to Save Energy established a Building Energy Efficiency Revolving Fund in the city of Gyumri with the amount of \$1000 for the first stage of program implementation.
- The condominiums do not collect enough money on monthly basis to implement EE measurement to avoid the possible heat losses in their buildings and maintain the building stock, especially the common areas on appropriate level.
- The Fund, which provides loans with 0% interest rate and 6 months repayment period, aims at developing means and methods for condominiums to increase the energy efficiency of buildings and improve heat conservation in common areas; to improve management and assist condominiums in maintaining the building stock.
- Alliance, together with NACO provides project oversight, while the local NGO in Gyumri - Third Nature NGO conducts day-to-day project management and coordination.
- Two condominiums (Bardzraberd and Ghandilyan) were selected for EE project implementation in their buildings for the first stage of the program. The loan repayments were made on time after the EE projects' implementation.
- The implemented EE projects include installation/repair of entrance and basement doors and windows; entrance ceilings and gutter pipes.
- Apartments' average indoor temperature increased by 2-3°C as a result of the project implementation, the comfort level was improved and consequently energy saving was achieved. The estimated yearly energy savings in Bardzraberd condominium are approximately 8,800 kWh per year.
- As an auxiliary benefit, implementation of the EE projects increased the reputation of the condominium managers, increased participation of homeowners in joint efforts within the condominium, and also resulted in higher fee collection rates.

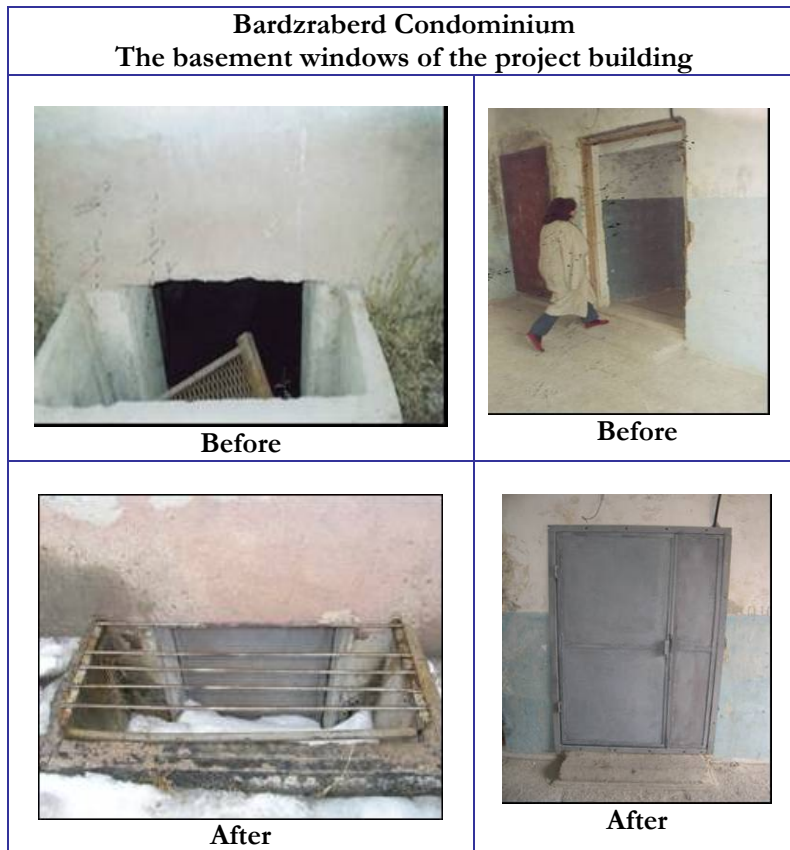
Key Results

- EE Measures Implemented: installation/repair of entrance and basement doors and windows; entrance ceilings and gutter pipes.
- Benefits: average indoor temperature increase by about 2-3°C, energy cost savings (for Bardzraberd) of about 8,800kWh/year; increase of condominium managers' reputation and voluntary participation of homeowners in resolution process of their own problems; improvement of fee collection.
- Project financing: \$1000 was available for the first stage of the Fund.
 - The project of Bardzraberd condominium: \$615, \$500 of which – a loan received from the Fund, \$115 – investments made by the residents /condominium.
 - The project of Ghandilyan condominium: \$604, \$500 of which - a loan received from the Fund, \$104 – investments made by the residents /condominium.

