Project funded by the EUROPEAN UNION

BSBEEP
Black Sea Buildings Energy Efficiency Plan

Black Sea CROSS BORDER COOPERATION

Black Sea Basin Joint Operational Programme 2007-2013

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Black Sea Buildings Energy Efficiency Plan

GA1: Knowledge and information collection and dissemination – Analysis of external current situation

Activity GA1.2

Collection of information about funding opportunities, programs and political initiatives at EU, national and local level and evaluation in order to meet the needs of partners

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Black Sea Buildings Energy Efficiency Plan (BSBEEP)

Black Sea Basin Joint Operational Programme 2007-2013

Black Sea Buildings Energy Efficiency Plan (BSBEEP*)* project aims at the establishment of strong regional partnerships and cooperation schemes in Black Sea area through the reinforcement of administrative capacities of local authorities and bodies in a very crucial sector (energy efficiency in buildings) having major environmental and economic impacts locally and globally.

The ultimate goal is to achieve change in the way they treating energy for buildings; facilitating change in the way local societies are acting. Furthermore, the project focuses on the establishment of a knowledge and experience exchange network aiming at the promotion of buildings energy efficiency. The network will engage a wide spectrum of organizations such as local and regional authorities, universities and research centers and NGOs which will help promoting energy efficiency in buildings at local and regional level. Meanwhile it will focus on raising awareness and mobilizing private sector and leverage funds to support future initiatives.

Ten partners are participating in the BSBEEP Project from six different countries; Munipality of Kavala (GR), Municipality of Galati (RO), Municipality of Cahul (MD), Municipality of Mykolayiv (UA), Municipality of Samsun (TR), Municipality of Tekirdag (TR), Democritus University of Thrace (GR), University Dunarea de Jos of Galati (RO), American University of Armenia (AM) and Renewable Resources and Energy Efficiency Fund (AM).

The specific study is one out of five studies, of GA1 of BSBEEP Project, which is a group of activities aiming to identify the external environment that all ten partners are working on (GA1: Knowledge and information collection and dissemination – Analysis of external current situation).

More details about BSBEEP Project are available on its website: **www.bsbeep.com**.

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1. Introduction

In this activity the funding mechanisms for energy efficiency at the European level and how they can be accessed by potential applicants from Partners' countries were evaluated. The main mechanisms and conditions that may provide financing for investment projects in energy efficiency are presented.

Financing needs are divided into three categories:

1. Support activities for communication / information:
   - education / awareness of consumers' information campaigns, information points;
   - development of support tools (e.g. Intelligent Energy Europe program):
   - software for calculating energy savings potential, post-investment monitoring methodologies; making standard;
   - eliminating non-technological barriers (exchange of know-how, case studies);
   - development of institutional capacity (energy efficiency local agencies, teams of technical assistance for project preparation, specialized structures for managing credit lines or management of funds);
   - presentation of a new funding sources;
2. Activities for preparation of investment projects:
   - financing market research;
   - financing the "marketing" - identifying investment projects, preliminary analysis (opportunity / feasibility), constituting the portfolio of projects;
   - financing feasibility studies;
3. Investment

Sources of funding include: grants, reimbursable and mixed. Another component of the activity was to identify national programs for energy efficiency. The types of energy efficiency measures which are implemented in partners' countries by these programs are presented.

In the third part of this activity the political initiatives and development strategy in energy efficiency and the legislative and bodies with responsibilities in monitoring and implementation of energy efficiency policies are summarized.

2. EU level analysis

2.1 Funding programs

Structural and cohesion funds

European Regional Development Fund (ERDF)
To reduce the difference between the levels of development of European regions and bridge the gap less favored regions, this regulation defines the types of actions eligible for funding from the European Regional Development Fund (ERDF).

The regulation also establishes the tasks and the objectives of extending the FEDR intervention in "Convergence", "Regional competitiveness and employment" and "European territorial cooperation" as defined in the general provisions on the European Regional Development Fund, European Social Fund and the cohesion reformed cohesion policy for 2007-2013. The Fund is intended transition to a low carbon emission economy.

Member State's contribution is 6% in Competitiveness regions and 20% in other regions. There are support actions to renovate housing in areas experiencing or threatened by physical deterioration and social exclusion in the Member States that joined the European Union on 1 May 2004 or thereafter. It aims at eliminating discrimination based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation during the various stages of implementation of the operational programs co-financed by the FEDR.

European Regional Development Fund supports more particular sectors of which the protection and improvement of the environment taking into account the precautionary principle and preventive action to support full economic development and effective use of renewable energy sources.

Expenditure on housing shall be eligible only for those Member States that joined the European Union on 1 May 2004 or thereafter and only under certain conditions. Expenses are limited to multifamily dwellings or buildings owned by public authorities or non-profit operators, which are designed for low-income families or people with special needs (Reg. 1).

Cohesion Fund (CF): financing of transport infrastructure projects and environment.
It is expected that the investments required for EE and SRE in the EU by 2020 is 115 billion € / year (60 billion € / year for EE buildings) = 47 times the FEDR contribution.

The Cohesion Fund is a special fund the European Community to help Member States with a Gross National Product (GNP) per capita of less than 90% of the Community average to reduce disparities between the levels of economic and social development

and to stabilize economies. It supports actions under the 'Convergence' objective and is subject to the same rules of programming, management and control as the European Social Fund (ESF) and European Regional Development Fund (FEDR).

Cohesion Fund finances activities that are part of the following areas:

- Trans-European transport networks, in particular priority projects of European interest as defined by the European Union;
- Environment, in this context, the Cohesion Fund may also intervene in energy projects or transport, as long as they have clear advantages for the environment: energy efficiency, use of renewable energy sources, development of rail transport, supporting intermodality , strengthening public transport etc.

Cohesion policy remains a key component of the Commission's proposed financial framework for 2014-2020. The scope of the Cohesion Fund will remain largely the same as the current one (Reg. 2).

Cooperation Programmes

INTERREG IV A - Cross-border cooperation

Cross-border cooperation refers primarily to "fill the gaps". Where cross-border issues related to infrastructure (building bridges), markets and services (creating links between universities, companies and clients) or cultural or linguistic barriers, INTERREG It is designed to solve them. This by cross-border analysis and agreed response strategies, formalized in one of the 52 cross-border programs.

INTERREG It handles a wide range of issues, including:

- encouraging entrepreneurship, particularly SME development, culture and cross-border trade;
- improving joint management of natural resources;
- supporting links between rural and urban areas;
- Improving access to transport and communication networks;
- joint use of infrastructure development;
- Administrative work for employment and equal opportunities.

INTERREG IV B - Transnational cooperation

Transnational operate at a larger scale. It develops cooperation at regional level, in regions involving several countries. This allows the development of a broader cooperation agreed joint approach to issues affecting entire river basins and mountain ranges. Programs adds a supplementary European regional development built around analysis at European level, leading to jointly agreed priorities and a coordinated strategic response. This allows a significant activity in areas such as communication corridors, flood management, international business and research linkages and the development of more viable and sustainable markets. Moreover, it offers a strategic investment framework agreed jointly to other resources on the Convergence funds collected from financial instruments, with a potential impact. Among the topics covered are:

- innovation, in particular the networks of universities, research institutions and SMEs;
- environment, particularly water resources: rivers, lakes and seas;
- availability, including especially telecommunications and networking;
- sustainable urban development, especially polycentric development.

JASPERS technical assistance programs, 2006

Assists the 12 EU member states in Central and Eastern Europe project preparation grant request for funding from the Structural and Cohesion Funds. Contribute to increasing the quantity and quality of projects to be submitted for approval to the Commission.

- JASPERS assistance granted free is directed to accelerate the absorption of funds.
- JASPERS is a partnership between the European Commission (DG Regio), the BEI and the BERD, aimed at supporting EU Member States in EU funds absorption by providing technical assistance for infrastructure projects.
- JASPERS program goal is the preparation of high quality project applications that have better chances of approval by the European Commission.
- JASPERS is for major projects (over 25 million Euros in the environment and over 50 million in other fields). Among the areas of intervention of JASPERS instrument and projects include energy efficiency and renewable energy resources and energy sector projects with environmental objectives.
- JASPERS is based on an annual action plan. This includes priorities based on the list of major projects proposed by the Member State. JASPERS is implemented with the support of experts DG Regio, the BEI and the BERD since 2006. JASPERS technical assistance is provided to the beneficiaries in the Member States free.

Jaspers offer assistance for certain stages of project preparation and areas such as:

- Improving the quality of applications;
- Financial analysis in developing financial models;
- Analysis of co-financing capacity of the state / beneficiary;
- Public-private partnership;
- State aid issues;
- Environmental impact assessment;
- Development of technical and financial capacity to implement the project for the beneficiary (FSE).

JESSICA technical assistance program 2009[1]

JESSICA technical assistance program 2009 it is developed in cooperation with the European Investment Bank (BEI) and the Council of Europe Development Bank (CEB).

[1] http://ec.europa.eu/regional_policy/thefunds/instruments/jessica_ro.cfm#1 (EPR)

Give Joint European Support for Sustainable Investment in City Areas. It supports sustainable urban development and regeneration mechanisms engineering financial.

It supports projects in the fields:

- urban infrastructure;
- patrimony and places with cultural value;
- resuming development of brownfield sites;
- creation of new commercial premises for SMEs, IT and / or RDI;
- university buildings;
- Energy Efficiency.

COOPERATION PROGRAMME INTERREG IV C and URBACT[2]

- INTEREG IV C, 2007:

Interregional cooperation works at pan-European level, including all 27 EU Member States and more. This cooperation builds networks to develop best practices and to facilitate the dissemination of lessons and experiences of regions which are successful. It shows how positively proceeds regions to attract those who invest. An essential part of this special direction is the "Regions for Economic Change", which is a step forward to sharing good ideas, bringing all policymakers at the same table. European Commission supports this initiative and providing policy expertise and specialists to work "fast-track" in areas such as information society and marine management. The idea is to disseminate know-how, especially new ideas, to be run on the widest possible scale.

It emphasizes the links between competitiveness and convergence programs to transform ideas into investment. Among the topics are:

- Innovation and knowledge economy;
- Environmental protection and risk protection.

- URBACT:
  - Inter-regional cooperation.

URBACT is a European exchange and learning programme[3] promoting sustainable urban development. It enable cities to work together to develop solutions to major urban challenges, reaffirming the key role they play in facing increasingly complex societal changes. It helps cites to develop pragmatic SOLUTIONS that are new and sustainable, and that integrate economic, social and environmental dimensions. It enables cities to SHARE good practices and lessons learned with all professionals involved in urban policy throughout Europe. URBACT is a network of 500 cities, 29 countries and 7,000 active participants. URBACT is jointly financed by the European Union (European Regional Development Fund) and the Member States.

[2] http://urbact.eu/fileadmin/corporate/Pilot_Transfer_Call_0310.pdf; http://www.infocooperare.ro/Files/Program%20operational%20URBACT%20II_2007126816311.pdf (URB).

[3] This European programme is part of Europe's cohesion policy: its goal is to help implement the Lisbon-Gothenburg Strategy, which prioritizes competitiveness, growth and employment.

URBACT enables numerous European cities to work together in projects to share and capitalise on experience. Each project focuses on a specific urban issue, such as tapping into the positive potential of young people (MY GENERATION), social housing (SUITE), or taking built heritage into account in urban development (Hero). URBACT enables the development of solutions to urban challenges that other cities can then adapt to their own context.

To do this, URBACT has 4 missions[4]:

Coordinating exchanges to make things happen: URBACT projects encompass primarily cities, but also other local authorities, as well as universities and research institutions. It use proven methodologies to coordinate exchanges among these numerous, diverse and geographically distant partners. URBACT ensure quality and realistic outputs by involving key players from each partner city via Local Support Groups. It helps them to define a relevant Local Support Group and effective Local Action Plan.

Analysing and capitalising on learning: URBACT collects what is learned by the projects and develop integrated responses that encompass the economic, social, cultural, and environmental dimensions of urban development. It mobilise the expertise of practitioners from the partner cities, Experts working on each project, and Thematic Pole Manager.

Dissemination information and outputs: URBACT disseminates information about the programme, particularly related to calls for proposals. It makes the outputs of our work available to all city policy players throughout Europe. URBACT does not propose universal, ready-to-use recipes to the major urban challenges cities are facing, but rather makes available solutions that have proven effective in certain situations. To do this, URBACT use its web site and National Dissemination Points, which are relay points that spread the information in each country's national language. URBACT also regularly organize conferences open to a broad audience and we distribute publications.

Funding project operations: URBACT funds project operations, with maximum budgets ranging from €300,000 to €710,000. URBACT do not finance the implementation of Local Action Plans, which can be funded by the partners or by other programmes (ERDF, European Social Fund, etc.).

URBACT has financed a lot of projects, having a direct or indirect relation to energy efficiency on building sector. Among them the most related are CASH and LINKS.

<u>CASH project</u>

Housing is a priority area for European energy efficiency, not only because it consumes a high volume of energy, but it is also an area where huge improvements could be made. Although contribution of housing to carbon dioxide emissions is high

[4] http://urbact.eu/en/about-urbact/our-missions/

and growing, many residents still cannot access affordable, "clean" energy, and practices remain inefficient. Technologies have been developed that could drastically reduce energy use in housing, but take- up is slow, and much of the related business potential remains untapped. In line with European Energy Performance of Buildings Directive 2010/31/EU (EPBD), and other EU initiatives like the Energy Efficiency Directive of 22 June 2011, the URBACT project CASH set out to help reduce the energy consumption of buildings and their occupants. Over three years, CASH's 11 partners focused on improving the energy efficiency of social and affordable housing, proposing new solutions and promoting new policies for sustainable renovation. They also aimed to influence users' behaviour through citizens' involvement.

LINKS project

Among other targets LINKS project, puts eco-restoration at the heart of urban development. The eco-restoration of old public buildings can form a focus for redeveloping city centres. Examples include: the low-energy renovation of the Vet School (administrative building) in Anderlecht; the renovation of St Mary's Church in Kilkenny; and the eco-restoration of a cultural cluster in Budrio, which combines work on public cultural buildings with a redesign of the connecting public space. Veria will also redesign streets so they connect scattered historic areas. The regeneration plan of Delft over the last 15 years is a good example of how an integral approach of renovation and governance can stimulate the re-use of central historic buildings.

Finally, URBACT has edit a book on building energy efficiency in European cities, on May 2013. Please visit http://urbact.eu/e-books/energy-efficiency/appli.html.

Intelligent Energy for Europe - IEE, 2003[5]

IEE program finances projects that contribute to the success of the Covenant of Mayors. It is available to all EU member states plus Norway, Iceland, Liechtenstein, Croatia and the former Yugoslav Republic of Macedonia. Available for financing and implementing projects for a number of European portals, facilities and initiatives.

INITIATIVE INTEGRATE: energy efficiency of buildings and local leadership in energy - an initiative dedicated to local and regional authorities with the following directions:

- Energy efficiency of public expenditure - new initiative that responds to the Global Comprehensive Plan's emphasis on energy efficiency of public expenditure;
- Local energy leadership - Strengthening capacities multipliers in relation to sustainable energy action plans;
- Mobilizing local energy investments - technical assistance to public bodies on banking training on sustainable energy projects (STEER, ALTENER, SAVE);

[5] http://www.finantare.ro/intelligent-energy-europe-iee.html#Solicitanti (IEEE).

- Energy efficiency and renewable energy for buildings - Energy performance certificate, energy-renovation with energy consumption near 0 (SAVE and ALTENER);

ELENA programme (EUROPEAN LOCAL ENERGY ASSISTANCE) - Funded under IEE[6]

Provides local and regional support to accelerate investment programs in the area of energy efficiency and use of renewable energy. Eligible measures for such funding include: feasibility studies, market studies, structure investment programs, business plans, energy audits, preparation for tendering procedures. The program covers up to 90% of the costs of technical assistance for the preparation of investment projects over 50mil. € or packages of projects of the same size. ELENA menus in partnership with CEB, KfW, EBRD, EIB and MLEI PDA.

The 7th Research Framework Programme - SMART CITIES[7]

Support a limited number of relatively large cities and regions implementing pioneering measures to achieve ambitious climate goals through sustainable use and production of energy. This will require systemic approaches and organizational innovation, including energy efficiency, low carbon technologies and smart management of supply and demand.

In particular, measures in the fields of construction, local energy networks and transport will be the main components of the Initiative.
Actions:

- New buildings and renovation of existing buildings (for 20 million citizens);
- Energy systems (heating, cooling and electricity);
- Transport.

Indicative funds (2010-2020): 10 000 -12 000 mil €.

TAF - Technical assistance facility EEEF (European Energy Efficiency Fund)[8]

TAF supports its beneficiaries by providing grants of up to 90% of total costs: preparation of feasibility studies, business plans, tendering, etc. EEEF goal is to provide market-based financing for renewable energy projects in the European Union but also for energy efficiency in public projects commercially viable.

Objectives of TAF:

- provide funding opportunities for energy efficiency and renewable energy projects on low scale;
- support public-private partnerships.

Types of eligible projects:

[6]http://www.fonduri-structurale.ro/detaliu.aspx?eID=6113&t=altefinantari (ELE).
[7]http://eu-smartcities.eu/
[8] www.fonduri-structurale.ro (EEE)

A. Energy Efficiency;
B. Renewables sources;
C. Urban transport.

This fund will support Member States in their quest to reach 2020 target of reducing greenhouse gas emissions by 20% and increase renewable energy use by 20%. European Commission fund investment is 125 million, the European Investment Bank to 75 million, while Cassa Depositi and Deutsche Bank will invest 60 million and 5 million.

Potential beneficiaries are public authorities (e.g. municipalities), preferably local and regional, as well as public or private, acting on behalf of such authorities, as well as energy service companies (ESCOs), regional companies combined production electricity and heat (CHP) or public transport providers.

WORLD BANK ACTION PLAN - Energy Efficiency for Sustainable Development - EEfSD[9]

Aims to increase energy efficiency to support economic growth, energy security, environmental sustainability and poverty reduction. It is divided into four areas, to allow countries to take advantage of energy efficiency opportunities in priority sectors:

1. Integrating energy efficiency in economic sector;
2. Integrated approach to energy efficiency investment operations;
3. Improving internal operational and analytical learning;
4. Monitoring, evaluation and future actions / steps taken

EFSD is part of the Action Plan on Clean Energy and Development Investment Framework. EEfSD strategy includes interventions at three levels: policy and regulatory sectors, sectors and sub-sectors and end-use equipment and appliances.

[9] World Bank. 2005. Energy efficiency for sustainable development (EEfSD): scale up strategy and action plan. Washington D.C. - The World bank.

2.2 Political initiatives

2012/27/UE DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 25 OCTOBER 2012 ON ENERGY EFFICIENCY, AND 2009/125/EC amending Directives 2010/30/EU and repealing Directives 2004/8/EC and 2006/32 / EC

As the European Union are facing unprecedented challenges present stage due to increasing dependence on energy imports and the reduced amount of energy resources and the need to limit climate change and to overcome the economic crisis, energy efficiency is a way important that those challenges can be addressed. It improves energy security by reducing the Union's primary energy consumption and energy imports. Energy efficiency contributes to the reduction of greenhouse gas emissions in a cost-effective and therefore mitigate climate change. The transition to a more energy efficient should also accelerate the dissemination of innovative technological solutions and improve the competitiveness of the Union, promoting economic growth and creating high quality jobs in several sectors related to energy efficiency.

This Directive establishes a common framework of measures to promote energy efficiency within the Union in order to ensure the achievement of the primary objective of 20% energy efficiency by 2020 and open the way for further energy efficiency after time.

This Directive provides rules designed to eliminate barriers in the energy market and overcome market failures that prevent efficiency in the supply and use of energy, setting national indicative targets for energy efficiency in 2020.

The requirements of this Directive are minimum requirements and shall not prevent any Member State from maintaining or introducing more stringent measures. Such measures must be compatible with EU law. Where national law provides stricter measures, the Commission shall notify this legislation.

Energy efficiency targets

Each Member State shall establish a national indicative energy efficiency, energy consumption based on either primary or final energy consumption, either primary or final energy savings or the energy intensity. When setting these targets, Member States shall take into account:

a) the fact that in 2020 the Union's energy consumption must not exceed 1 474 Mtoe primary energy or maximum 1078 Mtoe of final energy;
b) measures envisaged by this Directive;
c) measures taken to reach the national energy savings, adopted pursuant to Article 4 (1) of Directive 2006/32/EC;
d) other measures to promote energy efficiency within Member States and at EU level.

The main directions set by the Directive regarding energy consumption efficiently are:

a) Renovation of existing buildings
Member States shall establish a long-term strategy for mobilizing investment in renovating residential and commercial building stock, both public and private, available nationwide.
b) The example role of public buildings
Each Member State shall ensure that, from 1 January 2014, 3% of the total area heated and / or cooled owned and occupied by government are renovated annually to meet at least the minimum energy performance requirements established by the Member State concerned under Article 4 of Directive 2010/31/EU.
c) Scheme of obligations regarding energy efficiency
Each Member State shall establish a scheme of obligations regarding energy efficiency, which ensures that energy distributors and / or suppliers of energy operating in the territory of each Member State, make an objective cumulative energy savings in the end use until 31 December 2020.
d) Energy audits and energy management systems
Member States shall promote, to all final consumers, the availability of high quality energy audits. To ensure high quality energy audits and energy management systems, Member States shall establish minimum criteria transparent and non-discriminatory energy audits.
e) Count the energy consumption
Member States shall ensure that, as far as is technically possible, financially reasonable and proportionate to the potential energy savings, final customers for electricity, natural gas, district heating, cooling and hot water housekeeper are provided with competitively priced individual meters that accurately reflect the actual energy consumption and that provide information on actual time of use.

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL (Financial support for energy efficiency in buildings)

The buildings are the centerpiece of the EU's energy efficiency as housing, offices, shops and other buildings are responsible for approximately 40% of final energy consumption (and 36% of emissions of greenhouse gases). In addition, the energy sector, this sector offers the greatest untapped potential for achieving energy savings in terms of profitability. Improving energy efficiency in buildings lead to important benefits related including creating jobs, reducing fuel poverty, improve public health and increase energy security and industrial competitiveness.
The report has two objectives.

First, under Article 10 (5) of the Directive on the energy performance of buildings (recast) - Directive 2010/31/EU, the Commission had to submit an assessment of the effectiveness of the use of funds from the EU, of the BEI and other institutions public finance and also regarding the coordinating UE funding in national funding. The report contains the main results of this analysis.

Secondly, the new Energy Efficiency Directive (Directive 2012/27/UE) requires Member States to set up until April 2014, a long-term strategy for mobilizing investment to restore national heritage property. Also, according to this Directive, the Commission should ensure assistance to Member States to establish financing facilities to increase energy efficiency. Therefore, the report has to indicate how to improve financial support for energy efficiency in buildings.

The report contains the results of evaluation of the following aspects:

- condition of building in Europe;
- EU financial support for energy efficiency in buildings;
- funding from international financial institutions (IFI) for energy efficiency in buildings;
- financing energy efficiency of buildings through national programs;
- private sector financing for energy efficiency in buildings.

The picture that is apparent from an examination of European real estate assets shows that:

- situation varies significantly from one Member State to another in terms of real estate assets, financial support measures in place and the operating obstacles;
- Even though investments in energy efficiency in buildings are rising and there are many examples of good practice relating to tools that provide savings in terms of profitability, information on the effectiveness of various measures of support, both at EU and at national level are limited;
- There are still significant barriers that prevent the execution of more investment in energy efficiency in buildings, namely: absence of information and knowledge among all stakeholders on energy efficiency financing, high initial costs, relatively long recovery periods and credit risks (perceived) associated with investments in energy efficiency and competing priorities of the final beneficiaries.

In order to achieve energy efficiency savings in 2020 and more ambitious goals for 2050, the EU must necessarily increase financial support for energy efficiency in buildings. In this respect, it is necessary to properly implement the regulatory framework to provide more funds and to remove the main barriers.

Given the importance of a personalized approach to financing energy efficiency, it is essential that between public authorities, financiers and construction sector to have a close cooperation. Also, property owners will need to be convinced that greater energy efficiency properties benefit, a bill that not only reduced energy consumption, but also comfort and greater value of ownership. This could be one of the major obstacles to be overcome in order to increase the energy efficiency of buildings in Europe.

3. National and local level analysis

3.1 Armenia

3.1.1 Funding programs (national level)

Over the recent years, several international organizations participated in the reforms of the heat supply sector, which include legal reforms, establishment and empowerment of ESCOs, implementation of pilot projects in the heat supply, energy efficiency and energy saving sector, promotion of renewable energy resources and public awareness raising. Heat supply schemes for various settlements of Armenia were developed and analysis of the feasibility indicators of various heat supply systems were performed by a number of donor-funded projects. This Chapter provides a brief introduction to the key efforts and activities of the heat supply sector donors over the recent years.

The Global Environmental Facility (GEF) Programs

The GEF unites 182 countries in partnership with international institutions, non-governmental organizations (NGOs)[10], and the private sector to address global environmental issues while supporting national sustainable development initiatives. Today the GEF is the largest funder of projects to improve the global environment. An independent financial organization, the GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. Since 1991, GEF has achieved a strong track record with developing countries and countries with economies in transition. GEF has provided US$9 billion in grants and leveraged US$40 billion in co-financing for over 2,600 projects in over 165 countries.

Armenia – Improving the Energy Efficiency of the Urban Heating and Hot Water Supply (UNDP)

The program is implemented by United Nations Development Program (UNDP), financed by the Global Environmental Facility (GEF) Trust Fund in the amount of US$12,030,121, and co-financed by the Armenian Government in the amount of US$8,865,000. The project aims to reduce greenhouse gas (GHG) emissions resulting from current heat and hot water supply practices in Armenian cities[11]. The project consists of four components:

1. Strengthening the role of condominiums in organizing and managing the heat and hot water supply services at the building level.

[10]Global Environment Facility Supports Energy Efficiency Investments in Public Facilities of Armenia
[11]Improving the Energy Efficiency of the Urban Heating and Hot Water Supply

2. Supporting the restructuring process and building the capacity of the existing DH companies to improve the efficiency of their operations.
3. Supporting the emerging new service providers in offering their services to the condominiums and structuring financing for the investments needed
4. Documenting and disseminating the results, experiences and lessons learned nationally and regionally.

Memorandum of understanding was signed between the UNDP Country Office and Spitak and Gyumri cities municipalities on putting into operation the centralized heating and hot water supply systems of multi-apartment buildings (in total 556 apartments). Subcontracting organizations are selected, reconstruction works started and the preliminary contracts with apartment owners were signed. The MoU was signed with private operator on co-financing for installation of solar water heaters on the existing gas boiler plant to supply hot water to multi-apartment buildings serving 77 apartments. The draft of the heat law concept is developed in cooperation with ad-hoc working group composed of the representatives of 3 ministries and R2E2 fund. The document was presented to the Ministry of Nature Protection.

Program components and Expected Outcomes

Component 1: Strengthen the role of condominiums in managing heat and hot water supply

- Improved legal and regulatory framework to strengthen condominiums as legally and financially responsible counterparts for commercial service providers

Component 2: Support the restructuring process and build the capacity of the existing district heating companies to improve their operations through legal and regulatory changes

- Implementation strategy for improving energy efficiency
- Improved legal and regulatory framework to encourage commercial operation
- Consumption-based metering and billing system
- Strengthened capacity of management and personnel

Component 3: Support new service providers' services promotion and financing

- Improved legal and regulatory framework to encourage new, decentralized service providers to use mini grids, gas-fired building boilers, or other alternatives in unserved areas
- Strengthened capacity of new service providers and local manufacturers to develop "bankable" investment proposals, structure project financing, and manage operations
- Certification system for qualified service and equipment providers

Component 4: Propagate the outcomes nationally and internationally through public awareness campaigns, seminars, and trainings

- System for monitoring the GHG emission reductions
- Compilations, evaluations, and dissemination of lessons learned

Armenia Energy Efficiency Project (IBRD)

The World Bank's Board of Executive Directors approved a US$1.82 million grant from the Global Environment Facility (GEF) Trust Fund for the Energy Efficiency Project for Armenia. The project will help to reduce energy consumption of social and other public facilities[12].This project supports energy efficiency investments in schools, kindergartens, hospitals, administrative buildings, and street lighting and will reduce energy consumption of retrofitted public and social facilities as well as CO2 emissions.

The World Bank's Energy Efficiency Study for Armenia (2008) estimated that the public sector can save around 132 billion Armenian Drams (more than US$360 million), 130 million kWh of energy equivalent annually, and 35 percent of estimated total energy consumption. The energy audits conducted for eight public facilities as well as energy efficiency investments in eleven schools under the World Bank supported Urban Heating Project, suggest that an average facility could save around 150,000 KWh of energy per year by investing an average of US$70,000 with payback of three to eight years.

The project finances insulation of walls, basements and attics, repair/replacement of external doors and windows, window optimization reflective surfacing of walls behind radiators, improvement/replacement of boilers and heating systems, as well as replacement of mercury vapor lamps with high-pressure sodium vapor lamps.

The replicability of energy efficiency investments is ensured through: removal of existing legal, regulatory, procurement and information barriers to energy efficiency in public sector; development and testing of various financing, implementation and repayment schemes for similar sub-projects; training for public agencies to support with implementation of energy efficiency policies and regulations; and capacity building for private sector stakeholders to strengthen their capacity in carrying out energy audits, energy management, and financial appraisal of energy efficiency investments.

The project is supported by US$8.3 million from the Government funding, US$1.82 million from the GEF grant, and US$0.54 million co-financing from the Renewable Resources and Energy Efficiency Fund (R2E2 Fund). The Government funding includes repayments of the revolving funds under the recently completed World Bank supported Urban Heating and Renewable Energy projects.

Improving Energy Efficiency in Buildings (UNDP)

The objective of the GEF full size project is to reverse the existing trends and reduce consumption of electrical and thermal energy and associated GHG emissions in new and restored, primarily residential buildings in Armenia. It will do this by creating enabling regulatory environment, skills and capacity among industry professionals to introduce the principles of integrated building design in Armenian construction practices from the stage of building design through construction to maintenance of the buildings. The support to be provided by the project will combine development

[12]WB approves $1.82m grant Energy Efficiency Project for Armenia

of a new regulation (EE building codes and certification scheme) with the training of professionals, demonstration of integrated building design and stimulating manufacturing of new EE materials and equipment.

The project will be implemented under the UNDP-led GEF Global Framework for Promoting Low Carbon Buildings with a primarily focus on two thematic approaches promoted by the Global Framework: a) promotion and increased uptake of high quality building codes and standards; and b) developing and promoting energy efficient building technologies, building materials and construction practices. The coordination offered by the global program will help Armenia to learn from experiences and best practices from countries with similar EE building projects[13].

The pilot component of the "Improving Energy Efficiency in Buildings" project is addressing at least one building's design and construction using new code and integrated building design approach. The demo building is to be constructed in the city of Gyumri in the framework of the earthquake zone reconstruction state program (2010-2013). By end of project, it is expected to meet the objective of demonstration building showing at least 30% better thermal performance than the improved code and 60% better than the existing code. Currently buildings under the state program are already designed and part of them is built.

Armenia - Improving the Energy Efficiency of Municipal Heating and Hot Water Supply Project

The project implementation started in 1999. It is implemented in two phases:

Phase 1 (1999 - 2002) – Removing Barriers to Energy Efficiency in Municipal Heat and Hot Water Supply. In this phase the barriers to rehabilitation and improving the energy efficiency in municipal heat supply were identified, and recommendations were made to remove these. The project also aimed to select the most appropriate/relevant strategy option for heat supply development, in order to later elaborate a larger scale project.

Phase 2 (2005 - present) – "Armenia – Improving the Energy Efficiency of Municipal Heating and Hot Water Supply" Project[14].The objective of the project is to reduce greenhouse gas (GHG) emissions resulting from current heat and hot water supply practices in Armenian cities by laying the foundation for the sustainable development of heat and hot water supply services in these cities while taking into account global environmental impacts. Within this framework the project aims to:

I. Enhance the role of condominiums in collectively passing decisions on organizing heat and hot water supply services at the building level;
II. Support the restructuring and capacity building of the existing companies through improving their service quality and operational efficiency;
III. Support the new decentralized service providers to commercially run, market and diversify their businesses, in order to promote the use of

[13]Performing Design Works of Energy Saving Residential Demonstration
[14]Armenia - Municipal Network for Energy Efficiency

alternative environmentally clean and energy efficient technologies and to structure financing for the required investments in areas that do not sustain the centralized district heating services; and

IV. Promote the dissemination of the results, experiences and lessons learnt, assessing the GHG emission reduction volumes, as well as develop norms for supporting sustainable use of forest resources and implementation of the objective of the Climate Change Convention. The proposed capacity building and other technical assistance activities will complement, and will be implemented in close co-operation with, the activities of the other donors including the World Bank/IDA funded Urban Heating Project and USAID funded activities in the field of energy, heat supply in particular. Additional opportunities for co-operation will also be explored with other donors, in the areas of promotion of local self-government bodies, urban development, promotion of small and medium enterprise (SME), advancement of application of energy saving and renewable energy.

Advanced Experience Trainings on Heat Supply Technologies and Management

A number of trainings/seminars, presentations of advanced technologies, discussions and meetings on heat supply sector management and institutional issues were organized and conducted in the framework of UNDP/GEF Heat Project[15]. The main events implemented by the Project include:

- On March 22, 2006 Caterpillar Company presented its production, particularly the electrical and cogeneration units. Representatives of Caterpillar and "Zeppelin Armenia" and other stakeholder companies participated in that event held in the hall of RA Ministry of Nature Protection.
- On October 18, 2006 presentation and operational training of "fusio-therm" pipes was conducted in the hall of Golden Tulip (Yerevan) hotel, which was organized by UNDP/GEF Project, German "Aquatherm" company and "AH Building Technologies" LLC.
- A study tour to Denmark was organized in 4-8 December 2006, and assisted by "Ramboll" consultancy company. The objective of the visit was to familiarize with the Danish experience of centralized heat supply systems, modern technologies and equipment being exploited in those systems, study the adopted corresponding laws and sub-legislative acts in Denmark, the existing tariff policy and the steps undertaken towards emission reduction, so as to use (introduce) these in RA.
- A training on "The Use of Heat Regulating Devices in the Heat Supply Systems" taking place in the Project office on December 20, 2006 was organized by "Danfoss" company, UNDP/GEF Project and "Yerevannakhagits" CJSC. The updated "DANFOSS C.O.3.5" computer program elaborated by "Danfoss" company was presented. In addition, the program application on specific examples was demonstrated. The participants were provided with this computer program.
- A presentation of Software for Heat Supply Small Systems Calculation developed by the Project, as well as financing mechanisms of heat supply rehabilitation

[15]Current state of heat supply in residential sector of the Republic of Armenia

projects was also introduced during the meeting held in "Armenia Marriott" hotel on March 22, 2007. About 35 officials including governmental authorities, condominiums, scientific and design institutions, supplier and energy service companies (ESCOs) participated in this meeting.

- A seminar on "Energy efficiency technologies with application in residential sector" was organized by the Project and "Heat Automatic Machinery Moscow Plant" in Golden Tulip (Yerevan) hotel on 10 January, 2008. Heating and cooling energy efficient technologies based on heat pumps were presented and discussed in the framework of the seminar. Also, site visit to energy supply center at #6 Hyusisajin ave. was organized for seminar participants.
- A study tour for Armenian specialists on Gas Appliances Energy Efficiency and Labeling to Plzen, Check Republic was organized within the "Capacity Building for Cost-Effective Development and Implementation of Domestic Gas Appliances Energy Efficiency Labeling Program in RA" task during 16-22 February, 2008. The visit was organized by the Project, and "TODERO" Non-Governmental Association as a hosting party. The objective of the visit was to familiarize the Armenian specialists with Check experience in the field of energy efficiency standards and pricing procedures of gas devices, and their testing/certification procedures and capacities.

UNDP/GEF Project has also participated in two thematic exhibitions on heat technologies organized in Armenia during the recent years:

1. Initiated and assisted by the Government of RA and USAID in 15-16 March, 2006;
2. Organized by the Government of RA, Armenia Renewable Energy Resources and Energy Efficiency Fund, and World Bank in 2-4 May 2007.

The main objective of the exhibitions was the information provision to the public on existing technologies and creation of contacts among all participants of heat sector market such as: companies providing heat services, condominiums, banks, credit organizations and donors. Around 33 various organizations presented their production and provided services to the stakeholders at the exhibitions.

World Bank Programs

The World Bank Group is one of GEF's implementing agencies and supports countries in preparing GEF co-financed projects and supervises their implementation. It plays a primary role in ensuring the development and management of investment projects. The Bank draws upon its investment experience in eligible countries to promote investment opportunities and to mobilize private sector, bilateral, multilateral, and other government and non-government sector resources that are consistent with GEF objectives and national sustainable development strategies. Since 1991, the World Bank Group has committed $3.43 billion in GEF resources and $6.77 billion in Bank group co-financing for GEF projects in 131 countries. In addition to GEF and Bank

resources, the World Bank has mobilized additional co-financing of $14.07 billion from other donors[16].

Urban Heating Project – Armenia

The objective of the Urban Heating Project for Armenia is to increase the use of clean, efficient, safe and affordable heating technologies in urban schools and multi-apartment buildings.

Original Project Development Objectives (PDO) and Key Indicators:
The PDO was to increase the use of clean, efficient, safe and affordable heating technologies in urban schools and multi-apartment buildings. The key performance indicators of the project at appraisal were:

- Share of households in multi-apartment buildings with safe gas- or hot-water-based heating;
- Cumulative number of targeted schools with class temperature above 15˚C and no idle classroom days, resulting from inadequate heating;
- Reduced incidence of CO poisonings, fires and explosions (per 10,000 gas subscribers); and
- Share of targeted users satisfied with heating conditions (when comparing before and after installation).

Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification
The PDO and the key performance indicators were not revised. However, the results indicators for the "capital grants to the poor" sub-component and the "school heating component" of the project were revised in the final year of the project implementation to reflect the reallocation of credit proceeds. Specifically, the Government and the World Bank agreed to:

- Reduce the results indicator for the "capital grants to the poor" sub-component from the original target of 10,000 to 8,000.
- Increase the results indicator for the "school heating component" from the original target of 100 to 117[17].

Component A: Community and private sector mobilization and development of an enabling environment for effective and safe provision of heating services (US$ 3.9 million, of which IDA funding US$ 1 million). Technical assistance was to be provided in two areas:

A1. (US$ 1.1 million, of which IDA funding US$ 0.5 million). Development of enabling environment for effective and safe provision of heating services including:

- Development of regulations, safety norms and standards, and certification of suppliers and equipment, including for natural gas supply;

[16]Global Environment Facility Supports Energy Efficiency Investments in Public Facilities of Armenia
[17]Implementation completion and results report on a credit in the amount of SDR 10.0 million (US $15.0 million equivalent) to the republic of Armenia for an urban heating project.

- Improvement of legal and regulatory framework to make home owner associations (HOAs) more functional and to foster market-based provision of heating services.

A2. (US$ 2.8 million, of which IDA funding US$ 0.5 million). Community and private sector mobilization through:

- Capacity building of heat service providers, local financial institutions, and HOAs;
- Implementation of broad information campaigns and public education programs to inform the public about the available new heating technologies and their benefits, safety norms and standards, the need and benefits of using environmentally clean and safe heating solutions and the new approaches to community-led provision of communal services;
- Establishment of special advisory center(s) to provide private sector and communities with support
- on legal, technical, and financial matters of modern energy supply;
- Assistance in preparation of sub-projects under B1.

Most of the technical assistance (TA) above was to be supplied by UNDP/GEF and USAID TA projects in close collaboration with this project.

Component B: Financing of heating and related infrastructure (US$ 10.0 million, of which IDA funding US$ 7.2 million). Investment financing for heating of residential buildings was to be supported under two subcomponents:

B.1 Lending to project beneficiaries (US$ 6.0 million, of which IDA funding US$ 4.2 million). This sub-component was to enable heat providers, HOAs, municipalities and individual home-owners to access funding for heating infrastructure investments. The Renewable Resources and Energy Efficiency Fund (R2E2 Fund) would on-lend funds to eligible participating financial institutions (PFIs) that would in turn extend loans to beneficiaries.

B.2 Capital grants to the poor (US$ 4.0 million, of which IDA funding US$ 3.0 million). To enable the poorest households living in multi-apartment buildings to participate in the project and thus gain access to improved heating, this component was envisaged to finance investments necessary for the connection of gas, heat and hot water supply to the apartments of the poor. Eligible households were identified based on the existing Poverty Family Benefit Plan (PFBP). The Bank team leveraged US$ 3.0 million grant from Global Partnership on Output-Based Aid to supplement this component of the project.

Component C: School heating (US$ 6.25 million, of which IDA funding US$ 5.0 million). This component was to provide grant financing to urban schools for investments in installation and rehabilitation of gas-based local heating systems and basic thermal rehabilitation. All urban schools outside Yerevan were eligible for financing, provided they were in satisfactory technical condition, had suitable engineering design, and gas supply was available in the area. Cost-effectiveness of

the investment per student was the selection criteria for urban schools. If funds were left after financing of investments in all eligible urban schools, the additional funds were planned to be provided to schools in Yerevan.

Component D: Support for project implementation (US$ 0.8 million, of which IDA funding US$ 0.8 million). This included TA, goods, works and logistical support to the R2E2 Fund for project implementation, monitoring and supervision.

Component E: Project preparation (US$ 1.0 million, of which IDA funding US$ 1.0 million): This component was identical with the project preparation facility, which supported various activities that provided the foundation for successful project implementation: awareness building and mobilization of heat providers and consumers; removal of some of the legal and regulatory barriers; and design of the institutions involved in project implementation. Most importantly, 10 pilot projects were completed during the 2003/04 and 2004/05 heating seasons through HOAs, private sector heat service providers, and individuals.

Electricity Supply Reliability and Energy Efficiency Project

The power sector of Armenia has achieved remarkable results through reforms and restructuring. The sector is financially viable with collections at 100 percent of sales, reduction of power losses from 40 to 13 percent, and tariffs at short-term cost recovery level. The sector receives no explicit or implicit subsidies and the sector entities are among the largest tax-payers in the country. The overall efficiency and quality of the power supply has improved. Over 70 percent of generation assets and the distribution are privately owned and there is a competent regulatory agency for the sector[18].

However, the power sector faces four serious challenges (see attached presentation for details):

1) Emerging power supply gap: With available capacity of over 1400MW in winter and 1500MW in summer and peak demand of under 1200MW, Armenia currently has sufficient capacity to meet its demand. However, generation capacity shortage of over 800 MW may emerge after 2016 due to the planned shut-down of the nuclear power plant, and the phasing out of inefficient and old thermal power plants.
2) Jeopardized power supply reliability: Transmission and distribution assets are old and under-maintained. Over 70 percent of power generation depends on imported fuels. Power outages are possible if any of the following occurs: (i) transmission and/or distribution network fails due to extreme disrepair; (ii) the natural gas supply is interrupted; (iii) the nuclear power plant is shut down in winter.
3) The affordability of energy tariffs is increasingly an issue: 37 percent of population spends over 40 percent of household budget on energy bills. The affordability issue will exacerbate as the fuel prices continue to rise and the required significant investments are made in new generation assets and rehabilitation of existing generation and transmission assets.

[18]Electricity Supply Reliability and Energy Efficiency Project

4) The financial viability of the sector is threatened: The import price of natural gas has increased from US$ 54 per 1000 cubic meters to US$159 in 2009. The end-user power tariffs have been increasing but not commensurate with the increasing costs of supply. The import price of natural gas will increase to US$180 in 2010 and is likely to increase further in 2011. The financial viability of the power sector will increasingly be an issue if the end-user power tariffs do not get adequately revised.

The proposed Electricity Supply Reliability and Energy Efficiency Project will contribute to addressing issues A and B and, to a certain extent, the issues C and D. Specifically, the project will enhance the reliability of the power supply by improving the power transmission network back-bone infrastructure and will reduce the power supply gap by improving the utilization of the country's energy efficiency potential.

The transmission infrastructure is old and under-maintained. The average age of transmission infrastructure is 45 years. While the transmission substations have been rehabilitated through various donor funded projects, the pylons, conductors, concrete foundations, insulators and some other key pieces of transmission infrastructure are in extreme disrepair.

Armenia has significant potential for energy efficiency and can recoup sizable economic benefits through utilization of this potential. While Armenia is one of the less energy intensive economies in the region, largely due to the structural changes of the economy, large potential remains for further efficiency improvements. The 2008 World Bank Study found that Armenia could save 132 billion Armenian Drams (more than US$360 million) annually, equivalent to almost 5 percent of its GDP, through energy efficiency investments. The above study also identified a number of informational, legal, regulatory and financial barriers impeding energy efficiency investments. The World Bank study estimated the economic and financial returns of energy efficiency investments in public buildings having the highest return with paybacks of two to eight years. Investments in energy efficiency of public buildings cannot only free up the fiscal space, but also prime the market, by creating demand for energy efficient equipment and services and send a strong signal to the private sector and general public about the Government's commitment to energy efficiency.

The proposed Electricity Supply Reliability and Energy Efficiency Project (hereafter referred to as the project) is consistent with the strategic objectives of the Government, as reflected in the Sustainable Development Program, the Energy Sector Strategy, the National Program on Renewable Energy and Energy Efficiency. The project is aimed at supporting the second pillar of the CPS to support economic competitiveness and growth. Also, energy efficiency is a key reform area of the development policy lending operations in Armenia.

1. Proposed objective(s)

The project development objectives are to: (a) increase the reliability and capacity of the transmission network and (b) reduce energy consumption of social public buildings. The global environmental objective is to reduce greenhouse gas emissions

through the removal of barriers to the implementation of energy efficiency investments. Proposed key project monitoring indicators include:

- Reduction of transmission losses on the targeted section of the transmission line
- Increased capacity of the targeted section of the transmission line
- Energy savings (in physical units) of the proposed retrofitted social public buildings and associated GHG emission reductions.

2. Preliminary description

The project will have two components - transmission and energy efficiency.

- Transmission component. This component will consist of two sub-components:

(i) Investments in replacement of the transmission line. The funding needs for this sub-component will be finalized upon the selection of the contractor(s) for design, supply and installation works. This sub-component will specifically finance replacement of around 220 km section of transmission line from the Hrazdan Thermal Power Plant to Shinuhayr substation; this section connects two key generation centers and serves large electricity consumers in the Central-Eastern part of the country (see the attached map for details). The replacement of the above section of the transmission line will include erection of new pylons, replacement of existing conductors, insulators and other key pieces of infrastructure. The route of the new line will mostly be located within the existing corridor with small deviations to bypass the settlements or the difficult terrain, which are not expected to exceed 40 km.

The Government, in consultation with the Bank, was considering three investment options for the transmission component of the project: complete replacement of the line, rehabilitation, and replacement of only badly damaged pieces of infrastructure. The decision to completely replace the above section of the transmission line was based on the following key factors: (i) the repair costs of the existing line may be as much as the full cost of construction of a new line; (ii) due to safety considerations the rehabilitation works can be implemented only when the line is disconnected and the line disconnection is not feasible since the existing line is part of the backbone of the national transmission network; and (iii) the existing pylons' cross arms members are heavily rusted and may not survive the tension forces of new wire restringing.

(ii) Technical assistance. In order to ensure sustainability of the investments, TA is proposed to strengthen the capacity of the transmission company. The TA will include capacity building in areas of procurement and project management, planning and technical analysis, procurement of engineering software and training, etc.

- Energy efficiency component- This component will consist of two sub-components:

(i) Energy efficiency investments in public building. This sub-component will support energy efficiency investments in public buildings of social importance, e.g. schools,

kindergartens, hospitals, etc. The selection of public buildings to be financed under the project will be based on eligibility criteria, the energy saving potential and financial viability criteria. The Renewable Resources and Energy Efficiency (R2E2) Fund, which is currently implementing the World Bank financed Renewable Energy and Urban Heating Projects, will assess subprojects, finance them and develop suitable repayment mechanisms. For implementation of the subprojects, performance-based procurement options will be explored under which contractors will have flexibility in using energy efficiency solutions and will gradually start assuming performance risks.

(ii) Technical assistance. The TA will be directed at the removal of existing barriers to realizing the energy efficiency potential and creation of an enabling environment. The following key activities will be supported: (i) public awareness building to address the information and knowledge gaps; (ii) removal of legal and regulatory barriers and establishment of energy efficiency incentives; (iii) removal of institutional barriers and capacity building for public agencies; (iv) support for pipeline development, monitoring, and reporting for the investment component.

INOGATE Programs

Harmonization of gas and oil technical standards and practices (E. Europe and Caucasus)

Main and Specific objectives: The project aims to support the countries' adoption of international standards, rules and practices for design, construction, manufacturing, testing, certification, accreditation, operation and maintenance applied for all main components of gas and oil production / transmission / storage.

The specific objectives are: To achieve a common understanding on the rationale and need to shift to international standards in both oil and gas sectors To develop a strategy for the harmonization of technical standards and practices in the gas and oil sectors To identify a medium-term action plan for achieving harmonized technical standards and practices To propose the set of legal measures to be initiated by the national authorities for the adoption of harmonized technical standards To create awareness of EU standards, rules, certification and accreditation in the gas and oil sectors

Beneficiary Countries: Ukraine, Belarus, Moldova, Azerbaijan, Georgia, Armenia

Brief project description: The project aims at supporting harmonization of technical standards and practices of the gas and oil sector of the Partner Countries with those used in the EU countries, in order to support creation of integrated functioning energy market and gradual long-term convergence of the energy markets of the Partner Countries on the basis of the EU internal energy market principles. Technical assistance provided in the project will include technical, legal and institutional work, as well as various activities of promotion of harmonization and raising of awareness. The project will include the following main activities:

- Establishment of project offices
- Identification of contacts in Partner Countries, establishment of co-operation with all relevant stakeholders
- Identification of relevant international standards
- Establishment of working procedures
- Technical work on standards (analysis, training, translation, preparation for adoption)
- Analysis of legislative and institutional framework in Partner Countries, identification of necessary reforms and modifications
- Development of harmonization strategies and action plans in Partner Countries
- Organization of inter-regional meetings, national meetings, inter-regional training seminar, study tour

Expected results:

- Establishment and presentation of the Project
- Creation of an inter-regional forum (organization of inter-regional meetings) for harmonization of technical standards and practices in the gas and oil sectors
  supporting the process of creating a common understanding on the rationale and need to jointly shift to international standards
- Coordination of national efforts to adapt and improve technical standards and practices
- Support the process of developing a strategy aiming at harmonizing technical standards and practices
- Support to preparation of medium-term national action plans
- Supporting the process of developing legal measures for the adoption of harmonized technical standards
- Supporting the process of increasing awareness of EU standards, rules, certification and accreditation

Activities performed so far:

- Establishment of contacts with stakeholders in Partner Countries
- Kick-off meetings in Partner Countries
- Reviews of international gas and oil sector standards (EN, ISO, ASME, API) and EU directives and identification of relevant ones
- Reviews of standards used in Partner Countries
- Meetings with CEN, ISO, EASC, GOST-R, National Standards Bodies and oil & gas industry of Partner Countries
- Reviews of gas and oil sector structures in Partner Countries
- Reviews of standardization, certification, accreditation and relevant legal framework in Partner Countries
- Reviews of industry interests
- Review of Intellectual Property Rights issues related to standards
- Establishment of working procedures
- Organization of inter-regional meetings

Results achieved so far:

- Stakeholders in Partner Countries identified and co-operation established
- Establishment and presentation of the project completed
- Selection of relevant international gas and oil sector standards and directives completed for further processing with Project Partners
- Standardization, certification and accreditation and related legal framework in Partner Countries reviewed and variations from common international counterparts identified
- Procedures for standards adoption analyzed
- Intellectual property rights related to obtaining, translation and distribution of international standards analyzed and associated procedures for the project established
- Extensive review of gas and oil industry (both state-owned and private, also international) interests performed
- Contacts with European and international standards organizations, several technical committees, and other relevant international organizations established
- Participation of Partner Countries in international standardization, metrology and accreditation co-operation analyzed
- Translation contract signed and translation of standards started
- Working groups activities in Countries started
- Three inter-regional meetings organized
- Other relevant Technical Assistance projects identified, co-operation established

Activities programmed for the forthcoming period:

- Promotion of harmonization continued
- Translation of selected standards and directives into Russian continued
- Identification of legal, institutional and regulatory barriers to harmonization of standards finished; identification of necessary reforms and modifications
- Development of strategies and action plans for harmonization finished
- 4th inter-regional meetings arranged
- Two inter-regional training seminars arranged
- Study tour to European standards bodies organized
- Technical work on standards (analysis, training, translation, preparation for adoption) with working groups and other stakeholders[19]

Capacity building for Energy Regulators in Eastern Europe and Central Asia

Objectives: The project is to promote and advocate good and sound energy regulatory practices in the Partner Countries of the INOGATE Programme and to harmonize energy regulatory practices among them. The project will allow the transfer of EU best practices and the strengthening of cooperation among the countries involved. Furthermore, the project will aim to educate relevant ministerial level decision makers of these countries about the purposes and benefits of an independent energy regulatory organization.