PROJECT APPROACH

- The Alliance to Save Energy established Building Energy Efficiency Revolving Fund in the city of Gyumri in December 2005. \$1000 has been transferred to Third Nature NGO account for starting the operation of the revolving fund.
- A memorandum of understanding was signed between the Alliance and Third Nature NGO regarding cooperation in the field of building energy efficiency in multi-apartment buildings in Gyumri.
- Alliance, together with NACO provides project oversight, while the Third Nature NGO in Gyumri conducts day-to-day project management.

- The Fund provides loans with 0% interest rate and repayment period of 6 months. Thus, Fund's money can be used more than once a year, which increases the number of possible EE projects. This, together with the interest rate of 0% makes the approach new and unique for Armenia.
- The Alliance, together with the Third Nature NGO select the applicants for the Fund money based on the condominiums' demonstrated participation and interest in energy-efficiency and renovation of their buildings, willingness to contribute investment and the overall quality of previous operation of the condominium. The program provides assistance to residential buildings in improving energy performance of common areas, i.e. hallways, basements, attics, roofs, stairwells, elevators if applicable, and other shared building spaces.
- Two condominiums (Bardzraberd and Ghandilyan) were selected out of 4 applicants for EE project implementation in their buildings for the first stage of the Fund operation.
- The Bardzraberd condominium applied for a loan to install the entrance and basement doors and basement windows in the building # 1 on M. Avetisyan Street. The cost of the project was \$615, \$500 of which was a loan received from the Fund, \$115 – investments made by the residents /condominium in the form of money (\$84) and work (\$31). Loan agreement between Third Nature NGO and Bardzraberd condominium was signed in December, 2005. The project was implemented successfully and the loan was repaid in 6 months according to the repayment schedule of the loan agreement.



- The Ghandilyan condominium applied for a loan for installation/repair of entrance doors and windows and gutter pipes, and partial repair of entrance ceilings of the building # 51a on Ghandilyan Street. The cost of the project was \$604, \$500 of which was a loan received from the Fund, \$104 – investments made by the residents /condominium in the form of money (\$52) and work (\$52). A loan agreement between Third Nature NGO and Ghandilyan condominium was signed in December 2005. The project was implemented successfully and the loan was repaid in 6 months according to the repayment schedule of the loan agreement.

**Ghandilyan Condominium
The Gutter Pipes of the Project
Building**



RESULTS

- The EE projects implemented through the loans provided by the revolving fund resulted following positive changes and benefits:
 - Apartments' average indoor temperature was increased, the comfort level was improved and significant energy savings were achieved.
 - The reputation of condominium managers' and trust towards them was increased.
 - The fee collection rate was improved.
 - Participation of residents in joint efforts within their condominiums increased significantly.

According to the residents in the Bardzrberd condominium once external doors and basement windows were installed, indoor apartment temperature increased by 2-3°C. This temperature increase amounts to approximately 8,800kWh in energy savings throughout the entire building, which is approximately \$490 saved during the 188-day heating season. Therefore, during the three remaining months of the heating season after project completion in January 2006, almost half of the initial investment has already been recovered through energy savings. Thus, the average payback period for this project is one year.

- The implemented EE projects have high replication potential due to the high interest expressed by other condominiums. After the first stage of the program other condominiums applied for a loan to implement EE projects in their buildings.

LESSONS LEARNED

- Implementation of small-scale energy-efficiency measures can lead to significant energy and cost savings combined with relatively short payback periods for investment.
- The participant condominiums improve their skills in accounting and financial reporting.
- The keys to success of the first stage completion of the revolving Fund are the following:
 - 0% interest rate of loans;
 - Enthusiastic approach of building management bodies and residents;
 - Day-to-day follow-up work of the Third Nature NGO.