[19]Harmonization of gas and oil technical standards and practices (E. Europe and Caucasus)

Beneficiary countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

Brief Project Description: It aims to promote and advocate good and sound energy regulatory practices in the Partner Countries of the INOGATE Programme and to harmonize those practices among them. The project enables the transfer of EU best practices and the strengthening of cooperation among the countries involved. The project also seeks to educate Partner Countries' decision makers, at the ministerial level, about the purposes and benefits of independent energy regulatory organizations.

The project helps governments to improve the overall consistency of their energy policies and to better integrate regulatory tools into sectoral strategies and policies. It furthers the establishment of a common regulatory environment and contributes to common understanding of regulatory and market issues as well as practices, based on EU principles. It helps to improve organizational performance of energy regulators, including better tariff practices consistent with international methods. It supports the Partners in carrying out regulatory reforms and improving their regulatory responsibilities. It also helps change public attitudes by educating secondary target groups, namely consumer advocacy groups, research and academic institutions, as well as the press.

Expected results:

- Creation of a network for information exchange and assistance among the energy regulators of the beneficiary countries with the aim of helping governments to improve the overall consistency of their energy policies and to better integrate regulatory tools into sectoral strategies and policies.
- Transfer of information and best practices among the participating energy regulators and ministry representatives with the aim of establishing a common regulatory environment and common understanding of regulatory and market issues and practices, based on EU principles.
- Improve organizational performance including better tariff practices consistent with international methods and harmonized among the beneficiary countries.
- Support beneficiary countries in carrying out their regulatory reforms and improving their regulatory responsibilities.· Support beneficiary countries in establishing independent regulatory bodies.
- Educate secondary target groups (consumer advocacy groups, research and academic institutions, press)[20].

Capacity building for Sustainable Energy Regulation in Eastern Europe and Central Asia

Objective: The project is to promote and advocate good and sound energy regulatory practices in the Partner Countries of the INOGATE Programme and to harmonize

[20]Capacity building for Energy Regulators in Eastern Europe and Central Asia (INOGATE)

energy regulatory practices among them. The project will allow the transfer of EU best practices and the strengthening of cooperation among the countries involved. Furthermore, the project will aim to educate relevant ministerial level decision makers of these countries about the purposes and benefits of an independent energy regulatory organization.

Beneficiary Countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine[21].

Harmonization of electricity standards

Objectives: The project's objective is to assist the INOGATE Partner Countries in adopting international standards, rules and practices in the electricity sector. It is anticipated that cooperation on standardization within the framework of the INOGATE Programme will lead to market integration and convergence. The Project seeks to increase infrastructure efficiency, enhance quality and reliability of equipment, ensure safety in electricity transmission and distribution and facilitate trade and investments in modern technologies.

Partner countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

Brief Project Description: The INOGATE Harmonization of Electricity Standards Project (the Project) will develop action plans and establish a road map for eleven Partner Countries (PC) of the Eastern Europe, the Caucasus, and the Central Asia regions, in terms of the harmonization of standards, which will ultimately lead to integration with the electricity markets in the EU. The Project's activities will include:

- Identification of contacts in Partner Countries, establishment of co-operation with relevant stakeholders
- Identification of relevant international standards
- Establishment of working procedures
- Technical work on standards (analysis, training, translation, preparation for adoption)
- Analysis of legislative and institutional framework in Partner Countries, identification of necessary modifications
- Development of harmonization strategies and action plans in Partner Countries
- Organization of relevant events (meetings, seminars, workshops, study tour)

Expected results: The Project intends to develop proposals for harmonization of one or two major standards throughout the region or, where appropriate, sub-regions based on the geographic location and technical state of play. The selected standards will be used as case studies and followed closely throughout the Project in order to maximize the effects of "learning-by-doing"[22].

[21]Capacity building for sustainable energy regulation in Eastern Europe and Central Asia
[22]Harmonization of electricity standards

EBRD project

ArmSEFF is a finance facility provided by EBRD to local participating banks in Armenia, which will then on-lend the funds for energy efficiency and renewable energy projects. The government of Armenia has indicated its willingness to pursue policy measures designed to enhance investments in supply and demand side energy efficiency and renewable energy, building on the 2004 Law on Energy Saving and Renewable energy and the 2007 National Programme on Energy Saving and Renewable Energy.

ArmSEFF will ensure that local participating banks become familiar with appraising and financing industrial and residential energy efficiency and small-scale renewable energy investment projects and that local engineers have the technical expertise to identify and prepare technically feasible and bankable projects. The scope of work of the assignment is:

- Promote ArmSEFF through public awareness and marketing campaigns;
- Provide initial training to the participating banks;
- Development of a pipeline of potential energy projects;
- Advise on the eligibility of the energy projects proposed to be financed under ArmSEFF;
- Undertake preliminary screening and assistance in the preparation of energy projects;
- Monitor the performance of the credit line facility and the financed energy projects.

Within ArmSEFF, the EBRD will offers a total of US$ 20 million in loans through Armenian lenders such as Anelik Bank that already joined the facility. It is expected that the credit line will be extended with additional US$ 5 million to support residential energy efficiency projects.

ArmSEFF is a credit line dedicated to investing in energy efficiency and renewable energy projects that aims to increase energy savings and decrease carbon emissions. The credit line is a part of bigger EBRD-led Caucasus Energy Efficiency Programme (CEEP). It enables commercial banks in Armenia to meet increasing demand for energy efficiency loans and to maintain the availability of these specific credits to private companies and entities in a challenging environment where access to alternative sources of finance remains limited.

Industrial companies, commercial enterprises and private households that wish to invest in energy efficiency or renewable energy projects will be able to apply for assistance if they submit their proposals for evaluation. The credit line will be complemented by technical cooperation support to engage both international and local energy experts who will review investment proposals, conduct energy audits and support companies in securing funding under ArmSEFF. The technical assistance is absolutely free for companies and is funded by Austria's Federal Ministry of Finance.

In July 2007 the EBRD established the Caucasus Energy Efficiency Programme (CEEP), a dedicated credit line facility to finance energy efficiency and renewable energy projects in the Caucasus aimed at end-users in the industrial sector, renewable energy sources developers and the residential sector.

Earlier in October 2013 Anelik Bank was the first local bank in Armenia that joined ArmSEFF and received a US$ 3 million loan (approximately 1 billion Armenian Drams) for on-lending to eligible sub-borrowers[23].

United States Agency for International Development (USAID) Projects

The assistance at the establishment of an efficient and reliable energy system, which is crucial for sustainable economic growth, environmental protection and social well-being and which will meet the needs of the newly formed market economy is one of the main objectives of the United States Agency for International Development (USAID). To this end, the USAID implemented past and present energy projects have the following targets: 1) enhancement and development of the private sector participation; 2) raising economic and environmental efficiency; and 3) diversification of energy sources. USAID has implemented and continues to implement a number of projects related to the heat supply sector which are presented below.

Armenia Energy Efficiency, Demand-Side Management and Renewable Energy
This program was implemented over 2001-2007. The goal was to promote implementation of actions aimed at development of energy saving and renewable energy resources in Armenia. The program supported the introduction of knowledge and experience of energy efficient technologies in Armenia, the establishment of a services market in the area of energy efficiency and renewable energy, and development of energy service companies (ESCOs). A number of heat supply and energy efficiency demonstration projects were implemented under the program. The program implemented by Advanced Engineering Associates International (AEAI)[24].

Commercialization of Energy Efficiency Program (CEEP)
This program has been implemented since May 2007 and seeks to address the problems that hinder faster development of demand for energy efficiency services and products. It also seeks to expand the use of energy efficiency to increase private sector lending for energy efficiency projects (EEPs). Other objectives of the program include development of heat supply sector service and equipment providers, domestic production of heating equipment to reduce reliance on more expensive, imported products, thereby increasing the local capacity. The program develops socially-oriented pilot projects aiming at implementation of energy efficiency measures at institutions wholly or partially covered by public financing, including hospitals, kindergartens, special schools and other similar health facilities and educational institutions. The program also works with local consumer organizations to provide extensive outreach and education to consumers about the economic

[23]Implementation of the Armenian Sustainable Energy Finance Facility (ArmSEFF)
[24]Current state of heat supply in residential sector of the Republic of Armenia

advantages and disadvantages of energy efficiency services and equipment, as well as health, safety and environmental issues[25]. The program is implemented by Advanced Engineering Associates International, Inc. (AEAI)

Municipal Network for Energy Efficiency: Alliance to Save Energy

In 2001-2007 Alliance to Save Energy implemented the Municipal Network for Energy Efficiency (MUNEE) Program under USAID funding. The objective of the program was to share the positive/best experience in energy saving within the entire region through a relatively cheaper method. The program worked the following four key areas:

- Policy reform under which the Armenian Energy Efficiency Council was created, and the Law on Energy Saving and Renewable Energy of RA, and the National Program on Energy Saving and Renewable Energy of RA;
- Residential energy efficiency and heating under which small rotary funds were created in several Armenian towns to help condominiums implement energy efficiency measures in residential houses;
- Education and awareness raising which includes counseling on development of residential energy efficiency and heating projects, as well as organizing training courses, workshops and seminars on issues of energy efficiency and heating for municipality representatives and condominiums, and energy education seminars for high school students; and
- Strengthening the municipal network for energy efficiency in Armenia and cooperation with towns which includes enhancement of links with local selfgovernment (LSG) and municipalities, organizing discussions and exchange of best practices on energy efficiency issues of several Armenian towns, as well as organizing training on energy efficiency and urban energy planning and study tours to other countries[23].

Housing Sector Heat Supply Program

The program was launched in July 2005 and aimed at assisting the implementation of the strategy on heat supply on RoA settlements adopted in 2002, as well as identify efficient and economically viable solutions for heat supply of Armenia's various settlements. The program also sought to address institutional issues to promote transparency and effectiveness of provision of services, improve the level of fees collection and establishment of a sustainable commercial energy market. The major goals of the Program were not reached because of the Program termination in 2006. Among the most essential outcomes of the program are the heat supply schemes for the towns of Sevan and Spitak designed under the program; currently UNDP/GEF Program is dealing with the implementation of these schemes[23].

International Finance Corporation: Armenia Energy Efficiency Survey Project

The main goal of the Project is to assess the current market for energy efficiency financing in Armenia, Azerbaijan, Belarus, Georgia, Ukraine and to raise awareness among local financial institutions, small and medium enterprises (SMEs), and policy makers about existing opportunities for energy efficiency financing in the country.

[25] Current state of heat supply in residential sector of the Republic of Armenia.

Similar surveys have been conducted in Russia. By identifying best practices in SME energy efficiency and finance, the survey provided benchmarks with other countries and might lead to a more comprehensive program to increase energy efficiency in Armenia, Azerbaijan, Belarus, Georgia, Ukraine and the region[26].

Anticipated Impact:

- Banks begin to explore EE financing
- The awareness of EE among all interested stakeholders: FIs, SMEs, government, mass media, and general public is increased
- Advisory and investment opportunities in the country are developed

Armenia Renewable Resources and Energy Efficiency Fund (R2E2)

Armenia Renewable Resources and Energy Efficiency Fund started its operation since November 2005. It implements credit and grant projects targeted at the development of renewable energy and energy efficiency sectors in Armenia. The efficient cooperation between the RoA Government and the WB result in the implementation of the WB Financed Urban Heating Loan Project, Renewable Energy Loan Project; Renewable Energy Grant Project supported by Global Environmental Facility (GEF) trust fund; and Gas and Heating Grant Project supported by Global Partnership for Output Based Aide (GPOBA) trust fund. The Fund's Urban Heating Project activities include:

- Development of enabling environment for effective and safe provision of heating services;
- Providing loans to beneficiaries with apartment heating purpose in multiapartment buildings;
- Providing capital grants to around 9,000 to low-income (socially vulnerable) families; and
- Rehabilitation of heating systems of around 100 schools. The Fund's Gas and Heating Project envisages to provide heating grants to 8,000 more socially vulnerable households to enable them to gain access to improved gas and heating services and for provision of heaters. Under the Fund's Renewable Energy Project lending is provided for small hydropower plants and wind power plants; activities will also be carried out to create a favorable environment for investments, and to identify and develop wind, solar, biogas, bio-ethanol, hydrogen and other resources of renewable energy[27].

Armenian Social Investment Fund (ASIF)

The Armenian Social Investment Fund (ASIF) was created in 1996, to assist with the rehabilitation of basic infrastructure and support the subsistence of the most needful groups. The recent major projects of ASIF are ASIF II, launched on November 1 2000, and ASIF III, launched on December 20 2006.

[26]Energy Efficiency Survey Program
[27]Armenia Renewable Resources and Energy Efficiency Fund

About 70-75% of the funding for these projects is provided by the WB, 5-20% by the RoA Government, 5-7% by the communities, and the rest by other donors and sponsors. The objectives of ASIF II and ASIF III are as follows:

- Raise the living standards of the poor and vulnerable groups through rehabilitation of community infrastructure and improving the quality of and access to services; and
- Promote complementary institutional capacity building at the community and municipal level to improve the quality and sustainability of municipal investments and service delivery, financial management, increase accountability, and enhance greater stakeholder participation at the local level. These projects finance projects on renovation, reconstruction and construction of kindergartens, schools, orphanages, health centers and other public buildings; rehabilitation and construction of heat supply systems of the said buildings; renovation, reconstruction and construction of drinking water supply, irrigation and sewage systems, environmental improvement, and other similar projects[28].

KfW Development bank "Energy-efficient Housing Finance" project

This project has been initiated by the National Mortgage Company (NMC), the French Agency for Development, the EU Neighborhood Investment Facility and the KfW Development bank. The project will provide over 3,000 medium- and low-income families with accessible loans to renovate their houses and focus on energy-efficiency issues, promoting energy saving technologies and equipment demand. This is the second stage of cooperation between KfW Development Bank Armenian financial institutions. The first stage of housing financial support was undertaken in 2006.

Despite the fact that the French Agency for Development only recently initiated long-term social, economic and environmental activities in Armenia, cooperation has already recorded sustainable progress. Within the framework of the project, the French Agency for Development will provide NMC with a €10 million loan; NMC will then use this loan to refund mortgage loans provided by its partner financial companies.

3.1.2 Political initiatives (national level)

The National Program for Energy Saving and Renewable Energy (2007) provides an assessment of the energy saving potential in power supply, heat supply and gas supply systems; in industrial production, in the transportation, residential, and public sectors; and it also assesses the potential of renewable energy and measures for achieving potential energy savings. Specifically, the National Program on energy saving and renewable energy has the following objectives:

- Plan the development of energy resources of the country in parallel to the advancement of energy saving and renewable energy.

[28] Current state of heat supply in residential sector of the Republic of Armenia.

- Align state policy on development of fuel-energy resources with the development of the economy, in order to guarantee the sustainable development of the country through introduction of regulatory reforms and increase of public participation.
- Direct the finance and credit policy of the country to energy saving and renewable energy development, providing equal affordability conditions for the capital investments.
- Establish and maintain an active market structure through introduction and explanation of energy efficiency benefits, providing an effective choice mechanism for market participants.
- Organize, promote and provide equal accessibility of modern technologies for all members of society (companies).
- The national security strategy (2007) also prioritizes national energy security issues and defines main directions in energy sector development.
- Energy efficiency is regulated by two main laws: the law of the republic of Armenia on energy (2001) and the law on energy saving and renewable energy (2004). The laws define the main principles of state policy in the energy sector:
- Effective use of local energy reserves and alternative sources of energy and application of economic and legal mechanisms for that purpose;
- Ensure the energy independence and security of Armenia;
- Create new industries and organize new services, implement targeted national programs and apply new technologies in order to promote the development of renewable energy and energy saving;
- Promote energy-efficient and energy-saving technologies;
- Reduce environmental impacts[29].

The Law of the Republic of Armenia on Energy Saving and Renewable Energy, passed on November 9, 2004, defines the principles of state policy regarding energy efficiency. The Law provides for the development of mechanisms to enforce a wide array of energy efficiency measures, however, many of these have yet to be developed and implemented. Such mechanisms include the following:

- State-administered programs. The Law allows for: the development, adoption and implementation of a national, targeted program for energy savings and renewable energy, coordination among state programs to promote energy efficiency, and the incorporation of energy savings requirements in state programs on the economic development of Armenia.
- Standards. The Law commissions the Standardization National Body to adopt energy saving national standards with regard to the energy efficiency of:
    - Energy-using devices
    - The production, processing, transformation, transportation, storage and consumption of energy resources
    - Building and construction technical requirements for heating, lighting, ventilation, water supply and sewage
    - Production/industrial processes

[29]Improving Energy Efficiency in Buildings

- Voluntary labeling. The Law allows for the voluntary certification of energy-using devices at the expense and initiative of the private entity. Such devices will be subsequently labeled based on the energy efficiency indicators described above.
- Statistical data gathering. The Law commissions the Statistics National Body to record data on energy production, imports, processing, transformation, transportation, storage, and consumption. This data is to be used in the submission of energy balances as defined by the law "On State Statistics".
- Training and education. The Law instructs the state administration authorized body for education to incorporate energy savings into the curricula of elementary, secondary, graduate, supplementary and post-graduate educational institutions and to develop energy savings educational training programs for engineering staff.
- Information dissemination. The Law allows for information dissemination via public hearings/discussions, broadcasting, exhibitions, and other propaganda mechanisms. Information that falls within the jurisdiction of public dissemination campaigns includes:
    - Existing energy efficient devices, technologies and machinery,
    - Energy efficiency pilot projects,
    - Energy efficiency national objectives,
    - Environmental, economic and social benefits of energy efficiency.
- Energy audits. The Laws spells out several important factors and suggests certain prerequisite activities related to the development of the energy audit process in Armenia. Such factors and prescribed activities include:
    - The definition of purpose of the audit
    - The voluntary nature of cooperation
    - The measurement of energy efficiency indicators
    - The definition of a methodology and documentation format for carrying out an energy audit
    - The information to be included in the audit report
    - The possibility for tax and/or customs relief for a positive audit conclusion
- International cooperation. The Law recommends international cooperation with regard to the exchange of energy efficient technologies, information, the mutual recognition of standards and certification, and the development and implementation of joint energy saving programs and projects.
- Fiscal incentives. The Laws commissions the authorized state body for energy savings to submit proposals to the government on additions to the Customs Code of the Republic of Armenia and the Republic of Armenia law "On the Approval of List of Products imported by organizations and individual entrepreneurs eligible for zero (0) rate customs duty and excise duty exemption, for which the customs service does not calculate or charge value added tax".
- Updating existing compliance certification. The Law directs the appropriate state body to submit proposals to the government to include energy savings requirements and national objectives in the Republic of Armenia law "On

Certification of Compliance of Goods and Services with Normative Requirements"[30].

3.1.3 Yerevan (local level)

Due to the size of Armenia's territory and population, most of the major programs and projects on energy efficiency that are implemented on nation-wide level are being implemented on local level too.

3.1.3.1 Funding programs

The following energy-efficiency related programs that are implemented on nation-wide level, are being Yerevan too. The details about these programs are elaborated above.

The Global Environmental Facility (GEF) Programs

- Armenia – Improving the Energy Efficiency of the Urban Heating and Hot Water Supply (UNDP)
- Armenia Energy Efficiency Project (IBRD)
- Improving Energy Efficiency in Buildings (UNDP)
- Armenia - Improving the Energy Efficiency of Municipal Heating and Hot Water Supply Project

World Bank Programs

- Urban Heating Project – Armenia
- Electricity Supply Reliability and Energy Efficiency Project

INOGATE Programs

- Harmonization of gas and oil technical standards and practices (E. Europe and Caucasus)
- Capacity building for Energy Regulators in Eastern Europe and Central Asia
- Harmonization of electricity standards

EBRD project

- ArmSEFF - a finance facility provided by EBRD to local participating banks in Armenia, which on-lend the funds for energy efficiency and renewable energy projects.

United States Agency for International Development (USAID) Projects

- "Armenia Energy Efficiency, Demand-Side Management and Renewable Energy Program implemented by Advanced Engineering Associates International (AEAI)
- Commercialization of Energy Efficiency Program (CEEP) Implemented by Advanced Engineering Associates International, Inc. (AEAI)

[30]The Potential for Improving Energy Efficiency in Armenia

- Municipal Network for Energy Efficiency: Alliance to Save Energy
- Housing Sector Heat Supply Program
- International Finance Corporation: Armenia Energy Efficiency Survey Project.

Armenia Renewable Resources and Energy Efficiency Fund (R2E2)

- R2E2 implements credit and grant projects targeted at the development of renewable energy and energy efficiency sectors in Armenia.

Armenian Social Investment Fund (ASIF)

- This fund finances projects on renovation, reconstruction and construction of kindergartens, schools, orphanages, health centers and other public buildings; rehabilitation and construction of heat supply systems of the said buildings; renovation, reconstruction and construction of drinking water supply, irrigation and sewage systems, environmental improvement, and other similar projects.

3.1.3.2 Political initiatives

The initiatives of the RoA government on energy efficiency in buildings apply to the whole country, and to Yerevan in particular. The details about these initiatives are elaborated above.

- The National Program for Energy Saving and Renewable Energy (2007) provides an assessment of the energy saving potential in power supply, heat supply and gas supply systems; in industrial production, in the transportation, residential, and public sectors; and it also assesses the potential of renewable energy and measures for achieving potential energy savings.

The Law of the Republic of Armenia on Energy Saving and Renewable Energy, passed on November 9, 2004, defines the principles of state policy regarding energy efficiency. The Law provides for the development of mechanisms to enforce a wide array of energy efficiency measures, however, many of these have yet to be developed and implemented.

3.2 Greece

3.2.1 Funding programs (national level)

The National Strategic Reference Framework (NSRF) 2007–2013 is the guide statement document for the programming application of European Union Funds at national level for the period 2007 – 2013. NSRF has been elaborated within the framework of the new strategic approach to the Cohesion Policy of the European Union. A significant number of proposals were submitted to the Ministry of Economy and Finance and evaluated utilizing political directions -guidelines at national and European level, quantitative data and studies.

In parallel, the development strategy took into account the national policies described in strategic documents, such as the National Report on Social Protection and Social Inclusion Strategy 2006-2008, the Digital Strategy 2006-2013, the "Plan for the Development of Transports for 2007-2013 and twenty-year plan", the National Port Policy, the National Strategic Rural Development Plan for Greece 2007-2013, etc.

Based on the above, the NSRF targeting was structured over 4 levels:

- the NSRF strategic objectives level,
- the thematic (5) and spatial (3) priorities level, as required by the General Regulation of the Funds,
- the level of the General Objectives, in which each thematic priority is subdivided,
- the level of special targets and of main means of achievement

The financing framework was formatted on the basis of the decisions of the European Council of 16th December 2005 and of the specifications / limitations provided for in the new Regulations, and also according to the sectoral and regional development needs for the next period. It also took into account the needs for completion of ongoing projects carried forth from the previous programming period and the requirements for actions serving the objectives of the Lisbon Strategy.

The structure of the NSRF 2007-2013 Operational Programs (OPs) was formulated in such a way as to implement the country's strategic choices in the best possible manner, whilst also taking into account new data for the programming period 2007–2013.

The new scheme is characterized by a smaller number of Operational Programs in relation to the previous 2000–2006 period, leading to a more flexible management scheme. The country's strategic planning for the 2007 - 2013 period was implemented through eight (8) Sectoral OPs, five (5) Regional OPs and twelve (12) European Territorial Cooperation OPs. Thus, during the 2007–2013 period, all accessibility infrastructure projects are implemented through a single OP, while there are no distinct OP for the sectors of health and culture and the relevant actions are carried out through Regional and Sectoral OPs.

The Ministry of Environment, Energy and Climate Change (YPEKA) implemented the Operational Program (OP) “Environment and Sustainable Development 2007-2013”. The Ministry of Development implemented the Operational Program (OP) “Competitiveness and Entrepreneurship 2007-2013”.

Part of these programs refers to the following sections:

- Public Buildings
  - “EXIKONOMO", which means SAVE, for Local Government (municipalities with more than 10000 citizens)
  - Intelligent Energy Museums of Near Zero Energy Consumption.
  - Green roofs in public buildings (demonstration-pilot program).
  - Green Pilot Urban Neighborhood.
  - Demonstration projects using renewable energy sources (RES) or energy savings (ES) in public building.
  - Bioclimatic upgrades of public open spaces.

- Privet Buildings
  - “Energy Saving at Household Buildings” program (“EXIKOMISI KAT’ OIKON”) subsidizes and provides incentives to house owners to implement energy efficiency renovation and other energy performance actions under specific rules.
  - Photovoltaic Systems up to 10 kWp in building roofs
  - Changing air-conditioner

OP “Competitiveness & Entrepreneurship 2007-2013”

The OP "Competitiveness and Entrepreneurship 2007 - 2013" in Greece was approved by the European Commission on 26 October 2007. The program involves Community support through the ERDF for eight Greek regions under the "Convergence" objective ("phasing out" regions are not included), and through the Cohesion Fund, which intervenes all over the country including the "phasing out" and "phasing in" areas.

The priority axis - 4 “Completion of the country’s energy system and support for sustainability” of OP “Competitiveness & Entrepreneurship 2007-2013” intends to enhance the energy system of the country and to improve sustainability. Also the program aims to secure the Greek energy supply along with meeting environmental targets, to support energy market liberalization and to integrate electricity and natural gas transportation into large international networks. A variety of measures are provided by the program including energy efficiency projects for public and private buildings and enterprises.

Breakdown of finances for the mentioned axis are shown in the following table.

Table 3.2-1: Breakdown of finances for priority axis-4.

Priority Axis	EU Investment	National Public Contribution	Total Public Contribution
Priority 4: Completion of the country's energy system and support for sustainability	€330 990 000	€ 58 410 000	€ 389 400 000

The following initiatives have been activated under this OP.

- "EXOIKONOMO" which provides for energy saving activities in municipal buildings, communal areas, municipal transport means, including also activities related to publicity and sensitization of citizens and municipal employees regarding the energy consumption issues.
- "Allazo Klima" (Replace Air-conditioning), which provides for replacing old air conditioning equipment by brand-new equipment in households
- "Exoikonomisi kat' oikon" (energy conservation in houses), a forthcoming initiative related to energy efficiency measures in private households.

"EXIIKONOMO" program, which means energy saving, intends to apply energy efficiency improvement in local level, promote energy efficiency actions resulting direct applicable results, inform citizens and administrative staff, and ask questions regarding energy efficiency in urban condition. There are application of actions and proven good practices for the reduction of energy consumption in urban environments, laying stress on building sector (municipal buildings), and upgrade of communal areas and secondarily in the sector of municipal and private transfers and energy consuming municipal premises. The program implements actions of technical interventions and actions for the sensitization and mobilization of citizens, local government, companies and other entities.

The program includes, among others, energy efficiency upgrading projects in existing municipal buildings and application of technical measures in a variety of buildings, such as town halls, public service buildings, cultural centers, schools, sports and training centers, et c. Also, the program concerns reconstruction and building energy efficiency improvement in municipal installations and information dissemination actions to raise public awareness in energy efficiency.

Additionally, the program includes integrated interventions and actions for improving energy efficiency in city areas such as external heat-insulation, glass replacement, door and window frame replacement, rooftop planting, energy upgrading of heating/cooling electromechanical installations, performance upgrading of lighting systems, installation of energy management system (BEMS), installation of RES, and improvement of microclimate and energy efficiency in urban areas.

Eligible organizations for the submission of proposal are Municipalities with population over 10.000 inhabitants (based on 2001 census report). The eligible Municipalities able to submit proposals in the program are divided in the following categories:

- 10.000 - 45.000 inhabitants: € 700.000 (including VAT)
- 45.000 – 90.000 inhabitants: € 1.000.000 (including VAT)
- 90.000 – 150.000 inhabitants: € 1.500.000 (including VAT)
- 150.000 - 300.000 inhabitants: € 3.000.000 (including VAT)
- >300.000 inhabitants: € 6.000.000 (including VAT)

The total budget of the initiative (including public expenditure and Municipalities contribution) is €100 million from which €6,6 million for the East Macedonia & Thrace region. Each accepted project subsidized by 70% that is €70 million of the total budget, and the rest 30% of the total budget is contributed by the municipality. Regarding public expenditure, the amount of €24,573 million is provided by the OP "Competitiveness & Entrepreneurship" and €45,427 million is provided by Regional Operational Programs.

The program is also supported by the OP "Environment and Sustainable Development 2007-2013", which is described in the next paragraph.

"Replace air-conditioner" was an innovative program, which subsidized the replacement and recycling of old energy intensive domestic air conditioners. The action was partly financed by the European Regional Development Fund (ERDF) and national resources. The replacement actualized under the framework of National Strategic Reference Framework (NSRF) 2007-2013, through the Operational Program "Competitiveness" (EPAN II)" and the Regional Operational Programs, during summer 2009. The quantity of around 134000 air conditioners was replaced with new ones during this summer having energy class A, A+ and A++. All replaced air-conditioners were recycled. The total activity budget cost €45 million and the subsidy was 35% of retail price, with maximum subsidy limit €500 per household. The energy saving is estimated in 49,56 GWh/year. The initiative was financed by the OP Competitiveness and the Regional Operational Programs. According to the Ministry of Development, there is no intention to have a second round of financing for this kind of initiative.

"Exoikonomisi kat' oikon" ("energy conservation in houses") is a co- financed program for the implementation of energy efficiency upgrading interventions in residential buildings. This initiative for housing interventions related to energy efficiency was announced by the Ministry of Development in July 2009. The main objectives of the initiative are to reduce energy consumption of buildings (for housing purpose) and to reduce CO_2 emissions. The program applies Law 3661/2008 on "Measures for decreasing the energy consumption of buildings" and Directive 2002/91/EC on Energy Performance in Buildings Directive (EPBD) by utilizing Regulation of Energy Performance in Buildings (KENAK) and energy inspectors.

Legal framework of the above program includes the "Regulation of Energy Performance in Buildings" (KENAK, Ministerial Decision: Δ6/B/5825/30.03.2010, Government Gazette/407/B/2010, 9.4.2010) and the Presidential Decree 100/30.09.2010 concerning Energy Inspectors Register (Government Gazette 177/A) issued in October 2010.

The funding program will be realized through a Holding Fund entitled "Energy Efficiency at Household Buildings Fund" (DECISION no. 31654/ΕΥΘΥ1415/ 20.07.2010). The budget of the Program is €396 million throughout Greece.

The purpose of the program is to determine the buildings' energy requirements, properly specify the energy save actions in buildings, maximize energy savings, and provide incentives for households to improve the energy efficiency of their house saving energy. This energy efficiency program, that subsidizes investments in the residential sector, was issued by the Hellenic Ministry of Environment, Energy and Climate Change. The resulting energy efficiency renovations are partially funded throughout Greece.

The Program offers incentives to carry out the most important works to improve their houses' energy efficiency, while at the same time contributes to the achievement of Greece's energy and environmental targets. It is estimated that the program will help to save energy up to 1 billion kWh annually.

The subsidy depends on the household income and the energy classification of the building, and can cover expenses of up to €15000. In low income households, subsidy can reach 70% of the total budget and loans with low interests can be issued approaching 30% of the total budged. Only one application can be submitted for each eligible residence.

In details, the types of residences which are eligible for subsidy during the program are a single house (one single building comprising of only one property), a block of flats (one single building or complex of buildings, comprising more than one properties), and an independent apartment (a property in a block of flats, used as a residence).

All the above mentioned residence must meet the criteria described below:

- It is located in areas with an average zone price, as it is shown on the Single Real Estate Fee (ETAK), lower than or equal to 2100 €/m^3, as set by 31.12.2009.
- It has a building permit or relevant legalization document, which verifies that the building is legal.
- It is used as a residence
- It has been classified, according to the Energy Performance Certificate (EPC), as lower than or equal to class D (low energy efficiency buildings).
- The owners meet specific low income related criteria.
- It has not been marked for demolition.
- Only one application can be submitted for each eligible residence.

In order to assure the success of the Program, the following departments participate at national level:

- The Managing Authority for the Operational Program "Competitiveness and Entrepreneurship" (EYD EPAE). EYD EPAE acts as management authority under Law 3614/2007 and in accordance to Ministerial Decision No.

31654/ΕΥΘΥ1415/20.07.2010, issued by the Minister of Finance, the Minister of Economic Affairs, Competitiveness and Shipping and the Minister of Environment, Energy and Climate Change.

- Department for Planning and Coordination of NSRF co-financed actions in the fields of Energy, Natural Resources and Climate Change of the Ministry of Environment, Energy and Climate Change (YPEKA). The Department undertakes the planning and coordination of all departments involved, with a view to ensuring the smooth implementation of the Program.
- The Hellenic Fund for Entrepreneurship and Development (E.T.E.AN. A.E.), – "Energy Efficiency at Household Buildings" Holding Fund. The Fund is the Beneficiary of the Program. The Beneficiary develops and maintains an appropriate Information System for receiving applications, performing inspections and monitoring the implementation of projects. Also, the Beneficiary of the Program performs random audits to cooperating Banks and citizens.
- The Hellenic Energy Inspectorate (EYEPEN). The Inspectorate among others performs the required inspections in all Regions, in order to verify that energy inspections, relating to projects undertaken by citizens within the framework of the Program, have been carried out properly.
- Energy Inspectors registered in the Registry of Energy Inspectors.
- Financial Institutions / Banks, which:
  - receive the citizens' applications and verify the relevant supporting documents;
  - enter relevant data in the information system;
  - disburse loans and pay grants;
  - make payments to suppliers/contractors;
  - certify the implementation of the project on the basis of administrative controls.

The combined application of the program and the above-mentioned legal framework establishes an integrated framework for the implementation of energy efficiency actions.

The Ministry of Environment, Energy and Climate Change (YPEKA) has systematically made efforts to inform and activate the business sector establishing two registries, with which invites enterprises to show their construction products and services. These two registries "Xtizodas to Mellon" and "Exoikonomisi kat' oikon" are presented in the following websites:
http://www.ktizontastomellon.gr/index.php/proionta-kai-promhtheftes/
http://exoikonomisi.ypeka.gr/Default.aspx?tabid=677&locale=en-US&language=el-GR

OP "Environment and Sustainable Development 2007-2013"

The OP "Environment and Sustainable Development 2007 - 2013" in Greece was approved by the European Commission on 5 November 2007. The program involves Community support through the ERDF for eight Greek regions under the "Convergence" objective ("phasing out" regions are not included), and through the

Cohesion Fund which intervenes all over the country including the "phasing out" and "phasing in" areas.

The total budget of the program is € 2250 million. The Community investment through the ERDF amounts to € 220 million and € 1580 million through the Cohesion Fund. Eleven priorities are defined in this program. Five (5) of those fall under the Cohesion Fund and six (6) fall under the ERDF. In particular the priorities related to energy building energy efficiency are the followings:

Priority 1 - Air & rural transports, climate change, RES (Cohesion Fund).The strategic objective of this priority axis relates to energy saving, promotion of RES, and support the autonomy and security supply of energy by the use of RES. In addition, it will promote sustainable transport infrastructures combating climate change.

Priority 6 - Air and climate change (European Regional Development Fund). The objective of this priority is to protect the air pollution caused by gas emissions. This will be pursued by carrying out strategic studies and creating the necessary tools and mechanisms to implement effectively the national legislation. Measures aiming at systematic monitoring and recording of air quality are also programmed.

Priority 10 - Institutions (European Regional Development Fund). The objective of this priority is to improve the administrative efficiency and capacity of the Ministry of Environment Energy and Climate Change and other environmental bodies, which are responsible to implement and promote the environmental policy. In addition, there are actions to stimulate and encourage the participation of all actors, from business and citizens to NGOs and social partners, in order to ensure the diffusion of environment information for the benefit of the citizen at large.

Breakdown of finances for the three mentioned priority axes are shown in the following table.

Table 3.2-2: Breakdown of finances for priority axes 1-6-10.

Priority Axis	EU Investment	National Public Contribution	Total Public Contribution
Priority 1: Air & rural transports, climate change, RES	272 190 000	68 047 500	340 237 500
Priority 6: Air and climate change	18 400 000	4 600 000	23 000 000
Priority 10: Institutions and mechanisms	41 990 000	10 497 500	52 487 500

The following actions have been funded by OP "Environment and Sustainable Development 2007 - 2013".

I. Energy conservation actions and secondarily RES projects in school buildings to reduce energy consumption in special country areas defined by KENAK regulation.
Area of implementation: the entire country.
Application period: 17/12/2013 - 17/3/2014

Budget: € 7 million

II. Model demonstration projects utilizing RES and energy conservation actions in old and under construction buildings and sport facilities of local municipal organizations and municipal enterprises.
Area of implementation: the entire country.
Application period: 18/6/2013 - 31/12/2015

Budget: € 25 million

III. Energy conservation actions in old public school complexes.
Area of implementation: the entire country.
Application period: 28/3/2012 - 30/6/2012

Budget: € 20 million

IV. "EXIKONOMO" (energy saving) program for municipalities. Energy conservation actions in old municipal buildings and infrastructures including open building infrastructures.
Area of implementation: the entire country.
Application period: 1/4/2012 - 30/6/2012

Budget: € 75 million

V. Green Military Camps and Green Hospitals. Actions related to environmental action implementation in military areas in order to develop model installations.
Area of implementation: the entire country.
Application period: 2/5/2012 - 31/7/2012

Budget: € 40 million

VI. Green Rooftops in Public Buildings. Design and implementation of pilot/demonstration projects constructing green rooftops in public buildings inside urban areas.
Area of implementation: the entire country.
Application period: 5/12/2011 - 21/5/2012

Budget: € 20 million

VII. Model demonstration projects utilizing RES and energy conservation actions in public buildings.
Area of implementation: the entire country.
Application period: 20/7/2010 - 15/4/2011

Budget: € 40 million

VIII. Intelligent thematic museums with near-zero energy consumption. Model demonstration projects utilizing RES and energy conservation actions in old museums buildings. The museum organizations should be non profitable.
Area of implementation: the entire country.
Application period: 26/3/2012 - 22/10/2012

Budget: € 20 million

IX. Model demonstration projects utilizing RES and energy conservation actions in public school buildings.
Area of implementation: the entire country.
Application period: 9/3/2011 - 30/9/2011

Budget: € 40 million

X. Improvement of energy performance and rational energy management. The program finances studies, services, procurements and publicity actions of the Centre for Renewable Energy Sources (CRES).
Area of implementation: the entire country.
Application period: 10/1/2011 - 31/12/2011

Budget: € 12 million

XI. Green Neighborhood. Pilot energy conservation actions in heavy residential areas, which will represent model demonstration projects for future applications. The projects were implemented by the Centre for Renewable Energy Sources (CRES).
Green Neighborhoods Program (energy upgrading of social housing) is designed for the Municipalities in the Region of Attiki – Athens, which are interested in renovating social housing blocks in their authority area. Four social building blocks will be energy upgraded to almost zero energy consumption buildings improving also local microclimate. The program utilizes national funding from the Operational Program "Environment and Sustainable Development" in order to finance renovation of low income neighborhoods and develop sustainable areas of 'nearly zero energy'.
Area of implementation: the entire country.
Application period: 27/12/2010 - 31/12/2011

Budget: € 8 million

XII. High efficiency electricity and heat co-generation in hospitals. Installation actions of high-efficiency cogeneration of electricity and heat using natural gas in hospitals.
Area of implementation: the entire country.
Application period: 10/12/2010 - 30/6/2011

Budget: € 15 million

XIII. Demonstration Bioclimatic Schools in new or under construction schools. The program aimed to minimize the energy consumption utilizing passive solar systems, hybrid systems and RES.
Area of implementation: the entire country.
Application period: 6/9/2010 - 6/12/2010

Budget: € 25 million

"Xtizodas to Mellon" (building the future) is a special initiative for promoting energy performance in buildings. It is implemented by Centre for Renewable Energy Sources (CRES). The program represents a public private partnership with public, private sector and citizens. This partnership realizes in the framework of voluntary agreements with industry and traders, resulting certified products in low prices.

To support this concept a web-portal was developed presenting, among others, energy efficiency technologies, measures for energy saving in buildings, databases with products and companies, and guidelines for the implementation of energy efficiency measures.
The implementation of the program "Xtizodas to Mellon" aims to achieve the following targets:

- Reduction of energy consumption in building sector and upgrading of environmental quality.
- Renovation cost reduction of buildings.
- Reduction of building operational costs.
- Formation of new, modern and competitive economic scope for the construction sector, and the domestic construction materials and energy products industry.
- The strengthening of the industrial energy products market.
- The creation of significant new permanent employment.

Regional Operational Program (ROP) Macedonia-Thrace 2007-2013

There are five ROPs in Greece, which do not incorporate specific energy efficiency programs. One of these ROP is the ROP of Macedonia-Thrace 2007-2013. These ROPs are typically related to usual urban regeneration activities, such as social and national infrastructure including building construction and upgrading, health and social solidarity, promotion of cultural actions, neighborhood improvements, etc. In this context, energy efficiency projects have special intervention characters, which are not based on integrated energy efficiency plans.

The Priority axis 9 "Sustainable Development and Improvement of Life Quality in the East Macedonia – Thrace" region includes, among others, actions for environmental protection and sustainable urban development in an effort to ensure the health of the population. Energy efficiency projects might be implemented in the context of interventions related to environmental protection (district heating networks bioclimatic planning), climatic change and to integrated urban development plans.
The total co-funded budget from the EU for the ROP Macedonia-Thrace 2007-2013 amounts to € 3264,5 million, of which € 2675 million is from Community resources and € 589,5 million from National resources. The ROP for East Macedonia and Thrace is under the Convergence objective and co-funded by the European Regional Development Fund (ERDF).The axis 9 of the ROP Macedonia-Thrace 2007-2013 accounts 9,1% of total ROPs funding amount, which detailed in the following table.

Table 3.2-3: Breakdown of finances for priority axis 9.

Priority Axis	EU Investment	National Public Contribution	Total Public Contribution
Priority 9: Sustainable growth and quality of life in the region of Eastern Macedonia & Thrace	**242 800 000**	62 395 000	305 195 000

In accordance with the programming document of RO Program Macedonia & Thrace it is possible to finance interventions related to the establishment of funds or holding funds. In addition it is also mentioned that for priority axis 9, JESSICA fund may be utilized in order to mobilize resources quickly and efficiently.
The Urban Development Fund for Eastern Macedonia and Thrace can finance urban projects. Proposals can be submitted by interested parties for projects that contribute to the integrated urban development and are eligible under Priority Axis 9 "Sustainable Development and Quality of Life in Eastern Macedonia and Thrace" of the RO program Macedonia and Thrace 2007-2013.

Other Funding Programs / Instruments Related to Building Energy Efficiency

The "Green Fund" is a useful tool for financing actions and implementing of measures to improve energy efficiency. This fund was established by Law 3889/2010 allowing a large allocation of environmental funds to targeted actions dealing, among others, with environmental protection in which resource efficiency policies and measures play an important part for priority funding. One of the main measures is the reduction of energy consumption in households and public buildings.

The Green Fund also plays an important role in monitoring the collection, control and distribution of Green Resources for the implementation of measures and actions to improve energy efficiency. Funding distribution is described in the next table.

Table 3.2-4: Funding distribution – Green Fund.

Year	Amount (€)	Description
2011	60,30 million	Fund disbursements
2012	51,47 million	Payments
2013	48,25 million	Estimated payments

THISEAS - the National Program for Local Development. The program consists of three subprograms. One of these referred to local development and environmental protection including, inter alia, urban development. The total budget of the program exceeds €2 billion.

Most of the approved projects regard the implementation of restoration of communal spaces, and some lighting interventions. There was no project concerning the implementation of energy efficiency measures or utilization of RES.

"Photovoltaics on Roofs" (photovoltaic systems up to 10 kWp on building roofs) is a targeted national program issued by the Ministry of Development in cooperation together with the Ministries of Finance and Environment during summer 2009. The PV Rooftop program has begun the 1st of July 2009 and its duration has been determined until 2019. The program concerns installation of photovoltaic systems up to 10 kWp both for residential users and small businesses (enterprise buildings) that are installed on roofs and flat-roofs, including terraces, and offers incentives. The incentives are given through a special feed-in-tariff (FiT) for systems up to 10 kWp, which is tax and VAT free. Total produced energy is injected in mainland electricity distribution network, production is sold to the electricity distributor and the income is set off by the electricity bill for consumption. Furthermore, it is essential a residence to cover part of its hot water needs by some other renewable source (e.g. solar thermal). The time interval of the agreement will be 25 years.

Additionally, the installation of such systems needs a small scale building permit, which is issued relatively very quickly. The provisions of this particular program do not allow for financing the installation of PV systems from national or European sources such as NSRF, development law or any other initiative.

Installation of Electronic and Intelligent Electricity and Natural Gas Meters for Residential Consumers. Electricity and natural gas intelligent meters will be installed in buildings with residential consumers. The consumption electricity and natural gas will provide necessary data in order to evaluate the consumption behavior of residential consumers and the energy requirements of buildings resulting in appropriate financial incentives and energy efficiency measures.
The measure aims to the followings:

- Installation by the energy suppliers of electronic meters with time measuring and telemetric capabilities in order to provide better information and present energy behavior of consumers
- Installation of intelligent meters, which will be capable to monitor the energy consumed by each appliance. The monitoring results / information are

provided through appliances sited next to the electronic meter or are sent to mobile phones or personal computers.

In Greece, the Public Power Corporation (PPC) has already completed pilot installation of meters to 9 thousand medium voltage consumers (tertiary sector and industry).

Furthermore in 2010, the PPC announced a program that will install 160 thousand meters on residential consumers and 60 thousand meters in large commercial consumers. These intelligent meters will record in details the actual consumption of the consumer and send the data to a central system of PPC which will be collected and processed.

The pilot project: *"Pilot Telemetering and Management System for the Electric Power Supply Demand by Residential and Small Commercial Consumers and Implementation of Smart Grids"* was announced in 2011 having a total budget of € 24 million, is within the framework of the OP Competitiveness & Entrepreneurship 2007-2013 and partially co-funded from ERDF.

Additionally, the "Hellenic Electricity Distribution Network Operator S.A." (HEDNO) plans to implement, as a primary objective, a Pilot Program for the installation, testing and operation of at least 160 thousand meters in selected geographical areas of the distribution network, which will enable the documentation, on a technical and economic basis, of the selection of an appropriate combination of Meter, Telecommunication and Metering Data Collection and Processing Center technologies.

The supplied automated telemetering center shall be able to support at least 250 thousand independent metering points. At this stage and in the scope of this project, the metering points to be included in the Main System shall be approximately 130000 single phase and 30000 three phases.

The geographical areas at which the pilot program will be implemented are as follows:

- Xanthi Prefecture
- Lesvos Island
- Limnos Island
- Ag. Efstratios Island
- Lefkada Island
- Athens
- Thessaloniki

The HEDNO announced in December 2013 a draft call for tenders for the project: *"Pilot Telemetering and Management System for the Electric Power Supply Demand by Residential and Small Commercial Consumers and Implementation of Smart Grids"*. The main characteristic of the project are described below.

- Installation of the total Metering Data Telemetering and Processing System (Main and Back-Up), with a capacity to communicate with 160 thousand meters.
- The installation of electricity meters with communication devices (PLC and mobile telephony GSM/GPRS/3G/4G) of the metering devices for 160 thousand household and small commercial consumers. This is 2.13% of all 7,5 million Greek electricity customers.

The total budget of the above installations according to HEDNO assessment is € 39 million and the total project budget is € 49 million.

Other Funding Programs / Instruments Related to Building Energy Efficiency

Leveraging Private Funds

JESSICA Community Initiative is the acronym of Joint European Support for Sustainable Investment in City Areas. The main scope of this EU funding is the promotion of sustainable investments and growth in urban areas. JESSICA has being developed by the European Commission and the European Investment Bank (EIB), in collaboration with the Council of Europe Development Bank (CEB). JESSICA is a new way of using existing Structural Fund grant allocations to support sustainable urban development and regeneration projects of European Member States through financial engineering mechanisms.

JESSICA Initiative can be applied as an alternative instrument to finance energy efficiency projects in buildings.

In the initial report, four sets of criteria have been placed upon which the evaluation of JESSICA will be implemented. These criteria are:

- The applicability of energy efficiency in the context of integrated urban development.
- The existence of adequate demand regarding energy efficiency projects.
- The maturity of the initiatives planned.
- The promptness and the legislative capability of the country to incorporate JESSICA for energy efficiency into the whole organizational and administrative mechanism.

The European Investment Bank (EIB) acts as the JESSICA Holding Fund Greece and selects Urban Development Funds (UDFs) that will receive financing of approximately € 258 million until 31 December 2015. The selection procedures of the five Urban Development Funds (UDFs) have been concluded covering all regions that contributed resources to the Holding Fund:

- National Bank of Greece is the competent UDF for the regions of Attica, Western Greece, Ionian Islands, as well as for the contribution of OP "Environment and Sustainable Development".
- Investment Bank of Greece is the competent UDF for the regions of Eastern Macedonia & Thrace, North Aegean, Western Macedonia and Epirus.
- EFG Eurobank is the competent UDF for the regions of Mainland Greece and Peloponnese.

- Piraeus Bank is the competent UDF for the regions of Central Macedonia and Thessaly.
- Pancretan Cooperative Bank is the competent UDF for the region of Crete.

Five Regional Operational Programs and one Sectoral Operational Program have contributed a total amount of €258 million into the JESSICA Holding Fund. The table bellow describes the contribution of the Regional OP of Macedonia – Thrace into the JESSICA Holding Fund.

Table 3.2-5: Contribution of the Regional OP of Macedonia – Thrace into the JESSICA Holding Fund.

S/N	Indicative thematic priority	Priority Axis (Title)	Amount (€, million)
1	61	Sustainable Development and Quality of Life in the Region of Central Macedonia (Priority Axis 7)	20
2	61	Sustainable Development and Quality of Life in the Region of Western Macedonia (Priority Axis 8)	15
3	44, 59, 61	Sustainable Development and Quality of Life in the Region of Eastern Macedonia and Thrace Region (Priority Axis 9)	10

Funding applications can be accepted by the Urban Development Funds, which have already published the calls for selection of urban projects. Applications are submitted by public and private entities or public private partnership schemes aiming to implement urban projects that constitute part of an Integrated Plan for Sustainable Urban Development. These applications are submitted to the relative Urban Development Fund (UDF) according to the region where the project is to be implemented.

OP "South East Europe" (SEE) 2007-2013

The OP "South East Europe" was approved by the European Commission on 20 December 2007. The program involves Community support through the ERDF for regions in 16 countries- Member States, candidate, potential candidate countries and third countries.

The total budget of the program is € 245 million. The Community assistance through the ERDF amounts to € 206 million.

The program intends to improve "the territorial, economic and social integration process and contribute to cohesion, stability and competitiveness" through the development of trans-national partnerships. The program focuses on four thematic priorities:

- Priority 1: Facilitation of innovation and entrepreneurship.
- Priority 2: Protection and improvement of the environment.

- Priority 3: Improvement of accessibility.
- Priority 4: Development of trans-national synergies for sustainable growth areas.

Projects related with energy efficiency in building having partner from Greece are the followings:

- Upgrading of Energy Efficient Public Procurement for a balanced economic growth of SEE area – EFFECT.
- ENergy Efficiency and Renewables ? SUPporting Policies in Local level for EnergY - ENER SUPPLY.
- Energy Vision 2020 for South East European Cities - EnVision'2020.
- Low Carbon South East Europe – LOCSEE.
- My Modular, Intelligent, Low cost, Do it yourself, nearly zero energy House for our Eco Green Village - MILD HOME.
- Towards resource efficient urban communities in SEE - RE-SEEties.
- Transnational cooperation for the improvement of buildings energy performance and efficiency – TRACE.
- Widening the Thermal Solar Energy Exploitation by the Successful Models - Wide the SEE by Succ Mod.
- Addressing the divide between EU indications and their practical implementation in the green construction and eco-social re-qualification of residential areas in South East Europe regions - BUILD SEE.

MED Program 2007-2013

The MED program is a transnational program of European territorial cooperation. The program is financed by the European Union and it takes place within the objective "European territorial cooperation" of the period 2007-2013. The financial contribution of ERDF to the program budget is € 193 million.

MED program has four priority axes from which many projects of Axis 2: "Environmental protection and promotion of a sustainable territorial development" and Objective 2.2: "Promotion of renewable energies and energy efficiency improvement" are related to energy efficiency in buildings. These building energy efficiency related projects, in which partners from Greece are involved, are described in the following table:

Table 3.2-6: MED building energy efficiency projects in which partners from Greece are involved.