APPROACHES FOR HELPING VULNERABLE HOUSEHOLDS MEET ENERGY NEEDS INTO THE FUTURE

It is necessary to mention that the share of low-income population is very high in Gyumri, and usually there are problems with fee collection as a result. However, the two condominiums participated in the Revolving Fund Program did not have any difficulties repaying the loans, because they consist of 7 and 11 multi-apartment buildings consequently and monthly fees collected from all buildings were directed to loan repayment. Though this issue could raise questions among the homeowners of buildings that did not participate in the project, it never happened because the residents of the condominium agreed with the proposal of the condominium manager to allocate the loan funds first of all to the buildings that were in most critical condition.

In order to achieve success during the following projects and to avoid the critical issue of non-payment by the low-income population, it is necessary to involve the local government – the Municipality of Gyumri in this process.

Annex B: EE Revolving Fund Program in Vanadzor

PROJECT HIGHLIGHTS

- In August, 2006 the EE Revolving Fund was established in the city of Vanadzor. A memorandum of understanding was signed between the Alliance, Municipality of Vanadzor, NACO and the Lori Marz Condominium Center regarding cooperation in the field of building energy efficiency in multi-apartment buildings in the city of Vanadzor. The amount for the first stage of program implementation was \$1300.
- The condominiums do not collect enough money on monthly basis to implement EE measurement to avoid the possible heat losses in their buildings and maintain the building stock, especially the common areas on appropriate level.
- The Fund, which provides loans with 0% interest rate and 6 months repayment period, aims at developing means and methods for condominiums to increase the energy efficiency of buildings and improve heat conservation in common areas; to improve management and assist condominiums in maintaining the building stock.
- Alliance, together with NACO provides project oversight, while the local NGO in Vanadzor – Lori Marz Condominium Center conducts day-to-day project management and coordination.
- The Municipality of Vanadzor provided assistance to the low-income families participating in the projects by paying their share of the loans.
- Three condominiums (Kayaran, Narek and Satar) were selected for EE project implementation in their buildings for the first stage of the program. The loan repayments are made on time after the EE projects' implementation.
- The implemented EE projects include installation/repair of entrance doors and windows, repair of drinking water and sewage system inside the buildings.
- As an auxiliary benefit, implementation of the EE projects increased the reputation of the condominium managers, increased participation of homeowners in joint efforts within the condominium, and also resulted in higher fee collection rates.

Key Results

- EE Measures Implemented: installation/repair of entrance doors and windows; repair of drinking water and sewage system inside the buildings.
- Benefits: the temperature in the entrances have risen by 2-4 °C, increase of condominium managers' reputation and voluntary participation of homeowners in resolution process of their own problems; improvement of fee collection.
- Project financing: \$1300 was available for the first stage of the Fund.
- "Kayaran" Condominium
 - Implemented Work: installation of entrance doors, repair and glazing of entrance windows,
 - Loan Size: 200,000 AMD (\$482 USD),
- "Narek" Condominium
 - Implemented Work: repair of entrance doors and windows, thermal insulation of drinking water and sewage pipelines,
 - Loan Size: 179,100 AMD (\$432 USD),
- "Satar" Condominium
 - Implemented Work: weatherization of entrance doors and windows, repair of drinking water and sewage pipelines inside the building,
 - Loan Size: 160,750 AMD (\$387 USD).
- The loans are currently being repaid by the condominiums according to their schedules.

PROJECT APPROACH

- After announcing the program launch and meeting with the condominiums in Vanadzor a number of applications were received and three condominiums were awarded loans for implementation of EE measures in their buildings:
 1. "Kayaran" Condominium

MUNICIPAL NETWORK for ENERGY EFFICIENCY

- Implemented Work: installation of entrance doors, repair and glazing of entrance windows,
- Loan Size: 200,000 AMD (\$482 USD),
- 2. “Narek” Condominium
 - Implemented Work: repair of entrance doors and windows, thermal insulation of drinking water and sewage pipelines,
 - Loan Size: 179,100 AMD (\$432 USD),
- 3. “Satar” Condominium
 - Implemented Work: weatherization of entrance doors and windows, repair of drinking water and sewage pipelines inside the building,
 - Loan size: 160,750 AMD (\$387 USD).