Project Title	ERDF Contribution (€)	National Public Contribution (€)	Total Project Budget (€)
Energy Efficiency in Low-income Housing in the Mediterranean – "ELIH-Med"	6 992 797	2 154 399	9 147 196
Local Partnerships for Greener Cities and Regions – "GREEN PARTNERSHIP"	1 236 855	326 405	1 563 260
INtelligents MAterials – "MAIN"	1 573 500	524 500	2 098 000
Mediterranean Building Rethinking for Energy Efficiency Improvement - "MARIE"	4 511 098	1 402 782	5 913 880
Mediterranean implementation of EEA – "MEDEEA"	1 142 532	314 181	1 456 713
Promotion of PV energy through net metering optimization- "PV-NET"	1 015 766	263 759	1 279 526
REtrofitting PUBLic spaces in Intelligent MEDiterranean Cities – "REPUBLIC-MED"	1 152 210	384 070	1 536 280
Sustainable COnstruction in Rural and fragile areas for Energy efficiency - "SCORE"	1 278 057	388 579	1 666 637
High energy efficiency schools in Mediterranean Area: Multi-issues platform as interactive Network for technical regulations management, technologies' data base and best practice dissemination activity – "Teenergy"	999500	306 500	1 306 000
Zero Emissions Communities – "ZeroCO2"	1 403 560	467 853	1 871 414

Crossborder OP "Greece-Bulgaria" 2007-2013

The European Territorial Cooperation Program Greece – Bulgaria 2007-2013 is a cross-border cooperation Program co-financed by the European Union under the European Regional Development Fund. The he cross-border European Territorial Cooperation Program "Greece-Bulgaria 2007-2013" was approved by the European Commission on 28/03/2008 by Decision C(2008)1129/28-03-2008.

The total budget (ERDF and national contribution) for this program is €138.691.303.The total financing consists of €117.887.607 (85%) ERDF funding and €20.803.696 (15%) national contribution.

Priority 1 – "Quality of Life" and Area of Intervention 1.1 – "Protection, Management & Promotion of the Environmental Resources" has not building efficiency related projects and the other priorities are irrelevant.

3.2.2 Political initiatives (national level)

In 2010, the Ministry of the Environment, Energy & Climate Change adopted the *Green Growth Strategic Action Program* (2010 -2015). The program includes policies and activities in which, among others, there are energy conservation activities actions. The total budget of the program for the period 2010-2015 is € 44 billion.

The basic energy efficiency policy of Greece has been established by the *National Action Plan for Energy Efficiency (NAPEE)* for the period 2008-2016, as submitted to European Commission. The overall strategy of NAPEE is based on the formation of an efficient energy market, and the utilization new energy technologies. The main objective of NAPPEE is to achieve a 9% reduction of energy consumption until 2016, specifically to save 14,41 TWh and improve the energy self-sufficiency of the country. The following categories of measures related to building efficiency have been projected by NAPEE:

- *Horizontal measures*, which are not directly linked to any sector of economic activity. They are supporting actions such as the formation of standards for energy efficiency, legislative initiatives regarding energy efficiency (such as the incorporation of directive 2006/32 into the national legislative framework), energy measurement systems, training and other initiatives leading to the adaptation of modern tools and techniques.
- *Cross-sectoral measures*, which are related to energy efficiency of buildings, the implementation of energy management systems in services and public sector, and the promotion of district heating systems.
- *Measures in the public sector*, such as the obligatory implementation of "green procurement" procedures, installation of solar systems, implementation of an integrated energy plan for local authorities, establishment of energy service desks and classification of Municipalities according to their energy consumption.

Also, NAPEE intends to upgrade procedures for energy data collection, analysis and forecasting. The action plan designs and implements local and national promotional activities in order to sensitize - activate citizens in energy efficiency measures.

One of the main political initiatives is "green" sustainable development, which was introduced in 2009. Based on this political preference the new Ministry for the Environment, Energy and Climate Change (YPEKA) was established incorporating and consolidating all environmental and energy bodies.

Part of the new Ministry (YPEKA) is the Special Secretariat for the Environment and Energy Inspectorate (SSEEI), which is responsible to supervise and direct respective

departments at regional/local level in order to assure the implementation of the environmental and energy legislation.

In Greece the Special Secretariat for the Environment and Energy Inspectorate (SSEEI) of the Ministry of Environment, Energy and Climate Change has been established under Law 3818/2010. The Special Secretariat for the Environment and Energy Inspectorate is responsible for the implementation and quality control, and consists of:

- *The Hellenic Environmental Inspectorate (HEI)*.
- *The Office for Demolition of Illegal Constructions*, reporting to the General Inspector of the Hellenic Environmental Inspectorate.
- *The Independent Coordination Office for the Implementation of Environmental Liability*.
- *The Hellenic Energy Inspectorate*, which mission is to monitor the achievement of the objectives of the national energy policy on energy saving and energy efficiency and to implement articles 1 to 12 of Law 3661/2008 on "Measures for the reduction of energy consumption in buildings" (harmonization to the Directive 2002/91/EC of the European Parliament and EU Council on the energy performance of buildings).

The Special Service of Energy Inspectors (SSEI) is a branch of the Special Secretariat (SSEEI) and is responsible for auditing and monitoring the implementation of the Law 3661/2008 and its specified measures regarding, among others, the reduction of energy consumption of buildings. The SSEI is also in charge of issuing Energy Performance Certificates (EPC).

Regarding energy policy the priority and top objective is to safeguard and manage energy resources in a manner which secures the smooth, uninterrupted and reliable supply of the nation's energy needs and access for all users to affordable, secure energy. The second objective is to secure energy stocks, through alliances and alternatives energy sources and routes in order to ensure the supply of the domestic market and protect consumers in the case of emergencies. The third objective is the viable and sustainable development of the energy sector from the stage of production to the end-use while protecting nature and safeguarding the environment. Climate change on national level is a main priority for the Government and the Ministry of Environment, Energy and Climate Change. Actions have been designed in order to deal with climate change and achieve a more sustainable low carbon economy. Developing such a model depends on the horizontal coordination of mitigation policies and adjustment in various sectors.

The "Green Fund", as it is mentioned above, is a practical tool that collects and monitors the incoming resources, and thereafter distributes them to the appropriate beneficiary to apply energy efficiency actions.

One of the most significant legislative financial approaches is the Law 3855/2010 on "Measures for the improvement of energy efficiency in end-use, energy services and other energy provisions". The Law defines the legal context and the financial means

in order to achieve energy efficiency in the final use and sets the national final energy savings. The Law applies Directive 2006/32/EC into Greek legislation. The progress of the implementation is being monitored by the National Energy Efficiency Action Plans (NEEAP).

Furthermore, the initial National Energy Efficiency Action Plan (NEEAP), which was submitted in the European Commission, is in accordance with the prerequisites of Directive 2006/32/EC. The actions were decided on overall cost, direct suitability and projected annual savings to fulfill the 9 % energy saving target by 2016 and 20% target by 2020.

3.2.3 Kavala (local level)

3.2.3.1 Funding programs

Municipality of Kavala due to the lackness of own resources mainly stands on EU and national funds support for the development of new projects on energy efficiency. In general we can say that last ten years MoK, is accelerating its pace for the preparation of project proposals and the absorption of structural funds.

3.2.3.2 Political initiatives

MoK is participating on two (2) political initiatives that are related to energy efficiency on building sector. The first one is the *International Club of Black Sea*[31] and the second one is the well known "Convenant of Mayors"[32].

International Black Sea Club is an international non-governmental organisation uniting several cities on the Black Sea and in its vicinity. It has the status of Observer in the Black Sea Economic Cooperation organisation and the special Consultative Status with the United Nations Economic and Social Council. It was created in 1992 in Odessa, Ukraine and its current president is Sergey Bezdolnyy, the mayor of Azov.

The main IBSC managing body is the General Assembly that is held at least once a year in series in each of the member-cities. According to the Club's Statute the Assembly accepts and makes changes in the Statute; accepts the annual balance, financial report and approves the budget for the next fiscal year; forms the Club's policy by acceptance of the Club's activity annual programs; chooses the Club's Board and its Chairman, accepts the report on their activity; accepts new Club's members; determines the rate of the entrance and member fees; makes a decision on the Club's activity termination.

The Club's Board consisting of 13 persons, headed by Chairman of Board, which gathers not less than once in 3 months, carries out the following functions: develops perspective Club's programs, discusses financial issues; solves operative questions; determines date, place of holding and the agenda of the next Assembly.

[31] http://www.i-bsc.org/en/
[32] http://www.covenantofmayors.eu/index_en.html

The Executive Directorate consisting of the Executive director and 3 assistants works during 3 years in the Club's headquarters, cooperating with the local Clubs, created in cities-members according to the Club's Statute.

The IBSC has also created the Business Council which consists of the business circles and Chambers of Commerce and Industry representatives of the IBSC cities-members, which are the real instrument of more professional approach and effective economic cooperation.

The Executive agencies develop Club's perspective programs, solve financial issues, cooperate with the local clubs, created in the cities. On 2 October 2011 Mayor of Azov Sergey Bezdolnyy (Russian Federation) was elected IBSC President for the period 2012-2014.

The Covenant of Mayors is the mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20% CO_2 reduction objective by 2020.

After the adoption, in 2008, of the EU Climate and Energy Package, the European Commission launched the Covenant of Mayors to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies. Indeed, local governments play a crucial role in mitigating the effects of climate change, all the more so when considering that 80% of energy consumption and CO_2 emissions is associated with urban activity.

For its unique characteristics - being the only movement of its kind mobilising local and regional actors around the fulfilment of EU objectives - the Covenant of Mayors has been portrayed by European institutions as an exceptional model of multi-level governance.

3.3 Moldova

3.3.1 Funding programs (national level)

There different funding opportunities for development of EE and use of RES in Moldova, including the following:

- State budget funds
- Regional funding programs
- Local budgets
- Grants and soft loans from international institutions and organizations
- Commercial loans
- Credit-lines with a grant component
- GHG reduction trading (under CDM)

The biggest funding source for EE projects is the Energy Efficiency Fund (FEE).

Moldova EE Fund

Created in 2010, EE Fund is the main instrument used by the Government for promoting and financing EE projects. In 2011, the EE Fund had a budget of 160 million lei, while in 2012 it was reduced to 100 million lei, and increased again in 2013 to 189 mln MDL. It acts as an independent and self-governed facility, which has in its management representatives of the Government, civil society and donor community.

The main objective of FEE is to attract and manage financial sources in order to fund and facilitate the implementation of EE and use of RES projects according to the strategies and programs approved by the Government. FEE has the purpose to develop sustainable EE projects as well as to intermediate for extra funding for EE and RES projects and to support public and business in developing good quality project proposals when addressing extra funding.

The portfolio of financial instruments used by the EE Fund includes grants, loans, loan guarantees, etc. The potential beneficiaries of the EE Fund are public consumers and private companies. During the first years of operation, FEE had funded only public buildings such as kindergartens, schools, hospitals.

Projects that can be financed through the EE Fund include rehabilitation of public, municipal, business and multi-stories residential buildings. Rehabilitation refers to modernization of central heating systems, insulation of walls, windows, roofs and doors, RES use for heating, electricity and hot water, improving indoor lighting and street lighting. The project recipient needs to ensure that 1/3 of the project's benefits are due to measurable energy savings, introduce energy efficiency technologies, 20% of the total project cost should be the recipient's own contribution, payback period for EE projects should be up to 7 years, while for RES use maximum 15 years. Management of the FEE is as follows:

Council of Administration – is the supreme administration body consisting of 9 members:

- Representative of Ministry of Economy
- Representative of Ministry of Finance
- Representative of Ministry of Environment Protection
- Representative of Ministry of Construction and Regional Development
- 5 representatives of private sector and donor community, out of which 2 should be financial experts, nominated by the Head of the Council of Administration based on the proposals from civil society and business sector.

The Head of the Council of Administration is voted for one year period by all members of the Council.

Regional Development Agencies

Moldovan Government had created a Regional Development Fund, which addresses the development of each Region (there are 3 Regions) mainly addressing infrastructure projects such as: waste management, roads, water supply, rehabilitation of public buildings, etc. Municipalities can benefit out of this Fund through the Regional Development Agency that act as separate state institution governed by the Council of Regional Development.

The mission of the Agencies is to implement the Strategy on Regional Development elaborated by the Ministry of Construction and Regional Development., which include as well improvement of financial situation of local authorities through different projects. Such projects relate to business development, social condition improvement, reduction of budget costs, etc.

European Bank for Reconstruction and Development (EBRD)

EBRD provides funds for two credit lines for EE and RES use:

Moldovan Sustainable Energy Financing Facility (MoSEFF)[33] – first phase with a 20 million Euro credit line combined with a 5% to 20% grant component for on-lending to Moldovan companies through EBRD's partner banks (local banks). Eligible projects must lead to a reduction in primary energy consumption, reduction of CO2 emissions and in general improve rational energy use in industries, agribusiness and commercial buildings.

The main aim of the grants is to make a sound project economically viable and feasible for implementation. Another aim is to foster the application of advanced technologies in Moldova. The loan size varies from 25 thousands Euro to 2 million Euro. A team of technical and financial experts assists the applicants in the assessment and optimization of their projects. The Moldovan partner banks are responsible for the financial due diligence and the final decision on the loan disbursement. The second phase of the program combines 22 million Euro with a 6.8

[33] http://www.moseff.org/

million Euro grant support from the EU for technical assistance (TA) and incentives for the Moldovan borrowers.

Moldovan Residential Energy Efficiency Financing Facility (MoREEF)[34] – an up to 35 million Euro credit line for residential beneficiaries, including individuals and blocks or flat associations, with a grant share of up to 35% to stimulate residential sector investments. The funds will be provided through local commercial banks. Applicants are able to invest in energy efficient appliances and materials for their properties and significantly reduce their energy consumption and bills.

Building-level projects are implemented in multi-story apartment buildings and applied to common structures and/or common engineering systems. Dwelling-level projects are implemented in family houses and/or individual apartments. Partial applications for external insulation of outdoor walls, roofs and floors in multi-story apartment buildings are not eligible. Project costs partly or fully supported by other grant support programs are not eligible under MoREEFF.

GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit)[35]

Under the „Modernization of Municipal Services in Republic of Moldova Program 2010 – 2014", GIZ offers assistance to local governments for improving their water supply systems, including reduction of water losses, improved EE concerning energy utilization (EE measures for public buildings) with a budget exceeding 5 million Euro on a grant basis. No cost share is required.

Also, GIZ offers capacity building assistance for local governments for the:

- Modernization of public services in the energy sector. The project is mainly focused on improving planning and management of municipal services in selected rural communities, particularly for water supply, sewage and waste disposal, local road maintenance, renewable energy, and energy efficiency;
- Training of European Energy Managers: The goal of the training is to provide local experts with specific knowledge on how to calculate, construct and operate modern EE technologies in both private companies and public buildings.

United Nations Development Program (UNDP) Biomass Project[36]

The Biomass Project's total value is 14 million Euro and is funded by the EU and UNDP. The Project's objective is to increase use of agricultural biomass waste to offset energy needs and improve quality of life. Priority is given to heating rural public sector buildings by firing waste straw, supplied by local agricultural enterprises, in heating system boilers. The expected results of the project are:

[34] http://moreeff.info/
[35] http://www.giz.de/themen/en/31025.htm
[36] http://www.undp.md/projects/Biomass.shtml

- Install approximately, 130 straw-fired heating systems and to establish a market for the straw-based heating technology as a reliable and sustainable fuel
- Increase the use of low-tech biomass burners for utilizing waste straw
- Develop and demonstrate technologies for higher efficiency domestic stoves and briquette production
- Use biomass for communal heating and co-generation.

Moldova Social Investment Fund (MSIF)[37]

The Fund has a total budget of approximately 56 million USD and supports infrastructure projects, including EE and RES but also other types of projects.

The specific objectives of EE and RES project performed by FISM refer to the following:

- Support to implementation of legal framework in RES use;
- Promotion of awareness campaign for population and decision making official on benefits of RES use for building heating purposes;
- Promotion of Public Private Partnerships for the development of RES use market;
- Dissemination and replication of experience.

What are the project's activities:

- Selection of 72 communities (villages and small towns) where solar collectors and biomass fired boilers will be piloted;
- Awareness of community on the advantages of solar energy and biomass use;
- Development of technical designs for selected pilot projects;
- Acquisition and installation of innovative equipment;
- Monitoring of Project implementation, including after implementation;
- Organization of study tours to European Union countries with a vast experience on RES use.

EU sector budgetary support

The EU approved 40 million Euros to support EE and RES projects, funded through Moldova's EE Fund. The first installment, made in 2012 was 13 million Euros. Two other tranches of 13 and 14 million Euro will follow in 2013 and 2014 respectively. The technical assistance (TA) package has a value of 2.6 million Euros. The funds will be used according to the priorities, eligibility criteria and financing conditions of the EE Fund.

Expected outputs of the program:

- Progress in the implementation of the Energy Strategy, Energy Efficiency Action Plan, transpose the EU Directives identify investment projects;

[37] http://www.renerg.md/

- Improve tariff calculation methodologies (including feed-in tariff calculations);
- Harmonize primary and secondary legislation in the Energy Community Treaty context.

GIZ: Under the same Program for modernization of municipal services, GIZ will allocate at least 10 million Euros for EE and RES projects in public buildings (mainly hospitals) between 2012 and 2014. The objectives of the project are to increase the heating comfort and reduce the energy costs of these buildings.

3.3.2 Political initiatives (national level)

The Law on Energy Efficiency as of 02.07.2010 was elaborated by the Government in order to created the required legal framework to apply the European Directive 2006/32/CE of the European Parliament and European Council on Energy Efficiency and transposing the provisions of the above mentioned Directive into the national legal framework. The objective of the Law is to regulate the activities that lead to reduction of energy intensity in the national economy and to reduce the negative impact of energy sector on the environment.

The Law also contributes to improved energy efficiency through the creation and support of institutions and organizations involved in the elaboration and implementation of energy efficiency programs, action plans, energy services, etc.

The National Program on Energy Efficiency (NPEE) approved through a Governmental Decision on 10.11.2011 for the 2011-2020 period, represents the main planning document on the national level related to the reduction of energy consumption.
The Objectives of the NPEE are the following:

- reduction of energy consumption by 20% in 2020 in comparison with 2009;
- increase of renewable energy sources in total energy mix to 20% by 2020;
- increase by 2020 of biofuel share to at least 10% in the total fuel consumption; reduction by 2020 with at least 25% of the GHG emissions in comparison with 1990 baseline.

The Program also includes activities related to buildings energy certification, focusing on public buildings at first, and certification of energy auditors.

Based on the NPEE, the Government approved on 07.02.2013 the National Action Plan on Energy Efficiency (NAPEE) for 2013-2015 period, which sets a number of targets for energy consumption reduction for five sectors: energy, industry, transport, public, residential. According to the 'bottom-up' methodology calculation, an annual reduction of energy consumption by 1.8% in comparison with 2009 is envisaged for the national economy. This reduction amounts about 53,2 ktep of energy for the period of 2013-2015. The budgetary spending for energy efficiency and RES for 2013-2015 period is 52,7 mln MDL (about 2.8 mln Euro), which are channeled for improved institutional capacity of state institutions and funding of projects supported by the Energy Efficiency Fund.

3.3.3 Cahul (local level)

3.3.3.1 Funding programs

The funding opportunities at the town level, as in many cases, rely first of all on the local budget. Currently, the financial situation of many towns, including Cahul, is difficult, which makes a real challenge to the town administration how to find opportunities for supporting energy efficiency projects.

The capital investment of Cahul is about 2.5 mln Lei, out of which, only 1 mln Lei could be directed to energy efficiency measures. Of course, this is not sufficient to cover the real needs for such measures and the management had made a number of efforts to enlarge the contribution to improved energy efficiency. Namely, Cahul had submitted project proposals for public buildings energy efficiency measures to the Energy Efficiency Fund amounting 6 mln Lei. Also, energy audits have been performed by authorized companies.

The mayoralty of Cahul is looking for new possibilities to boost the investments in energy efficiency measures and one of those initiatives is to look at Public Private Partnership projects, where mayoralty could play a significant role and to contribute to attracting private investments in energy efficiency projects.

3.3.3.2 Political initiatives

In order to support the energy efficiency development in the town, Cahul mayoralty and Council have supported the initiative on the national level to have a deeper decentralization process that would allow the local governments to manage more efficiently the local financial means and to come with different initiatives, including implementation of energy efficiency projects. The decentralization will allow LPAs to have a better local budget planning for a 3-5 years period.

Also, Cahul administration is working on the elaboration of Local Energy Efficiency Program (LEEP) and Action Plan (LEEAP) with the support of Local Government Support Program (USAID) as well as Socio-economic Strategic Development Plan.

LEEP and LEEAP will include an analysis of all public buildings financed by the local budget, focusing on reduction of energy consumption by building and by energy efficiency measure, including the analysis of required investments, energy savings and simple pay-back period for each EE measure. Such a Program will allow Cahul LPA to have a better prioritization of future investments in EE in order to achieve best outcomes.

3.4 Romania

3.4.1 Funding programs (national level)

National Action Plan for Energy Efficiency (PNAEE)

PNAEE includes horizontal and cross-sectorial measures, namely regulations (transposition into national law the provisions of Directive 2006/32/EC and Directive 2005/32/EC), information campaigns, funding schemes are expected to be undertaken in partnership with the European Bank for Reconstruction and Development. PNAEE promoting energy efficiency improvement measures that fall into the following categories:

- Regulations;
- Information and legislative measures (Information, Energy Audit);
- Energy services for energy savings (Third Party Financing, energy performance contracts);
- Financial instruments (subsidies, tax exemption on construction permits for thermal rehabilitation works);
- Energy efficiency mechanisms and other combinations of other subcategories (Energy Efficiency Funds)

The most important measures of PNAEE to improve energy efficiency in residential and tertiary sector are:

- Thermal insulation and ventilation in multi-level residential buildings constructed during the period 1950-1990 achieved through the following actions:
    - Thermal insulation of exterior walls;
    - roof insulation;
    - pipe insulation in the basement / channel heat;
    - replacement the windows.

- Improving energy efficiency in heating / cooling individual homes achieved through the following actions:
    - control actions in the marketing of air conditioners and boilers for heating and hot water;
    - Determination of households consumption.
    - campaigns to promote the use of alternative energy sources and appliances / energy efficient equipment for households.

- Promotion of high-efficiency cogeneration through the adoption and implementation in order to promote high efficiency cogeneration of a bonus scheme type support;

- Improved lighting system achieved through the following actions:
    - replacing old lighting appliances with new, energy efficient;

  - continuing the replacement of inefficient equipment;
  - introduction the luminous flux reduction devices on the main roads with low traffic periods.

- Promoting the use of household electrical appliances and energy efficient lamps by promoting and supporting the replacement of incandescent lamps with energy-efficient lamps and replacing appliances with energy efficient appliances (refrigerators, washing machines, etc...) to achieve reduction in household consumption.

- Promote the development of energy service companies - ESCOs applying energy performance contract - CPE for implementing energy efficiency measures and guarantee energy savings by ESCO.

- Using renewable energy achieved by the following actions:
  - Promoting the use of renewable energy sources for electricity and heat production;
  - Using biomass: Central heat and sawdust own distribution system; Transformation substations (PT) in the thermal center (CT) running on sawdust;
  - Using solar energy: DHW heating in CT neighborhood by installing solar collectors, domestic hot water through solar panels CT;
  - Using heat pumps;
  - Using biogas from sewage treatment plants.

Program replacement or addition to traditional heating systems with systems using solar, geothermal and wind power and other systems leading to improved air quality, water and soil

Program beneficiaries are administrative units and central authorities who may submit project proposals for heating systems in buildings of patrimony or under their administration, including for health care facilities, educational institutions, social settlements, cultural and homeowners associations with legal personality.

Allocation from environmental fund of the amount necessary to fund it is made annually within the funds established for this purpose in the annual budget of revenues and with this destination through Environment Fund Administration, approved by Government Decision. Administrative-territorial units can apply for funding for multiple locations within the same application.

Funding is non-refundable, as a percentage of eligible project costs, the percentage of eligible expenses will constitute unfunded contribution of the applicant's own financial sources. The grant, provided by the Environment Fund Administration shall be granted 70% of eligible project costs. It is worth mentioning that in the case of projects submitted or administrative-territorial units for owners associations participation quota is established in the local council. There are funded:

- expenditure provided for the investment under pre-feasibility study (installation, parts, construction related facilities);
- installation costs of the systems, performance verification tests and tests;
- value added tax (VAT);
- expenditure on consultancy, pre-feasibility studies, feasibility studies, engineering design, advertising in up to 6% of eligible expenditure.

Replacement or addition program to traditional heating systems with systems using solar, geothermal and wind energy, or other systems

The guide of the program for funding the installation of heating systems using renewable energy, including replacing or supplementing traditional heating systems (for individuals) provides conditions under which funding these projects.

The purpose of the program is to improve the quality of air, water and soil by reducing pollution caused by burning wood and fossil fuels used to produce heat energy used for heating and production of hot water, as well as to stimulate the use of systems using this renewable energy, clean, by funding from the Environment Fund project on installation of heating systems using renewable energy, including replacing or supplementing traditional heating systems.

National program for energy efficiency and use of renewable energy sources in the public sector for 2009-2010

Romanian Government approved in December 2008 "National Energy Program in the public sector for 2009-2010, which provides financial support through grant financing from the state budget for a range of investment objectives in the energy sector.

For program funding was allocated 32.9 million for 2009 and 40 million in 2010. Financial support was provided by co-financing from the state budget through the Ministry of Economy and Finance, transfers between units of government. According to EU legislation, it is necessary that the public sector have an exemplary role in the efficient use of energy and renewable energy, with the application of modern solutions for modernization and refurbishment.

"Green House" for public authorities

"Green House" for public authorities - Program for installation of heating systems using renewable energy, including replacing or supplementing traditional heating systems - beneficiary municipalities, public institutions and religious facilities. Financing Guide was published in Monitor of Romania No. 731 of 3 November 2010.
Beneficiaries of the program. The Program was made to fund from the Environment Fund project on installation of heating systems using renewable energy, including replacing or supplementing traditional heating systems. Beneficiaries were municipalities, public institutions and religious facilities.

"Green House" program 2011

"Green House" program 2011 -individual- Program installation of heating systems using renewable energy, including replacing or supplementing traditional heating systems, popularly called "Green House" that addresses individuals. Program budget allocated for 2011 was 100,000 thousand, being distributed to each county based on the number of its inhabitants.

National program "Heating 2006-2015 heat and comfort"

Envisages the following objectives:

- significantly reduce heating costs for heating and hot water consumption for all consumers connected to district heating systems heat by increasing their effectiveness and improve service quality;
- reduce primary energy consumption by at least 1 million Gcal / year (about 100,000 toe / year) compared with consumption of primary energy resources used to provide heat for the population in 2004;
- annual energy yield of the units of heat production by at least 80% and at least 70% of units using biomass as primary energy resource, correlated with the Government Decision No. 219/2007 on the promotion of cogeneration based on heat demand useful;
- reduction of technological losses in the transmission and primary heat distribution networks up to a maximum of 15% of the energy floated;
- exploitation of the local potential renewable resources to meet the demand of thermal energy and reducing fuel replacement or expensive or deficient;
- reducing both emissions on urban living from the use of individual heat sources as well as global pollution by reducing emissions of greenhouse gases.

Regional Operational Program 2007-2013 Priority 1

Regional Operational Program 2007-2013 Priority 1 - Supporting the sustainable development of cities - urban growth poles - Major intervention field 1.2. - Supporting investments in energy efficiency of housing blocks. The program addresses potential grant applicants, i.e. administrative units county capitals and Bucharest sectors represented by local authorities.

In order to implement efficient and deadline for completion of investments (07/31/2015) funded under this major area of intervention, the Managing Authority for Regional Operational Program aims to develop financing mechanisms contribution administrative units and homeowners associations through the support of international financial institutions.

Major intervention field 1.2 - "Support for investments in energy efficiency of housing blocks" is a pilot phase during the period 2007 - 2013. Investments in energy efficiency will be provided later in the programming period 2014 - 2020, following the conditions for future application to be developed from the findings of the pilot phase of implementation.

Regional Operational Program (POR) is a strategic document that implement elements of the National Strategy for Regional Development of the National Development Plan (PND) and contributes, along with other operational programs (e.g. Operational Program Transport Infrastructure Operational Program Increase of Economic Competitiveness, etc...) to achieve the objective of the National Strategy of Regional Development of the National Strategic Reference, namely reducing economic and social disparities between Romania and the EU Member States media development.

Regional Operational Program addresses the 8 development regions of Romania, established in compliance with EC Regulation no. 1059/2003 concerning the establishment of a common statistical classification of territorial units. In Romania it have been created 8 regions:

- Development Region North - East
- Development Region South - East
- Development Region South - Muntenia
- Development Region South – West Oltenia
- Development Region West
- Development Region North - West
- Development Region Central
- Development Region Bucharest - Ilfov.

PRO strategic objective is to support an economic, social, development sustainable and balanced of all Romanian regions, according to specific needs and resources, with a focus on supporting sustainable development of urban growth poles, improving the business environment and basic infrastructure to make Romanian regions attractive places for investment.

Co-financing from the European Regional Development Fund can be up to 85% of the total financial allocation of the Program. This priority axis aims to increase the quality of life and creation and the maintenance of employment by urban infrastructure, improving urban services, including social services and developing business support structures and entrepreneurship. In this area of intervention is financed investment for energy efficiency of residential buildings blocks.

The objective of this major area of intervention is to create / maintain jobs and promoting social cohesion by helping to improve the energy efficiency of residential buildings blocks in Romania, according to the strategic objectives of Europe 2020, which will increase / maintain rate labor employment, low power consumption and limit emissions of greenhouse gases.

The construction sector is a major consumer of global energy and a major generator of greenhouse gases. In the EU, about 40% of the energy consumed in this sector. Therefore, improving the energy efficiency of buildings is an important objective in EU policies. A significant proportion of energy consumed in residential buildings is for heating. This is seen especially in the EU12 countries, including Romania, due to a

housing stock built without thermal protection during the communist period, especially in the form of housing blocks.

Residential buildings in Romania dominate overall, representing approximately 95.4% of all buildings. Existing residential buildings are generally old (over half of residential buildings were built before 1970). These buildings have low thermal properties - average annual heating requirements between 137-220 kWh/m^2. Heat consumption for heating and hot water in households represent about 80% of energy consumption in buildings. The average potential energy savings in residential buildings is estimated at around 38%, which could be translated into significant savings on conventional fuel. It is also important to mention that in buildings Romania specific consumption of heat and hot water is double the Western European, and therefore there is a high rate of pollution emissions.

Most homes were passed into private ownership since 1995 (a process that began after 1989). On 31 December 2009 there were state owned only 3.2% of households in urban areas and only 1.2% in rural areas (villages). Most new houses are built in Romania and private resources are privately owned. About 95% of dwellings are owner-occupied Romania, so most households simultaneously act as owners and users. Improving energy efficiency in residential buildings help create and maintain jobs, to counteract the effect on the economic downturn by boosting the construction industry and related industries most affected by the economic crisis.

Investments in energy efficiency of residential buildings will help reduce energy poverty in Romania, by reducing the heating costs of population, especially those with low incomes, which will help improve the purchasing power of the disadvantaged people. This area of intervention will contribute to social cohesion, paying particular attention to vulnerable groups of the population with low incomes. In this respect, established a mechanism for selection of residential buildings to be rehabilitated, because this population to benefit mainly the implementation of investments. In addition, financing rates are set according to ability and their capacity and availability of people to co-finance such investments.

Implementation of energy efficiency measures in residential buildings will improve the living conditions of the population through:

- Improvement of indoor comfort;
- Reducing energy consumption;
- Reduce maintenance costs for heating and hot water;
- Reducing of pollutant emissions from the production, transport and consumption of energy, leading to efficient use of energy resources in accordance with the Europe 2020 strategy.

According to Law 230/2007 on the establishment of homeowners associations, the term "apartments block" is defined "building-block of flats, condominium - property consisting of individual properties defined apartments or spaces destination other than that housing and undivided joint ownership.

It can be defined condominium also a section with one or more stairs within the building housing in the conditions under which it can be delimitated clearly the common property."

Co-financing rates applicable for eligible expenses are:

- 60% of eligible costs of the project - the European Regional Development Fund and the state budget, in proportion of 82% FEDR, 18% of the state budget;
- 40% of eligible costs of the project - Local Public Authority and Owners Associations.

Rates of co-financing of local public authorities and associations of owners (regarding the eligible costs) will be modulated according to the proportion in building of low-income families. Within this area, the following categories are eligible for thermal rehabilitation of the block:

A. Rehabilitation of thermal envelope;
B. Rehabilitation of the heating system;

A. <u>Rehabilitation of thermal envelope;</u>
   a) Insulation of facades opaque portion;
   b) replacement of existing exterior woodwork, including that related to access block with insulating (the glass); woodwork must be equipped with devices / slots / controlled ventilation grilles space and avoid condensation on elements of envelope;
   c) closing balconies and / or loggias with insulating including insulation of parapets;
   d) thermal and hydro insulation of flat floor, thermal insulation of the floor over the last level (hydro insulation is not eligible without thermal insulation);
   e) insulation of the floor above the basement, where the design provides ground floor apartments.

B. <u>Rehabilitation of the heating system</u>
   a) repair / restoration heat distribution system for heating and domestic hot water in the basement / thermal channel, including insulation of pipes distribution between the point of connection and the floor above the basement / thermal channel block;
   b) fitting thermostatic valves on radiators and differential pressure valve at the base of the columns heating;
   c) repair / replacement of the boiler and / or burner in central heating of the block / scale without changing the type of fuel.

The grant funding is conditioned by the elaboration of energy audit report - including sheet thermal analysis of the building, respectively the energy performance certificate - which is developed under the actual legislation, which shows, by the measures proposed minimum 40% reduction in energy consumption for heating and the achieved specific energy consumption for heating does not exceed:

- 90 kWh/m^2/year for climatic zones I and II;

- 100 kWh/m2/year for climatic zones III and IV;

3.4.2 Political initiatives (national level)

Creating legal and bodies for monitoring energy efficiency in Romania

The legal framework in Romania is currently provided by Law no. 199/2000 energy efficiency, as amended by Law no. 56/2006 and finally by OG no. 22/2008. This OG is applied to: providers of energy services through which are realized energy efficiency improvement measures, energy distributors, distribution system operators and retail companies, energy end users.

According to art. 2 of Ordinance no. 22/2008, paragraph 3: National Energy Efficiency Policy is part of the state energy policy and aims:

a) removing barriers to promoting energy efficiency and promotion for end-users of renewable energy;
b) promoting energy efficiency mechanisms and financial instruments for energy savings;
c) final consumer education and awareness on the importance and benefits of implementing energy efficiency improvement measures;
d) final consumer education and awareness on the importance and benefits of implementing energy efficiency measures;
e) cooperation between end users, manufacturers, suppliers, distributors, energy and public authorities in order to achieve the objectives set by national energy efficiency policy;
f) promotion of fundamental and applied research in the field of efficient use of energy and renewable energy.

According to art. 2 paragraph 4 of the same OG: National energy efficiency policy defines the objectives of improving energy efficiency, indicative targets for energy saving and energy efficiency in all sectors of national economy, with special reference to:

a) introduction of energy efficient technologies, modern systems of measurement and control and energy management systems, monitoring, ongoing evaluation of energy efficiency and energy consumption predicting;
b) promoting the renewable energy use on end-consumers;
c) reducing the environmental impact from the activities of generation, transmission, distribution and consumption by all forms of energy;
d) application of modern principles of energy management;
e) imposition of obligations for final consumers of energy, energy distributors, distribution system operators and energy companies retail energy;
f) granting financial and fiscal incentives;
g) market development for energy services.

For the legal provisions in the field of energy efficiency in Romania was created Romanian Agency for Energy Conservation (ARCE), which had the following history:

- Romanian Agency for Energy Conservation (ARCE) – the first energy efficiency agency in South-Eastern Europe; - created in 1990 based on the French model of ADEME
- ARCE structure and activity has been monitored by Energy Charter Secretariat according to the Protocol for Energy
- Efficiency and Related Environmental Aspects (annex to the ECT) by various Regular Review and In-depth Review
- ARCE activity has been evaluated by the EnR experts according to the EnR accession procedure – membership accepted in 2006 (one year before Romania Access in EU); in 2008 it held the Presidency of the network
- ARCE activity strongly supported by EC in negotiation process for Romania integration in EU

Main projects and activities:

- Elaboration of Energy Efficiency Law – 1996-2000
- Market survey for household appliances – according to EU Labeling Directives
- Implementation of the National Program for EE&RES in public sector 2001-2009
- Implementation of the national Program for Energy Management in Industry authorization of energy managers and auditors for industry
- Extensive International cooperation

- In 2009 ARCE work is taken over through Law 329/2009, by ANRE. ARCE becomes department in ANRE: Regulatory Department in Energy Efficiency (DREE);
- In 2012, DREE turn, by Law 160/2012 regarding the organization and functioning of ANRE, in the General Direction Regulatory, Monitoring and Authorization in energy efficiency -DGRMAEE, having in the structure two directions:
- DRAEE – Direction Regulation and Autorising in energy efficiency;
- DMPEE – Direction Monitoring and Projects in energy efficiency.

<u>Romanian energy strategy for the period 2007-2020 updated for 2011-2020</u>

Romania has developed energy strategy for the period 2007 - 2020 updated for the period 2011 - 2020, in which energy efficiency is a national priority in the context of the current energy crisis. The overall objective of the energy sector is represented by energy needs both now and in the medium and long term, at a price as low as possible, suitable for a modern market economy and a decent standard of living, in terms of quality, safety in feed, respecting the principles of sustainable development.

Sustainable development is based on:

- increase of energy efficiency;
- promoting energy production based on renewable resources;

- promoting the production of electricity and heat in cogeneration plants, especially in high-efficiency cogeneration plants;
- supporting research, development and dissemination of research results applicable;
- reducing the negative impact of the energy sector on the environment;
- rational and efficient use of primary energy resources.

One of the major deficiencies of the Romanian national energy system is the low energy efficiency in chain of production-transport-distribution- final energy consumer. Romania no longer afford to waste energy in the situation of an availability reduced and an increased cost of energy sources; energy efficiency is the most cost effective method of emissions reduction, of improving safety and competitiveness, decreasing the energy service bill. For achieving the priority objectives of Romania's energy strategy will be adopted following types of measures:

- general measures, valid for all energy subsectors (mining, generation, transmission, distribution and storage of natural gas and oil products and also the production, transport and distribution of electricity and thermal);
- specific measures in the fields: environmental protection, energy efficiency, restructuring / privatization and implementation of Structural Funds;
- specific measures for each sector.

Diminishing the negative effects of energy production process on climate requires concrete and effective actions. In this context, Romania must act constant and coherent in order to align with European actions which promote the Lisbon objectives. In order to limit the predicted global temperature rise, respectively emissions of greenhouse gases, Romania will act especially in the field of energy efficiency and renewable energy. Actions to promote energy efficiency and renewable energy will contribute both to reducing negative environmental impacts and increase security of supply, decreasing dependence on energy imports of Romania.

Directive no. 2006/32/EC on energy efficiency at end-user level, which became mandatory for Romania in 2008, stipulate that EU Member States commit to reduce final energy consumption by at least 9% in a period of nine years (2008 -2016) compared with the average consumption in 2001-2005. In this respect, it will adopt the following energy efficiency measures:

a) utilization of financial instruments for energy savings, including energy performance contracts that stipulate the delivery of measurable energy savings;
b) purchase of equipment and technology considering especially the specifications on energy efficiency;
c) accelerate the execution of the rigorous energy audits on industrial consumers, public and residential buildings, certified audit by abilitated bodies, followed by measures to reduce energy consumption.

The national energy savings potential, reducing energy losses, is estimated at 27-35% of primary energy resources (industry 20 to 25%, building 40-50%, transport 35-40%).

To reduce the energy intensity in sectors with high energy consumption and meet targets in both the National Energy Efficiency Strategy and Action Plan for Energy Efficiency stipulated in Directive 2006/32/EC regarding the energy efficiency on end-user consumer it will be taken measures in the following areas:

Industry:

- Information campaigns;
- Long-term voluntary agreements in different sectors of manufacturing;
- Energy audits and energy efficiency management;
- Improve energy efficiency supported by communitarian funds.

Transport:

- reducing energy consumption by upgrading projects of rail passenger and freight;
- increasing the quality of public transport in order to use it to the detriment of private car transport;
- expanding the public transportation through new routes;
- improving traffic and parking;
- transportation for employees paid by the companies;
- greater development of transport raceways within urban transport (trams, buses);
- increasing the energy efficiency of vehicles by establishing a minimum of efficiency criteria;
- introduction of regulations to support the efficient and clean vehicles;
- using of gaseous fuels and biofuels in transport.

To achieve the above measures, a critical component is to educate people on acceptance and their widespread application.

Residential (final energy consumption in buildings: heating, hot water and lighting):

- envelope rehabilitation measures for thermal rehabilitation of buildings, financial support for low financial owners with opportunities to achieve rehabilitation works;
- improving of existing thermal installations;
- improving of lighting installation, use of low consumption lamps;
- obligation to apply the provisions of the Directive and European Standards of efficiency in new buildings;
- improve energy efficiency by supporting financing using Community funds;
- heat metering continued to final consumers;
- creation of a national program for energy education to population in schools and in the media to energy saving, environmental protection and local use of renewable energy resources;
- stimulating the function energy services companies (ESCOs).

Public Sector:

- increase efficiency and reduce consumption of public lighting;
- increasing the efficiency and reducing the consumption of water supply;

- improving energy efficiency in public buildings.

Cogeneration:

- promote high efficiency cogeneration;
- identifying and capitalizing on national cogeneration potential;
- energy auditing for cogeneration unit;
- rehabilitation and modernization of existing plants to increase efficiency and reduce environmental impact;
- construction of new high efficiency cogeneration plant.

Financial mechanisms to support energy efficiency measures mentioned above are relatively limited in Romania, which has a negative impact on their promotion. To successfully implement the measures provided for these areas it is necessary a financial support materialized in grants, tax cuts, aid from the private companies involved in the realization of these plans but also credit facilities from banks. Financial aid which will be proposed to support this sector will be given by law, in compliance with laws on state aid.

To achieve energy efficiency targets, will consider the following measures:

- Increasing efficiency in the use of electricity and natural gas industry, the development of some demonstration projects to attract investment to update the technological equipments;
- Continued investment for rehabilitation of centralized heat supply in cities and reduce energy losses;
- The realization of National Program for thermal rehabilitation of existing residential buildings approved by the Government;
- Establish minimum levels of energy efficiency in industry, transport, construction, agriculture, services and households;
- Supporting energy efficiency programs through the allocation of funds from the Romanian Fund for Energy Efficiency;
- Making projects and energy efficiency demonstration zones;
- Creating the necessary legislative framework to develop competitive market for energy services;
- Promotion of white certificates trading to boost investment in energy efficiency, if there is a practice developed in this direction in EU;
- Promoting the actions type DSM (Demand Site Management);
- Fiscal and financial incentives for projects to increase energy efficiency, in compliance with laws on state aid.

Financing of investments aimed mainly at increasing energy efficiency can be achieved:

- from the state budget and local budgets;
- under a performance contract signed with third parties;
- under a performance contract signed with an energy service company (ESCO);

- by bank loans obtained from external funding bodies (BM, BERD, BEI, JBIC) or from commercial banks;
- by co-financing from structural funds.

ESCO programs for energy efficiency

Energy Service Companies – ESCO is a company that is involved in projects providing integrated solutions for achieving energy efficiency.

The main steps in developing an ESCO Project:

- DEVELOPMENT: audit, financial and risk analysis, agreement;
- IMPLEMENTATION: design, construction and installation, financing;
- ENERGY PRODUCTION
- MANAGEMENT: operation and maintenance, monitoring and management.

Advantages and benefits of energy efficiency project ESCO:

- Interlocutor unique with skills and experience;
- Investment CAPEX 0 (zero) for the beneficiary;
- Reducing operating costs OPEX;
- Financing all or part of the investment;
- Guarantee results through energy performance contracts;
- Reducing energy consumption - reducing energy costs;
- Reducing the environmental impact by reducing emissions of greenhouse gases (CO2);

The most important is that the beneficiary of the receives project ESCO receive for free the investment at completion of the contract. In May 21, 2013 was released in Bucharest ESCO Energy Efficiency Program with representatives of ANRE, Ministry of Regional Development and Public Administration, Ministry of Finance, municipalities, European Commission campaign ESCO, energy companies ESCO and banking community presence. Through the program it is desired to develop pilot projects in four cities that demonstrate the benefits of CPE mechanism (Energy Performance Contract).

More broadly, the BERD wants the elaboration of national legislation to encourage support for large-scale development projects CPE type and possibly multiplying PCE type projects for a total of up to 6 municipalities. In a later stage it is intended to strengthen the capacity of collaboration in at least 20 other municipalities. BERD has obtained funding from the Global Environment Facility ("GEF") to develop a program to improve energy efficiency in public buildings in Romania.

Basically, under the ESCO Energy Efficiency in the public sector, selected cities will benefit of free technical assistance for the identification and preparation of projects for energy efficiency in public buildings (e.g. schools, kindergartens, etc...) and / or street lighting, a mechanism for third-party financing through investments in energy efficiency will be performed by a company ESCO (energy service companies), which

will be repaid from future energy savings, reduced energy bills will reduce the pressure on the public budget, a level of comfort to citizens, such as warmth and comfort in schools and streets safer, adequately lit at a reasonable cost. The program runs for a period of five years, from November 2010 to October 2015.

3.4.3 Galati (local level)

3.4.3.1 Funding programs

Locally, Galati municipality has benefited on existing funds in national level on which it was added the local co-founds. Should be noted that the municipality, through his duties in accordance with Law no. 215 regarding the public administration updated and republished, annually conducted repairs and maintenance to the owned buildings (eg schools, kindergartens, etc.) leading to increased energy efficiency of such buildings (repair systems heating and DHW, rebuilt roof insulation, horizontal roof etc.). These works has conducted with funding from the local budget of Galati municipality.

Another source of funding was represented by the national budget funds available to cities by Ordinance no. 18/2009 – regarding the increasing of energy efficiency to residential buildings which provided constructions on thermal envelope tot the residential buildings like:

a) thermal insulation of exterior walls;
b) replacement of existing windows and exterior doors, including carpentry related access in block of flats, with energy performance windows;
c) thermal and hydro insulation of the terrace above the last level;
d) d) thermal insulation of the floor above the basement, where the design of the block provided on the ground floor apartments;
e) dismantling works installations and equipment mounted on the façades / terrace housing block, and reinstall them after the insulation works;
f) finishes restoration work envelope.

Completion of the intervention aims to increase the energy performance of housing blocks, so specific annual energy consumption for heating calculated to fall below 100 kWh/m^2 - usable area, in terms of economic efficiency. Funding of those works have been made as follows:

- 50% of funds allocated from the state budget within the funds approved annually;
- 30% of local budget funds allocated for this purpose in the local budget;
- 20% repair fund of the association.

In the town of Galati were recorded requests from homeowners associations for inclusion in the National program of thermal rehabilitation from 130 blocks by a total of 7854 apartments.
At this point the most important source of funding is: 2007-2013 Regional Operational Programme (POR) - Priority 1 "Supporting the sustainable development of cities -

urban growth poles" Key Area of Intervention 1.2 - Supporting investments in energy efficiency of residential buildings "

The legislative framework whicu is reglementing the implementation ROP 2007 - 2013 is the HG 1061/2012 amending Annex. No. 2.4. 363/2010 regarding the approval of cost standards for investments financed by public funds, Law no. 159/2013 amending and supplementing Law no. 372/2005 on the energy performance of buildings and Law 238/2013 approving Government Emergency Ordinance No. 63/2012 amending and supplementing Government Emergency Ordinance No. 18/2009 on increasing the energy performance of housing blocks.

Works Categories which are eligible under MDRT Order 2368/2012 are the following:

- Rehabilitation thermal envelope, insulation of facades and floor above the basement, termohidroizolarea terrace, replacing the existing woodwork, including closing balconies;
- Thermal rehabilitation of the heating system
- Expenditure (removal and installation of the facade)

To obtaine funding from this program the Galati municipality hase proposed a number of five funding requests from 11 housing blocks totaling 605 apartments. An opportunity is the BERD program - Energy Efficiency Pilot Program in the public sector from Romania where the Galati municipality is trying to become one of the pilot cities. Depending on the results of the pilot program it will be developed the ESCO investments in Romania.

3.4.3.2 Political initiatives

In the city of Galaţi, the supply of hot water and heat for heating side are made by SC Apaterm SA. The main source of heat is SC Electrocentrale Galati SA.Primary heat transport network has a length of about 182 km. Heat distribution is achieved through the thermal and secondary network, which measures the length 592.31 km, of which 1.1 km above ground. Thermal stations are composed of thermal old equipment with a high degree of wear. The electropumps are old, their life period is overdue, high technical characteristics relative to current consumption. The pipes connecting the equipment, valves circuits and heating hot water presents high overused, plants are not equipped with devices for automation. Heat distribution networks and the one for hot water are used in a proportion of 66.68%[38].

Galati is going through a socio - economic transformation without precedent in his history. The implementation of new technologies in the city's economy as well as national and regional organization put the city in the face of challenges and opportunities which we must face.

Following the signing of the Kyoto Protocol in 1997 by Romania, legislative measures have been taken to implement it. These legislative measures should lead to the reduction of greenhouse gases (mainly CO_2) is a challenge both nationally and locally.

[38] Galati, 2008 Local Development Strategy 2008 -2013 Galati City (GLS).

In accordance with national low the public administration has the opportunity to be involved in increasing the energy efficiency of buildings in the city. Housing stock is having 103.992 houses with a total area of 3,336,735 square meters. Analysis of the main social aspects of living in the city of Galati includes assessing the existing housing stock and socio-demographic characteristics of the population.

Table 3.4-1 : Social and sociological indicators of housing[39].

No.	Indicator	Value
1.	Number of dwellings in public ownership	3.549
2.	Number of houses with private funds	100.107
3.	Living area (sq m)	3.336.735
4.	Living area public property (sqm)	56.943
5.	Living area with private funds (mp)	3.268.793
6.	Number of blocks ANL-20	
7.	Number of apartments	732
8.	Social housing	159

At the local council level were taken a number of decisions which aims is to increase thermal comfort by increasing the energy efficiency of residential buildings.In addition to local council decisions (HCL) approving the heat billing rates for population and grants it was taken also decisions of the Local Council for the rehabilitation and modernization of centralized heat distribution. Thus in 2008 and 2009 by HCL 312/13.05.2008, 674/22.12.2009 it was approved technical documentation - economic and financial resources for modernization and rehabilitation of thermal energy distribution system.

Another local initiative has been to prepare a total of 19 technical documents with a total of 1086 apartments for thermal rehabilitation of housing through the financing mechanism of OG 18. These technical documents were approved by the Local Council of Galaţi by HCL 406/23.07.2009 on approval documents for approval (DALI) on increasing the energy efficiency of residential buildings in 2009. By implementing the projects included in the Integrated Urban Development funded Regional Operational Programme 2007-2013 (POR) Priority Axis 3 "Improving social infrastructure" Key Area of Intervention 3.4 Rehabilitation / modernization / development and equipping of undergraduate, graduate and training infrastructure continuing professional rehabilitation works were carried out for a number of partial thermal two secondary schools and two school groups.

To increase the energy efficiency of residential buildings funded pilot project funded by the 2007-2013 Regional Operational Program (ROP) Priority 1 "Supporting the sustainable development of cities - urban growth poles" Key Area of Intervention 1.2 - Support for investments in energy efficiency blocks of flats", Galati Municipality prepared the technical documentation for a total of 19 blocks and a total of 1120 apartments.

[39] Euroconsultants Corporation Eurotec, Integrated Urban Development Plan 2009 (UDE).

3.5 Turkey

3.5.1 Funding programs (national level)

The funding programs related with energy efficiency and CO_2 emission reductions in Turkey are;

- government funding of the national programs aimed at improving energy efficiency and reducing emissions (for industry);
- funding from the regional and local budgets (development agencies);
- preferential loans, including international organizations;
- grants from international organizations, designed to stimulate the processes of increasing energy efficiency and CO_2 emission reduction.

After the Energy Efficiency Law was issued, a number of incentive and funding opportunities occurred. Most of the funds are directed to SME's and the industry. There are incentives for "Efficiency Increasing Projects" and "Voluntary Agreements" for those industry establishments who decrease their energy density. Ministry of Energy and Natural Resources is working on a funding program for energy efficiency in buildings which is also mentioned in the Energy Efficiency Strategy Paper and Climate Change Action Plan.

Globally, several existing financial and fiscal mechanisms were identified in the building sector, ranked by relevance and priority (Table 3.5-1).

Table 3.5-1: Existing financial and fiscal mechanisms for the building sector.