The repayment of the loans is done by all three condominiums according to their schedules:

Payment date	October 30, 2006	November 30, 2006	December 30, 2006	January 30, 2007	February 28, 2007
Kayaran condominium	28,600 AMD (USD \$78.35)	28,600 AMD (USD \$78.35)	28,600 AMD (USD \$78.35)	28,600 AMD (USD \$78.35)	28,600 AMD (USD \$78.35)
Narek condominium	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)
Satar condominium	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)	27,400 AMD (USD \$75)

RESULTS

- As a result of implementation of projects in the aforementioned condominiums 30 entrance doors and 50 m² of entrance windows were either refurbished or newly installed.
- Partial renovation of roofs was done and 70 m of drinking water pipeline was insulated. Besides the EE measures, some general repair work was implemented in the entrances of the buildings.
- All three condominiums report that as a result of the implemented work significant improvements were achieved in the overall condominium operation:
 - Increased fee collection rate. The residents started to pay their debts.
 - Increased trust towards the condominium managers
 - According to the residents of the buildings where the projects were implemented, the temperature in the entrances have risen by 2-4 °C

Before and after project implementation pictures

“Kayaran” condominium



Before

After

“Satar” condominium



Before



After



After

“Narek” condominium



Before



After



Insulation of drinking water pipes

LESSONS LEARNED

- Implementation of small-scale energy-efficiency measures can lead to significant energy and cost savings combined with relatively short payback periods for investment.
- The participant condominiums improve their skills in accounting and financial reporting.
- The keys to success of the first stage completion of the revolving Fund are the following:



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- 0% interest rate of loans;
- Enthusiastic approach of building management bodies and residents;
- Day-to-day follow-up work of the Lori Marz Condominium Center.

APPROACHES FOR HELPING VULNERABLE HOUSEHOLDS MEET ENERGY NEEDS INTO THE FUTURE

The Municipality of Vanadzor provided assistance to the low-income families participating in the projects by paying their share of the loans. This significantly eased the loan repayment burden on the condominiums.

**Annex C: Report from the 6th roundtable meeting of
the Armenian Energy Efficiency Council**

November 21, 2006

The meeting was devoted to presentation of the National Program on Energy Saving and Renewable Energy of Armenia and of development of sub-legislative field under the Law on Energy Saving and Renewable Energy of Armenia.

A number of presentations were made during the meeting and a fruitful discussion was held after those. A number of general actions for development of the secondary legislation under the Law on Energy Saving and Renewable Energy as well as for further improvement of the National Program on Energy Saving and Renewable Energy of Armenia were proposed by the participants of the meeting:

1. Development of financial incentive mechanisms for implementation of energy saving measures, including targeted funds, fiscal or tax incentives, customs exemptions, etc.;
2. Determining capacity building mechanisms for energy audit institutions;
3. Designing and modernization of existing building codes and construction norms;
4. Designing energy efficiency standards;
5. Implementing wide information and awareness raising campaign targeted to Energy Efficiency.
6. Supporting local manufacturing of energy efficient products, equipment and materials.
7. Maintaining a statistical database on end-use consumption of energy resources.
8. Further development of secondary legislative field.

The meeting participants agreed on the following immediate steps to be taken:

The work on the National ESRE Program and the general framework of the AEEC should continue to encompass the following:

1. Develop action plan for Government and public groups targeted to energy efficiency and energy saving.
2. Propose financing mechanisms and programs targeted to energy saving and renewable energy development and include those in the National Program on Energy Saving and Renewable Energy.
3. Assess the potential greenhouse gases (specifically - CO₂) reductions expected from the implementation of energy saving measures proposed in the National Program on Energy Saving and Renewable Energy.
4. Review and modernize the existing construction norms and standards. An AEEC meeting should be held in the nearest future, with a narrower list of participants that are immediately involved in the design and construction sector, in order to discuss the aforementioned actions.