MECHANISMS	RELEVANCE	SOURCE OF FUNDING	PRIORITY
Grants	**High** for large buildings	State budget, funds, international financial institutions, bilateral donors	Short term priority; aimed at determining the level of investment demand and supporting owners in loan applications; energy audits, feasibility studies; public buildings, commercial services, multi-apartment buildings
Preferential loans	**High** for commercial services and residential buildings	International financial institutions, Energy Efficiency funds, guarantee funds, development funds/banks, local commercial banks	Short term priority; assessed investment demand serves as a base for Government loan applications to international financial institutions
Third Party Financing (TPF) / ESCO (EPC)	**Medium**	Energy service companies, leasing companies	Mid-term; prerequisites: legislation, standardized monitoring and verification protocols, training, cost-reflective energy carrier prices

White certificates	**Low**	Developed countries	Mid- to long-term
Tax Rebates	**Low** to **medium**	State budgets; more suitable for companies	Mid-term
Tax Deduction	**Low** to **medium**	Income tax reduction for legal and natural persons investing in EEI of own buildings	Short- to mid-term
VAT Reduction	**Low** to **medium**	Suitable for measures with short payback	Short- to mid-term

Although grants and preferential loans have started to enter the Turkish construction market, third party financing and ESCO's have not really taken-off despite open support by government policy. Tax rebates and deductions are also not applied widely as yet. This is thought to be one specific area where local administrations could have an impact on the energy efficiency investments (EEI) in the building sector.

International donors and International Finance Intermediaries (IFIs) have been very active in the Turkish EE/RE market. The most important funding programs relating to the building sector include:

- The United Nations Development Program (UNDP);
- The European Bank for Reconstruction and Development (EBRD);
- The European Investment Bank (EIB);
- The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH;
- The World Bank;
- The European Commission;
- French Development Agency (AFD);

United Nations Development Program (UNDP) has been active in the transformation to a low carbon economy in Turkey in several areas. They have been working for EE in buildings; Market Transformation of Energy Efficient Appliances; EE in industry; Appliance labeling and EE awareness; Utilization of EE and RE in South Eastern Anatolia. Funds related with energy efficiency are listed below;

- The objective of the *Market Transformation of Energy Efficient Appliances* in Turkey is to reduce the household electricity consumption and the associated greenhouse gas emissions of Turkey by accelerating the market transformation of less energy consuming building appliances. UNDP have been trying to improve institutional capacity in appliance labeling policy, support the development and implementation of a structured appliance labeling verification and enforcement system, raise awareness with end-users and the supply chain and strengthened capacity of the local manufacturers to produce appliances complying with the new energy efficiency standards for the Turkish market, monitor learn, and evaluate. The project focuses on six priority product groups: refrigerators, deep freezers ,washing machines, dishwashers, electrical ovens, air conditioners. The project started in 2010 and expected to

end in 2014. The budget is US$ 5.656.000 and General Directorate of Renewable Energy is the executing partner in Turkey. Ministry of Science, Industry and Technology, Turkish White goods Manufacturers (TURKBESD) and Arçelik A.Ş. (one of the largest white good manufacturers in Turkey) are key partners of the project. Ministry of Finance, banks and other financial institutions, NGOs such as consumer organizations, professional chambers are key stakeholders for the project[40].

- *Promoting EE in buildings;* Through this project it is aimed to reduce energy consumption and associated GHG emissions in public buildings in Turkey by raising building energy performance standards, improving enforcement of building codes, enhancing building energy management and introducing the use of an integrated building design approach. UNDP is the implementing agency of the project. The project will be executed by General Directorate of Renewable Energy (YEGM). The Ministry of Environment and Urbanization, Housing Development Administration (TOKİ) and Ministry of National Education are other partners of the project. Promoting Energy Efficiency in Buildings in Turkey Project is financially supported by Global Environment Facility (GEF). Project start sate is 2011 and estimated end date 2015. The project budget is US$ 17.580.000[41].

The *European Bank for Reconstruction and Development (EBRD)* implements the following programs;

- *TURSEFF I and II*[42] The European Bank for Reconstruction and Development (EBRD) is playing a key role in Turkey's efforts to become an energy-efficient and low-carbon market economy with a financing facility that now totals close to half a billion Euros. The financing is provided under the EBRD's extended *Turkish Sustainable Energy Financing Facility (TurSEFF)* – a dedicated finance facility aimed at supporting Turkey's long-term energy strategy. Launched in July 2010, the US$ 284.2 million TurSEFF was extended by a further US$ 265 million in 2013 to meet the growing demand for energy efficiency and small-scale renewable energy investments among SMEs. Currently five commercial banks in Turkey – Akbank, Denizbank, Işbank, Vakifbank and YapiKredibank – are financing energy-saving projects under TurSEFF.

  Any eligible SME willing to invest in energy efficiency measures or renewable energy projects can apply for up to €5 million financing at EBRD partner banks. In addition, the EBRD investment is supported by a comprehensive technical assistance program, funded by the EU and the Clean Technology

[40]Market transformation of energy efficient appliances in Turkey project, available at: http://www.tr.undp.org/content/turkey/en/home/operations/projects/environment_and_energy/market-transformation-of-energy-efficient-appliances-in-turkey.html

[41]Promoting Energy Efficiency in Turkey project, available at: http://www.tr.undp.org/content/turkey/en/home/operations/projects/environment_and_energy/promoting_energy_efficiency_in_buildings_in_turkey.html

[42]Driving energy efficiency of Turkish Businesses, available at: http://www.ebrd.com/pages/news/press/2013/130704.shtml

Fund, to assist banks and businesses with the provision of advice for energy-saving investments.

Since 2010 more than 90 per cent of TurSEFF funds have been on-lent to almost 400 SMEs, while more than 50,000 individual households in Turkey have benefited from energy-efficient heating and cooling technology through vendor finance schemes financed under the TurSEFF umbrella. The first phase of TurSEFF achieved energy savings representing 234,000 tonnes of oil equivalent every year, which would correspond to the yearly electricity consumption of almost half a million Turkish homes, and some US$ 147 million in oil imports. The projects financed have resulted in a total reduction of 686,000 tonnes of annual carbon dioxide equivalent (CO_2e) emissions, equivalent to the annual emissions of 260,000 cars.

- *TurEEFF*[43] is presently financing energy efficiency up-grades and improvements in private residential properties. Eligible measures encompass complex energy efficiency up-grades or implementation of measures related to thermal protection of residential buildings and/or improvement of efficiency of mechanical and electrical services (space heating, domestic hot water, mechanical ventilation, air-conditioning, lighting, water supply, building integrated renewable energy installations).

  The EBRD is considering a framework operation of US$ 350 million under which credit lines will be provided by EBRD to several commercial banks in Turkey for residential energy efficiency investments, undertaken by private residential stakeholders including individual homeowners, housing associations, condominiums, housing cooperatives, and service providers (e.g. housing management companies, ESCOs, construction companies implementing energy efficiency improvements on behalf of homeowners, etc.). Eligibility requirements will be set up beyond Turkish regulation at levels compliant with EU best practice.

  TurREEFF will finance energy efficiency up-grade and improvements in private residential properties. Eligible measures will encompass complex energy efficiency up-grade or implementation of measures related to thermal protection of residential buildings and/or improvement of efficiency of mechanical and electrical services (space heating, domestic hot water, mechanical ventilation, air-conditioning, lighting, water supply, building integrated renewable energy installations).

  TurREEFF will generate transition impact by demonstrating the benefits of household energy conservation and promoting the expansion of energy efficiency investments in the otherwise difficult residential sector. Such demonstration will also be provided by promoting enhanced energy efficiency standards beyond Turkish regulations, and in line with EU best practice.

[43]Turkey Residential EEFF (TUREEFF), available at:
http://www.ebrd.com/pages/project/psd/2013/45195.shtml

The *European Investment Bank (EIB)* implemented the following programs in Turkey related to buildings since 2008[44];

- Financing of small and medium-scale projects carried out by SMEs, primarily in manufacturing and services sectors. Garanti Bank-2010 (250 million €) Dedicated EIB Loan for SMEs for the financing of small and medium scale productive investments across Turkey.
- Yapı Kredi Bank I and II (2010-200 million € and 2013-99 million €) The proposed framework loan used primarily to finance renewable energy and energy efficiency projects as well as other projects with a significant positive contribution towards the environment and the fight against climate change.
- Denizbank (2011); framework loan for cofinancing small and medium-scale renewable energy and energy efficiency projects (75 million €)
- Finansbank Climate Change Facility (2011); framework loan for financing renewable energy and energy efficiency projects in Turkey (75 million €).
- Vakıfbank Climate Change Facility (2011); framework loan for financing renewable energy and energy efficiency projects in Turkey (75 million €)
- İsbank Climate Change Facility (2012); framework loan for financing renewable energy and energy efficiency projects in Turkey (75 million €)
- Sustainable Tourism and EE Global Loan (2013); financing of hotel refurbishment, energy efficiency and sustainable tourism projects (200 million €) through Turkey Development Bank (TKB) and Industrial Development Bank of Turkey (TSKB),
- Energy Efficiency Cofinancing Facility (2013); the loan will be intermediated by three selected Turkish banks with a proven track record in energy efficiency projects. The first selected promoter is Türkiye Vakıflar Bankası (Vakifbank). Framework loan to support energy efficiency projects accross Turkey in co-financing with the European Bank for Reconstruction and Development's (EBRD) Turkish Sustainable Energy Financing Facility (TurSEFF) initiative. Energy efficiency projects will focus on investments in the residential, commercial and industry sectors. Final beneficiaries will be SMEs, Mid-caps, energy service companies (ESCOs), individual households and homeowner's associations. The total cost will be 300 million € and 150 million € will be financed by EIB.

World Bank's latest program regarding energy efficiency in Turkey is Turkey-Small and Medium Enterprises Energy Efficiency Project[45],

- The development objective is to improve the efficiecny of energy use in Small and Medium Enterprises (SMEs), by scaling-up commercial bank lending for energy efficiency investments. The global environmental objective is to

[44]European Investment Bank in Turkey, available at: http://www.eib.org/projects/loans/sectors/energy.htm?start=2007&end=2014&region=enlargement&country=turkey

[45]Turkey-Small and Medium Enterprises Energy Efficiency Project; available at: http://documents.worldbank.org/curated/en/2013/02/17425514/turkey-small-medium-enterprises-energy-efficiency-project

reduce Greenhouse Gas (GHG) emissions through the removal of barriers to energy efficiency financing in the SMEs sector. There are two components to the project. This component consists of investment lending and includes support for sub-project development, appraisal and monitoring: International Bank for Reconstruction and Development (IBRD) on-lending, and loan loss reserve fund. The second component of the project is policy support and technical assistance to General Directorate of Renewable Energy (YEGM). Two sub-components are envisaged under this component: market development and information dissemination, and policy dialogue and capacity building within Ministry of Energy and Natural Resources (MENR). The project have started in March 2013 and will be active till September 2018. Total project cost to be US$ 201 million.

French Development Agency (AFD)[46] programs regarding energy efficiency in buildings are;

- AFD program to reduce the environmental footprint of Turkish growth and support the fight against climate change through the financing of SME's undertaking energy efficiency projects and small-scale renewable energy projects. The project consists of providing Halkbank with a € 100 M credit line in order for the bank to be able to support SMEs through investment loans. Out of the € 100 M granted by AFD to Halkbank, €60 M will support energy efficiency gains in SME's and € 40 M will finance small-scale renewable energy production units.
  The adjusted AFD financing conditions will also enable Halkbank to implement a technical assistance program aimed at supporting the emergence of energy efficiency projects and at improving the environmental impacts of small-scale renewable energy production units. Funded projects will contribute to reduce SMEs' energy bill and thus fight climate change and preserve fossil energy resources. Ex-ante and ex-post evaluations of realized energy economies will be done, as well as an assessment of projects' impacts on greenhouse gas emissions reduction.
  The credit line provided to Halkbank should have a demonstrative effect on Turkish commercial banks, showing the feasibility and the interest of funding SMEs energy efficiency projects. It should also prompt Turkish SMEs to take energy efficiency issues into account, thanks to the technical assistance program and the access to dedicated financing. This project will also develop the energy consultancy market in the SME segment thanks to the energy audit component of the technical assistance program. Thus more than 100 Turkish SMEs will benefit from energy audits provided by expert consultants.

German International Cooperation (GIZ)[47] implemented the following programmes:

[46]Agence Francaise & Development, Countries, Turkey, available at: http://www.afd.fr/lang/en/home/pays/mediterranee-et-moyen-orient/geo/turquie/tr-projets/efficacite-energetique-pme

[47]Energy efficiency in the construction sector in the Mediterranean (MED-ENEC) available at: http://www.giz.de/international-services/en/html/1749.html

- Until 2010; the MED-ENEC project, by GIZ International Services promoted energy efficiency measures and renewable energies in the buildings sector in countries in the Mediterranean region [7]on behalf of the European Union, . Energy supplies are to become more secure and the negative impacts of the dramatic increase in energy consumption on the environment and climate should be reduced. Energy Efficiency in the Construction Sector in the Mediterranean (MED-ENEC) supports national MEDA partners in their efforts to put in place a more enabling environment for energy efficiency and the use of renewable energies in buildings. It also embraces further training, pilot projects and the promotion of company joint ventures and technology transfers. MED-ENEC supports demand-driven energy efficiency measures and the use of solar energy in the construction sector with a view to making energy supplies more secure and reducing the negative impacts on the environment and climate of the dramatic increase in energy consumption. The outputs will be;
    - Active promotion, among state institutions in particular, of the introduction of new technologies and services concerning all aspects of energy efficiency in buildings ('ESCO business')
    - Political dialogue and policy advise on planning, regulatory development and the implementation of low-energy building standards in target countries
    - Institution building services for ministries, energy agencies and network organisations in the form of advisory and training services
    - Knowledge transfer, including workshops, presentations, seminars and brochures
    - Implementation and promotion of conference events
    - Preparation of studies with the aim of reducing dependence on fossil fuels
    - Organisation of PR work, including updates of an internet-supported database of companies, organisation of trade fair presentations, events and press conferences

Promotion of Energy Efficiency in Buildings in Erzurum, Turkey[48] project The project, "Promotion of Energy Efficiency in Buildings in Erzurum, Turkey", was carried out between November 2002 and October 2005. The projects objective was "to get local authorities, state and private users of buildings to apply measures to reduce specific energy use in buildings in Erzurum." Efforts should be directed towards reducing the rate of growth of energy consumption for buildings in line with the national policy on energy. With the pilot-like introduction of local energy management in Erzurum, the project was intended to form the basis for a strategy of implementation extending beyond Erzurum, to introduce energy-saving measures in public and commercial-use buildings and so provoke a knock-on effect in other municipalities.

[48] Promotion of Energy Efficiency in Buildings in Erzurum, Turkey, Ex-post 2007 Evaluation brief report http://www.giz.de/de/downloads/gtz2007-en-turkey-energy-ex-post-evaluation.pdf

European Union (EU) programs for energy efficiency in Turkey

Turkey has been participating in EU Framework Programmes since FP5 and has gradually increased its participation in this important R&D and Technology Deployment facility of the Union. Although some pioneering projects have been carried out via research institutions, universities and some private firms in the construction sector regarding nano-materials, green building materials and building integrated renewable energy technologies, it is thought that the present Horizon 2020 or FP8 through the Smart Cities sub-programme will attract significant participation from Turkish municipalities.

Improvement of Monitoring and Evaluation Infrastructure of Turkey's Energy Efficiency Project (In cooperation with Netherlands/Turkey[49]

The project started in 2011in cooperation with Ministry of Economic Affairs of Netherlans and General Directorate of Renewable Energy of MENR of Turkey. The project aims to support YEGM's activities by increasing the capacity of experts, pilot project implementations, development of methodology for monitoring and evaluation acitivites. The project budget was € 350.000 and was completed in 2013.

KfW Energy Efficiency Loans in Turkey

- Cooperation with the Turkish Development Bank TSKB

The Turkish development bank TSKB is a member of the International Development Finance Club (IDFC) and is among the long-time partner banks of KfW Entwicklungsbank. The new loan agreement has intensified the existing successful cooperation in the area of climate protection. For the first time a new FC instrument in the form of a covered promotional loan was used. With the new line of credit, KfW Entwicklungsbank supports investments in renewable energies with particular focus on innovative technologies and improvements in energy efficiency in the Turkish industry. The topic of energy efficiency in particular is increasingly gaining importance in Turkey. According to the signed agreement in November between the German Federal Minister of Economics Rösler and the Turkish Energy Minister Yildiz, the German-Turkish cooperation in the area of energy is to be further expanded in future.

Loan facilities in residential building sector

Several commercial banks in Turkey already offer green loans. Historically seen the most advanced of these banks would be TSKB, who has had a specific sustainable energy loan product for many years. However, as this is targeted at SME and corporate projects, it is irrelevant here. Some banks offer dedicated green loan products at the retail level. Others have dedicated agreements with vendors and pre-agreed special loan terms for specific products offered by the vendor. Some examples are listed below.

Many Turkish banks developed various personal loan (or individual loan) categories to penetrate the market for financing individuals' small loan needs. These fall under the remit of the retail departments of the banks. These loans do not have standard

[49] Türkiye'de Enerji Verimliliği İzleme Ve Değerlendirmesinin Geliştirilmesi Projesi (Hollanda /Türkiye İşbirliği Projesi); available at: http://www.eie.gov.tr/projeler/uls_verimlilik.aspx

conditions and their names vary from bank to bank, largely based on the purpose of the loan; e.g. consumer loans, car loans, fixed credits/flexible credits, rescue accounts/overdraft credits and holiday loans.

"Energy loans" are also a part of this personal loan category. Some banks have designed "energy loans" for their clients to support their energy efficient product or service purchasing expenses. Since banks can finance these types of specific loans through different sources (syndicated loans, long term loans from foreign banks etc.) they can pass on the advantages in terms of interest rates or payment terms to their clients. Therefore, "energy loans" are consumer loans specifically designed for "energy efficiency expenses of individuals".

Loan facilities in the residential building sector are provided by the following local banks in Turkey:

- Ekokredi from Sekerbank; Energy efficiency credit scheme with Izoder[50] as technical support provider, this credit scheme was originally developed with the support of the TuRSEFF I team. This is an EE credit up to a maximum of TL 36.000 and a maximum maturity of 60 months offers a 6 month grace period and no transaction costs as special advantages. A special condition of the deal is that the suppliers, who are members of Izoder, offer a discount of up to 7% on products financed with Eko Credit
- Ekokredi from Denizbank; Also initially with the support of the TuRSEFF I team, Denizbank set up a vendor relationship with Filli Boya with loans starting from TL 90 up to a maximum of TL 36.000. Again, a special advantage of this deal, which is exclusive to Filli Boya products, is the maturity of up to 60 months, which means that no life insurance is necessary and that there is no need to go to a bank branch for the application in case the applicant owns his own flat.
- İZODER (Association of Thermal Insulation, Waterproofing, Sound Insulation and Fireproofing Material Producers, Suppliers and Applicators) cooperated with other banks like Türkiye Finans, Tekstilbank, Ziraat Bankası, Finansbank for similar financing schemes for thermal insulation of buildings.
- Yapi Kredi offers 'green mortgages' for homes that are built or refurbished to reach higher energy efficiency standards.

Future Prospects and Recommendations for Further Improvements on EE and financing in the building sector[51]

- Governmental financing mechanisms (EE projects and Voluntary Agreements types of incentives) for building sector

[50] Association of Thermal Insulation, Waterproofing, Sound Insulation and Fireproofing Material Producers, Suppliers and Applicators, available at: http://www.izoder.org.tr/tr/yalitim-istiyorum/yalitim-kredileri/index.asp

[51] Financing Energy Efficiency in Buildings within the frame of EU Regulations and Legal Arrangements – Future Perspectives, IMSAD, available at: http://imsad.org/docs/guide_ana.pdf

- Public-private partnership, energy performance contracting with third party financing
- Preferential loans and credits with low interest rate together with the involvement of more national financing institutions
- Taxation and tariff policy arrangements in favour of EE in building
- More R&D studies for the technological improvements in EE and RE concerning climate change i.e. reduction of GHG and
- related financing mechanisms application like white certification
- Data centre formation for the determination of reference values and the maximum saving potentials for the energy
- Performance certification
- More demonstration projects especially by public-private partnerships for the standardization
- Eco-design concerns for energy consuming equipment and systems

3.5.2 Political initiatives (national level)

The basic politicial initiative to ensure an increase in energy efficiency is the target within the "Energy Efficiecny Strategy Paper" to decrease at least 20% of amount of energy consumed per GDP of Turkey in the year 2023 (energy intensity)[52]. The target in the National Climate Change Strategy is to decrease energy intensity with reference to 2004 levels by 2020[53].
It is proposed to;

- To reduce energy intensity and energy losses in industry and services sectors
- To decrease energy demand and carbon emissions of the buildings; to promote sustainable environment friendly buildings using renewable energy sources
- To provide market transformation of energy efficient products
- To increase efficiency in production, transmission and distribution of electricity, to decrease energy losses and harmful environment emissions
- To use energy effectively and efficiently in public sector
- To strengthen institutional capacities and collaborations, to increase use of state of the art technology and awareness activities, to develop financial mechanisms except public financial institutions.

In order to achieve these objectives the following reforms will be made;

- To define applicable measures in energy efficiency with the savings potential in industry sub sectors.
- To require the business enterprises, obliged to establish an energy management unit or nominate energy manager in the industry and services sectors, and the industrial zones to have ISO 50001 Energy Management

[52]Energy Efficiency Strategy Paper 2012-2023, available at: http://www.eie.gov.tr/verimlilik/document/Energy_Efficiency_Strategy_Paper.pdf
[53]National Climate Change Strategy 2010-2010, available at: http://iklim.cob.gov.tr/iklim/Files/Stratejiler/%C4%B0DES_ENG.pdf

Systems Standard paper in the relations of them with the public enterprises.

- To prepare the action plans related to the application by determining the necessary measures, energy savings potential and their cost by making energy audits periodically in the business enterprises consuming five thousand (5.000) TOE annually and in the buildings having a usage area more than twenty thousand (20.000 m^2) used for commercial or service purposes.
- To bring the buildings maximum energy requirement and maximum emission limitations.
- Administrative sanction shall be applied to the ones having amount of carbon dioxide emissions exceeding the minimum amount defined in the related legislation by the year 2017.
- In holding the licenses of commercial buildings and luxury dwellings and residences having usable area more than ten thousand meter square (10.000 m^2) to request attribute of sustainability as of the date of eighteenth (18) months following the issue of license, to promote this application as covering the buildings defined in SA-02/SH-01 by the year 2017.
- To promote local production applications in the public housing projects.
- To limit the sales of goods using energy inefficiently and to activate market inspection
- To be respected with priority of the subjects of total cycle efficiency, harmful environment emissions and waste heat recovery in the process of rehabilitation, modernization, privatization, license granting of coal thermal power plants and their legislation arrangements.
- To make applications of progressive stage tariff, multiple term counter and smart network according to the amount of energy and power.
- To provide the free market entry of load decrease of demand side
- To be activated efficiency improvement applications in the buildings and facilities of public enterprises.
- Not to buy or not to make the ones that not providing minimum efficiency criteria, determined by the Ministry, in commodity and service procurements and construction works having energy use in public procurements.
- The vehicles fulfilled their economic lives shall be clarified by gradually in the public enterprises.
- To realize efficiency improvement applications in the buildings and facilities belong the public sector with Energy Performance Agreements
- To strengthen corporate structures of energy efficiency, renewable energy sources and energy information and technology.
- To strengthen collaborations between institutions
- In the related authority and private sector to develop the necessary capacity for not licensing to the buildings contrary to the Building Energy Performance Legislation and applying ”Energy Identification Certificate” in the buildings

- In the areas of energy efficiency and renewable energy resources ; to build capacity for enabling integrated resource planning and providing future previsions with performance indicators which compared the development in Turkey with the previous years and other countries
- Rearranging authorization criteria: To classify and grade authorization certificates given to the Energy Efficiency Consultancy Companies; to prepare and develop the minimum standards directed to the energy efficiency services of the Energy Efficiency Consultancy Companies.
- In the areas of energy efficiency and renewable energy resources; to prepare technology master plans, to provide coordination between the supporting establishments, to form a national technology inventory where investors benefited.
- In the areas of energy efficiency and renewable energy resources; to arrange legislation for encouraging R&D results application and to be established perfection centers established with the collaboration of public-private sectors in the preferential technologies.
- To prepare a communication plan and conduct the awareness activities in the framework of this communication plan.
- Development of “Energy efficiency consciousness index”.
- To prepare a road map or a Strategical Document directed to establishing carbon market with a serious of the workshops where the related shareholders shall have been attended.

Political initiatives for Turkey on national basis listed as follows:

Energy Efficiency Association

Efficiency-based activities are becoming more common around the world. All countries and big organizations have been spending (using) high budgets on research and development in this area. Several institutors and organizations are working on energy efficiency in our country. The Energy Efficiency Association is a non-governmental organization, established in 2008. Its primary purpose is to create awareness in people, helping them to use energy efficiently and productively. Furthermore, it aims to continually conduct scientific research and also to increase public knowledge by sharing those findings with public enterprises and citizens.

The Association; organizes successful campaigns, promotions and activities with its strong management and qualified technical infrastructure; it is already able to awareness about energy efficiency on the community in short time. The management of the Energy Efficiency Association was changed in order to realize its goals. Many important industrialists, businessmen and bureaucrats have been appointed to the Executive Board.

World Energy Council Turkish National Committee

The World Energy Council Turkish National Committee (hereafter WECTNC) is the principal impartial network of leaders and practitioners promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all.

Formed in 1923, WEC is the UN-accredited global energy body, representing the entire energy spectrum, with more than 3000 member organizations located in over 90 countries and drawn from governments, private and state corporations, academia, NGOs and energy-related stakeholders.

WECTNC informs global, regional and national energy strategies by hosting high-level events, publishing authoritative studies, and working through its extensive member network to facilitate the world's energy policy dialogue.

Turkey Energy Efficiency Assembly

By supporting the establishment of policies related to energy and energy efficiency, the Turkish Energy Efficiency Assembly aims to establish social awareness of developments and innovations related to the productive usage of energy and create social negotiation and cooperation in order to realize this goal. The names of the founders of the association are as follows:

Ministry of Energy and Natural Resources-ETKB, Union of Chambers and Commodity Exchanges of Turkey-TOBB, Turkish Exporters' Assembly-TIM, Independent Industrialists and Businessmen's Association-MUSIAD, Turkish Industry and Business Association-TUSIAD, International Competitiveness Research Institute –URAK, Turkish Confederation of Businessmen and Industrialists-TUSKON, Energy Efficiency Association-ENVER, Anatolian Lions Businessmen's Association-ASKON, The Young Businessmen Confederation of Turkey – TÜGİK, The Association of Local and Regional Televisions-YBTB, Economic Journalists Association-EGD, Architects & Engineers Group-MMG, World Energy Council Turkish National Committee-DEKTMK, Small and Medium Enterprises Development Organization – KOSGEB, Istanbul Chamber of Commerce-ITO, Business World Foundation-IDV

The Chamber of Mechanical Engineers

The Chamber of Mechanical Engineers has completed its establishment procedure by the convening the First General Assembly on the date of December 18th 1954. The Chamber of Mechanical Engineers is one of the 23 constituent chambers of engineering of the Union of Chambers of Turkish Engineers and Architects. The Chamber of Mechanical Engineers has become a wide spread organization, which is covering the whole country through its 18 Branches, 50 Provincial and 33 Country Representative Offices, 21 Professional Auditing Offices and nearly 1500 Representatives in Industry and work places. The total number of chamber members has exceeded 62.000 in year 2005, which were only 902 in year 1954.

Establishment objectives The Chamber of Mechanical Engineers are stated below:

- Performing technical and scientific studies in order to have high utilization of the natural resources of the country in respect to the benefits of country and society, the increase of production and the development of national industry in the most appropriate way in compliance with the national interests; and letting it‘s members and industry to use and get benefit from these studies.
- Providing the technical responsibility of any research, study, project, and report preparation and application works in its area of profession, to be executed by expert mechanical engineers.
- Performing technical and scientific research studies on industry oriented research and development subjects like work and workers safety, Ergonomics, Environmental protection, Energy Production and Management, Calibration of Measurement and Testing Instruments and other similar subjects.
- Preparing all kinds of standard contracts, technical specifications documents and standards related to its area of profession.
- Helping the education and training of engineers, who own the required qualifications to meet the needs of the country; in co-operation with the institutes, those are providing education and training on its area of profession.

The Chamber of Electrical Engineers

The Chamber of Engineers (EMO) has been established in 1954. The establishment is based on the UCTEA Law No.6235. It is a professional organization defined in the form of a public institution as stated in the Article 135 of the Constitution. It is one of the 23 constituent chambers of the Union of Chambers of Turkish Engineers and Architects.

EMO represents Electrical, Electronics, Computer, and Biomedical Engineers and has members over 46000. EMO Headquarters is located in Ankara. It has branches in Adana, Ankara, Antalya, Bursa, Denizli, Diyarbakır, Eskişehir, Gaziantep, Kocaeli, İstanbul, and İzmir, Mersin, Samsun and Trabzon. Additionally, The Chamber of Electrical Engineers is a widespread organization, having representatives and professional control offices in provinces and districts among the country.

3.5.3 Samsun (local level)

3.5.3.1 Funding programs

Samsun Metropolitan Municipality believes that the challenge of absorbing all available funding can be overcome by new instruments such as technical assistance programs and new tools being developed in the context of the Energy Efficiency Directive (i.e. national energy efficiency funds which would help to streamline funding, concentrate assistance and provide a one-stop shop). Funding opportunities and programs for Samsun on local basis listed as follows:

Middle Black Sea Development Agency

Middle Black Sea Development Agency (OKA) has been established by the decision of the Council of Ministers on November 10th, 2008 in order to support economic, social and cultural development of four cities located in the Middle Black Sea Region of Turkey. These cities are Samsun, Amasya, Tokat, and Çorum, among which Samsun has been chosen as the centre of the Agency.

OKA is one of the regional development agencies which have been founded by the Turkish Government throughout the whole country in the NUTS-2 regions to coordinate regional development, to introduce strategies to enable regions to use their capacities to the maximum benefit of the region, to supply the region with the means to improve their competitiveness and reduce the imbalance existing within and between the regions.

Objectives of the Agency are to improve the cooperation between public sector, private sector and NGOs and to promote the effective and efficient use of the resources in order to accelerate the sustainability of the regional development by evoking the local potential.

Duties of the Agency are as follows:

- Providing technical support to the planning activities and duties of local authorities,
- Supporting the activities and projects ensuring the implementation of regional plan and programs; monitoring and evaluating the implementation process of activities and projects supported within this context and presenting results to the Under secretariat of State Planning Organization,
- Contributing to the improvement of the capacity of the region concerning the rural and local development in accordance with the regional plans and programs, and supporting the projects within this extent as well,
- Monitoring other projects implemented by public sector, private sector and non-governmental organizations in the region and considered as important in terms of regional plan and programs,
- Improving cooperation between public sector, private sector and non-governmental organizations to achieve regional development objectives,
- Carrying out research, or having them carried out, concerning the determination of resources and opportunities of the region, acceleration of economic and social development and enhancement of competitiveness, and supporting other research carried out by other persons, organizations and institutions.

The two grant projects called as “samSUN Solar Energy Project” and “At Selahattin Ereren Drinking Water Treatment Facility Hydro Power Plant (HPP) Construction Project with Innovative Approaches”, presented by SMM have successfully approved by Middle Black Sea Regional Development Agency. The grant projects have prepared within the framework of the subheading 1.2. Funding Opportunities, Programs and Political Initiatives located at the Group Activity I Analysis of Current External

Situation Studies completed under BSBEEP Project, which has been implementing in the scope of ENPI, Black Sea Basin Joint Operational Program 2007-2013 in Samsun.

samSUN Solar Energy Power Project Approved by OKA

General Information on the Project;

- Name of Applicant: Samsun Metropolitan Municipality
- Project Title: "samSUN Solar Energy Power Project"
- Support Program: 4- Small Scale Renewable Energy infrastructure Financial Support Program
- Priority Areas of the Project: Renewable Energy
- Duration of the Project: 12 months
- Total Budget of the Project: 847.256,60 TL (~ 285.000,00 EURO)
- Requested Demand of Grant: 635.000,00 TL (~ 210.000,00 EURO)
- percentage of total eligible cost of the Project: % 75
- Beneficiary: Samsun Metropolitan Municipality
- Legal Status of Beneficiary: Local Administration

General Purposes: Increasing the production of electricity by using solar energy as renewable energy resource with innovative way in Samsun.

Specific purposes:

1. Establishing 48 kWh power Solar Energy Power Plant (SEPP) with solar tracking system.
2. Providing the Daily electricity used for the handicapper's park from SEPP.
3. Selling overproduced electricity to district distributor.
4. Creating local and national public awareness about SEPP.

Basic Activities:

1. Establishing Project Office.
2. Forming Project team.
3. Carrying out visibility activities.
4. Carrying out SEPP tender.
5. Organizing SEPP area.
6. Actualizing SEPP installation.
7. Gathering trial production data, acceptance of SEPP.
8. Realizing conference about SEPP.
9. Preparation of Interim Reports and Final Reports.

Target Group(s) / client(s):

1. Samsun Metropolitan Municipality.
2. Solar Power Plant supplier firms.
3. Printing Houses.
4. Tech-savvy 100 youth.
5. Regional electricity distributors.

6. Samsun and all electrical subscribers under responsibility of electricity distribution company Yedaş.
7. Company YEDAŞ in Ordu, Çorum, Amasya, Sinop provinces and regions.

Final beneficiary(s):
1. Material and equipment suppliers of GES supplier firms.
2. Material suppliers of printing houses'.
3. Social surroundings of tech-savvy youths.
4. Electricity consumers of the region.

Expected result(s):
1. 48 kWh power GES with solar tracking system is established.
2. Electricity which is used for the handicapped park is provided by GES.
3. Overproduced electricity is sold to region distributor.
4. Awareness created on at least 100 young people.

Indicators that will be affected by the Project:
1. Number of Installed unlicensed Solar Energy Plant and the total installed power capacity.
2. The annual amount of electricity generated by solar based.
3. Produced annual electricity quantity.
4. Number of conducted seminars.
5. Number of Women Participating to the seminar.
6. Number of Men Participating to the seminar.
7. Number of brochures printed and distributed.
8. Number of printed signboard.

<u>At Selahattin Ereren Drinking Water Treatment Facility HEP Plant Construction with Innovative Approaches Project Approved by OKA</u>

General Information on the Project;

- Name of Applicant: Samsun Metropolitan Municipality, General Directorate of Water and Sewerage Administration
- Project Title: At Selahattin Ereren Drinking Water Treatment Facility HEP Plant Construction Project with Innovative Approaches
- Support Program: 4- Small Scale Renewable Energy infrastructure Financial Support Program
- Priority Areas of the Project: Renewable Energy
- Duration of the Project: 20 months
- Total Budget of the Project: 2.493.117,74TL(~ 830.000,00 EURO)
- Requested demand of grant: 750.000,00TL(~ 250.000,00 EURO)
- Beneficiary: Samsun Metropolitan Municipality, General Directorate of Water and Sewerage Administration
- Legal Status of Beneficiary: Local administrations

General Purposes: Make contribution to increasing quality of life in TR 83 region by diversifying the sources of renewable energy without harm the nature. Economic and

social development of our country also increases electric demand. There are various production techniques to obtain this demand. Since some of these production techniques harm the nature, in general, reactions to these investments rise in society. With the reactions consisting in society, new approaches on energy production is carried out. Therefore renewable energy sources gain importance at the present time. Besides wind, solar, geothermal, biomass, biogas, wave, tidal power etc, electrical power can be produced by installing tribune to water purification systems. By installing tribune on water bearing one of two pipes to Selahattin Ereren Drinking Water Treatment Facility which is located in the basin of ÇAKMAK Dam and SASKİ-run, hydraulic energy will be obtained. The generated electricity will be transferred to the national electricity network in accordance with unlicensed electricity generation regulations. Thanks to electricity sales, an ongoing source will be created to SASKİ budget. Increase in resources will provide development of new projects of SASKİ and more infrastructure services.

Specific purposes: Creating infrastructure with renewable methods to produce electricity energy from Çakmak Dam which meets the need of Samsun province's drinking water to conveyance line brought onto Selahattin Ereren Drinking Water Treatment Facility.

Basic Activities:
1. Preparation of project management Office.
2. Procurement of Consultancy Services
3. Making a tender for construction work
4. Signing a contract with Contractor Company
5. Control of construction works and acceptance
6. Connection Agreement with Yedaş for electricity generation.
7. Promotion and informational activities.

Target Group(s) / client(s):
Energy Market Regulatory Authority (EPDK): Besides numerous tasks related to energy, it is a government institution tracking licensed and unlicensed electricity production and arranging its legal procedures. EPDK is government institution that purchases produced electricity on behalf of the state. Service a very wide area. Output of our project 575 kw hours of electricity will be transferred to the responsibility of this institution's electrical network. Through this network, the institutions and persons will be beneficiaries.

Final Beneficiary(s):
People and institutions that are benefit last of the outputs, and outcomes provided under the Project. It is used widely by electric power industry, agriculture, trade, infrastructure, institutions and organizations in the services sector.

Expected result(s):
1. Electrical generation will be provided by mounting turbine inside the water pipes which is brought to Selahattin Ereren Drinking Water Treatment Facility from the

basin of Çakmak Dam and a facility transfers the electricity to main electric network will get ready.
2. Realizing an innovative application on renewable energy sources in Samsun province.
3. Producing 575 kWh electrical energy.
4. Creating new revenue source for increasing the infrastructure services of SASKİ.

Indicators that will be affected by the Project:
1. Annual amount of electricity produced by wave sourced, hydraulic and currents.
2. The rate of meeting the demand of the institutions' annual electricity needs.
3. The number of permanent employees within the Project.
4. The number of conducted seminars
5. The number of brochures printed and distributed
6. The number of printed signboard

3.5.3.2 Political initiatives

The goodwill and technical cooperation protocol has been signed among Samsun Metropolitan Municipality and Samsun Branch of the Chamber of Mechanical Engineers in order to mutually share current experiences on energy efficiency in buildings and to improve the content and quality of the BSBEEP Project activities, which will be implemented in accordance with project schedule. This goodwill and cooperation protocol might be described as the first protocol signed with the NGOs among the project partner countries in the framework of the BSBEEP project.

Samsun Energy Efficiency Platform will be established within the directive of Samsun Metropolitan Municipality by participation of all such relevant nongovernmental organizations as Samsun Branch of the Chamber of Mechanical Engineers, Samsun Branch of Energy Efficiency Association and others. Sustainability of BSBEEP Project will be guaranteed by establishing such political initiative as Samsun Energy Efficiency Platform.

Deep renovations are expensive on local basis of Samsun Province too, even if they are cost effective. They require considerable up-front capital that is normally beyond the support of any single financial instrument. Thus, there will be the need for some form of bundling.

New strategies to secure sufficient financing for the deep renovation of the existing building stock in Samsun are needed which ideally bring together private and public investment streams.

Local policy-makers and the relevant stakeholders in the building sector on the local basis of Samsun Province, e.g. the real estate community, should elaborate which policy framework would enable the necessary investments. This would not only create new investment opportunities for the private sector but would also reduce the burden on Samsun Metropolitan Municipality budgets. Undoubtedly, more innovative ideas and initiatives will be necessary on the local basis of Samsun. Political initiatives for Samsun on local basis listed as follows:

<u>Samsun Branch of Energy Efficiency Association</u>

The energy efficiency in the industry is very important from the point of view of international competition power. In order to enhance the energy efficiency in the industry, researches are made in the fields such as; energy accounting, control systems, insulation, new technologies and industrial processes, raw material properties, product varieties and specifications, climatic conditions and environmental effects, capacity utilizations.

Furthermore, application and evaluation works to influence the electricity consumption in quantity and time aspects are underway. These works are named as demand management. Any one or several of the demand management works that are carried out in three methods could be applied jointly. The technical precautions that

is one of the methods; include the fields like, high efficiency providing illumination, high efficiency motors, cooling systems, building insulation. Second method is the provision of the information and the lack of information of the consumers is eliminated by the prepared technical documents. Provision of information includes the subjects like; directing the works related to the reduction of the demand for energy in the centers of energy efficiency, to advise, to organize educational courses and seminars and the promotional works to encourage the utilization of equipment that consume the energy efficiently. The third and the most applied method is, to make different tariffs, to change the consumption structure and to price according to the time of utilization or the quantity of utilization.

The precautions to be taken in the industry sector are as follows:

- Changing of the fluorescent and mercury vapor bulbs to high pressure sodium bulbs, in the process illumination.
- Adjust the climatization units in the sections of low personnel activity, in the night shift working establishments.
- When not required, shut off exhaust fans, furnaces, motors etc.
- Provide the compressor air inlets from the colder areas instead of hot equipment chambers.
- The enhancement of the efficiency and paybacks are interesting.
- The steam and compressed air leaks are very costly for the establishment. These must be determined by regular audits.
- The careful monitoring of the excess air coefficient which is the heart of the combustion air provides considerable energy savings.
- Big savings can be achieved by improvement of the power factor according to the establishment tariff structure and power factor.
- Considerable savings can be obtained by the insulation of the process lines and the tanks.
- Especially when it is the case for new applications, utilization of energy efficient motors, amortizes itself in a short period of time.
- In case the pressures had been designed redundantly, reduction of the pressure will not heat the process and great savings are in the picture.
- In general the industrial installations are insufficiently insulated. Proper insulation means big savings.
- In large compressors the heat discarded by air and water cooling, can be used in space heating especially in winters, by suitable designs.
- The plastic stripes, door buffers and air curtains help blocking the infiltration from the large entry doors.
- The economizers provide optimum utilization of the outside air. The savings from their utilizations are great.
- The payback from the radiant heaters utilized for the partial heating, instead of heating the whole spaces is attractive.
- The closure of the heated open spaces leads to big energy savings.
- The little modifications to be made in the timings of the equipment, reduces the demand loads considerably.
- Spot climatization reduces the required climatized air quantity.

Samsun Branch of the Chamber of Mechanical Engineers

Chamber Membership: All of the engineers, who have graduated from any faculty or department of Mechanical Engineering, Industrial Engineering, Management Engineering, Aircraft Engineering, Aeronautical and Aerospace Engineering, legally authorized to perform their art and profession within the borders of Turkey, are entitled to the membership of Chamber Mechanical Engineers.

The Chamber membership of the workers of governmental establishments and organizations and Public Economic Enterprises is left to the preference of the individuals, in accordance with the 135th article of the 1982 Constitutional Law. Chamber membership is a must for all other engineers, not included in this scope, in order to practice in this area of profession.

A committee discusses the applications of foreign engineers for chamber membership. The foreign engineers are granted a temporary membership, limited with their employment period in Turkey.

Publication Activities

Periodicals
Periodicals of "Engineer and Machinery", "Industrial Engineering" and "H.V.A.C and Sanitary Engineering" are published and one of these periodicals is delivered to our members free of charge according to their preference. Subscription possibilities are available in case of any member of the Chamber also wants to buy other periodicals. Information on both of the professional & technical developments and chamber activities & policies are transferred to our members by means of these periodicals.

Engineers and Machinery
Industry, factory an plants originated articles of applications are also published in addition to the articles those are sent from the universities and scientific and research institutions; on this periodical, which is unique in its field in our country with 22.000 number of copies printed and 44 years of publication life. The qualities of the articles like inclusiveness of the latest technological developments and being readable by the majority of our members who are working in several different expertise fields are taken into account during the process of content determination. In accordance with our publication policy, the published articles are been evaluated by the expert umpires of the subject.

Period: Monthly
Number of Copies Printed: 22.000
Delivery: Members, subscribers, related departments of the universities, public establishments and governmental organizations.

Industrial Engineering
This periodical has been published since 1989 and it covers articles related with theoretical and practical applications of industrial and management engineering

Period: 3 Month
Number of Copies Printed: 3.000
Delivery: Members of industrial and management engineers, subscribers, related departments of the universities, public establishments and governmental organizations.

H.V.A.C. and Sanitary Engineering
This periodical has been published since March 1993 for our members working in HVAC and sanitary application. It covers technological developments about this area, sector news and Chamber facilities.

Period: 2 Month
Number of Copies Printed: 5.000
Delivery: Members, subscribers, related departments of the universities, public establishments and governmental organizations.

Books:
Since its foundation the Chamber of Mechanical Engineers have published 300 books about our profession areas for our members and students. Therefore our Chamber has become an important source of technical publications in Turkey.

Our Chamber carries on studies about internet which is the most effective and rapid communication tool of nowadays for three years. The technical services and facilities carried out by our Chamber, Chamber Boards and Commissions, Chamber publications and books, and news related with the Chamber and our members can be reached from our web site.

Technical Services Carried Out By The Chamber:

Licensing
· Licensing of engineering projects and consulting offices
· HVAC and Sanitary Engineers Professional License
· Automotive Engineers Professional License
· Licensing of mechanical engineers working in design and production of elevators

Controlling Professional Activities Our Members
· Endorsement of HVAC, Sanitary, Natural Gas Projects
· Endorsement of Elevator Projects
· Endorsement of Motorized Vehicle Revision Projects

Controls and Measurements
· Periodic Controls of all kinds of compressed reservoirs and lifting devices
· Flue Gas and Pollutants Measurements of Plants, and

Vehicles
· Gas Leakage Control of vehicles running with LPG.

Education Activities

Since technology develops rapidly nowadays, engineers in production process must be re-new themselves according to these developments. This situation necessitates continuous education for engineers. Our Chamber carry out this mission by giving courses to our members by means of Center of Profession Education founded in the structure of Chamber of Mechanical Engineers.

Courses Given by Center of Profession Education in Chamber of Mechanical Engineers:

· Automotive Engineering
· Conversion of vehicles from gasoline to LPG
· Conversion of vehicles from gasoline to CNG
· Designing, Producing and Installing of Elevators
· Application and Design Projects of Natural Gas
· Application and Design Projects of LPG
· Swimming Pool Design
· Industrial Laundry Design
· Industrial Kitchen Design
· Heating, Sanitary and Heat Insulation
· Automatic Control
· Air-Conditioning
· Ventilating
· Refrigerating
· Fire engineering
· Heating Systems with Steam, Super-heated Water and Super-heated oil
· Pressurized air installations
· Refining installations
· Safety and Security of Working conditions
· Hydraulic and Pneumatic
· Welding
· Courses to engineers working at food industry

Conventions, Exhibitions, Symposiums

Name of the Activity and Secretary Branch:
- Union of Chambers of Turkish Engineers and Architects Industrial Convention Chamber Center
- Student Member Council Chamber Center
- Maintenance Technologies Convention and Exhibition
- Conveying Technologies Convention and Exhibition
- National HVAC and Sanitary Convention and Exhibition
- National Aeronautical and Aerospace Engineering Council
- National Industrial and Management Engineering Council
- Work Safety and Security Convention
- National Welding Technologies Convention
- Machine Design and Production Technologies Convention

- South East Anatolian Project and Industry Convention
- Iron-Steel Symposium
- National Hydraulic and Pneumatic Convention and Exhibition
- Mechanical Engineering Education Symposium
- National Metrology Convention
- Quality Symposium
- New and Renewable Energy Sources Symposium
- Insulation and Energy Management Convention
- Natural Gas Convention
- Heating Science Technologies and Solar Energy Systems Symposium
- Transportation and Traffic Convention
- Paper Industry Symposium
- Automotive and Spare-Industry Symposium
- LPG and CNG Applications Symposium
- Civil Construction Machines Symposium

Samsun Branch of the Chamber of Electrical Engineers

The Chamber of Electrical Engineers (EMO) has been established in 1954. The establishment is based on the UCTEA Law No.6235. It is a professional organization defined in the form of a public institution as stated in the Article 135 of the Constitution. It is one of the 23 constituent chambers of the Union of Chambers of Turkish Engineers and Architects.

EMO represents Electrical, Electronics, Computer, and Biomedical Engineers and has members over 46000. EMO Headquarters is located in Ankara. It has branches in Adana, Ankara, Antalya, Bursa, Denizli, Diyarbakır, Eskişehir, Gaziantep, Kocaeli, İstanbul, and İzmir, Mersin, Samsun and Trabzon. Additionally, The Chamber of Electrical Engineers is a widespread organization, having representatives and professional control offices in provinces and districts among the country.

Objectives of EMO

1. To create solutions for members considering current needs, conditions and facilities; make efforts for the profession to be practiced and developed according to the interests of members, society and the country; preserve honesty and morality in relations with members and other professional chambers; set up and defend policies for the common good in the field of profession; form public opinion; warn relevant authorities.

2. To make all necessary attempts at securing public and national interests; finding, protecting and operating natural resources of the country; increasing agricultural and industrial productivity; protecting the environment and supporting artistic and technological improvements.

3. To collaborate with public authorities and other organizations in order to protect the interests of the profession, the country and the members; to take legal steps related to the professional field when necessary.

4. To protect the rights and authorization of members, provide solidarity among the members, prevent unfair competition.

5. To examine and analyze standards, norms, regulations, technical specifications, contract types and similar documents related to the profession; change, improve and modernize them.

6. To make recommendations to public authorities and the Union about preparation and modification of the laws, rules and regulations concerning the activities of the Chamber.

7. To improve theories and practices of art and science concerning the profession.

8. To provide educational services related to the profession for members; construct and operate training institutions; organize courses, national and international fairs, seminars, congresses, exhibitions; give certificates to participants.

9. To audit professional services and products to improve their quality; set up calibration and test laboratories.

10. To provide facilities for social and cultural activities to members.

11. To serve as expert, arbitrator or consultant about the professional field at courts of law.

12. To introduce the profession to students who study in the related engineering branches; let them benefit the facilities and resources of the Chamber, such as courses, internship, social activities; examine problems of engineering education and students; offer solutions.

13. To work in collaboration with universities and the industrial sector; organize collective events.

Membership Requirement

- Those who graduated from electrical, electronic, electrical-electronics, computer, control, communication, telecommunication, biomedical, software, information systems and microelectronics engineering departments of universities in Turkey and universities abroad which are accredited by The Council of Higher Education (YÖK) can become members.
- The undergraduate degree is referred for membership.
- One has to be a citizen of The Republic of Turkey to become a full member.
- The following must be submitted in order to apply for membership:
    - For Turkish citizens; Copy of diploma or graduation certificate approved by a notary or the faculty (Those who graduated from a university abroad must also submit a notarized copy of the accreditation certificate taken from The Council of Higher Education.)

  - Copy of identity card (with the original)
  - Three photos
  - Registration form (available in the branch office)
  - Registration fee (35 TL)
  - Membership payments from graduation to registration date (9 TL/month, retroactive up to 5 years)
- Law on UCTEA 6235: Article 33: One has to register for the relevant Chamber in order to carry on professions of engineering and architecture. According to the Law 6235, foreign engineers who are allowed to work in Turkey must become temporary members. Chamber General Assembly may confer honorary membership to people who work for achieving the objectives of the Chamber. Foreign engineers who will apply for temporary membership must submit the work permit taken from the Ministry of Public Works and Settlement, in addition to the documents listed above. Registration and membership fees are different for foreign engineers.

Student Membership

You can apply for student membership to the nearest EMO unit with your identity card, student ID and two photos. Student membership is free of charge.

Structure and Mission of the Chamber

- Decision Making and Executive Bodies
- General Assembly
- Executive Board
- Honorary Board
- Inspection Board
- Supporting Bodies
- Coordination Council
- Scientific Board
- Editorial Board
- Commissions

General Assembly

The General Assembly convenes biennially in February. It is composed of delegates, who are elected in Branch General Assemblies, in addition to regular delegates. The following must be on the meeting agenda of the General Assembly:
a) Election of the Presidential Council
b) Reading operating, financial and audit reports
c) Election of the Chamber Executive, Honorary, Inspection Boards; and candidates for UCTEA General Assembly, Executive, Inspection, High Honorary Boards.

Executive Board

The Board consists of seven full and seven alternate members. It implements the decisions taken in the General Assembly; attends Branch General Assemblies when necessary; provides communication and coordination with UCTEA; calls Honorary and Inspection Boards to duty when required; represents the Chamber and the members in lawsuits.

Honorary Board
It consists of five full and five alternate members; works in order to keep the activities of the Chamber in accordance with the laws and regulations; takes decisions and precautions about members who act contrary to ethical and moral principles of the profession.

Inspection Board
The Inspection Board consists of seven full and seven alternate members. It audits the accounts and relevant activities of the Chamber at least on a quarterly basis; prepares reports and presents it to the Executive Board.

Coordination Council
The Council aims to provide coordination among executive units of the Chamber. It consists of UCTEA Executive Board representative, Chamber Executive Board, Branch Executive Boards and if required, full members of the Chamber Honorary and Inspection Boards.

Scientific Board
The Chamber Scientific Board has been established in order to analyze scientific and technical issues and the main problems of the profession, and offer solutions. It is composed of two members from each Branch Executive Board and the members of the Chamber Executive Board.

Editorial Board
The Editorial Board is responsible for Elektrik Mühendisliği Dergisi, Cumhuriyet Enerji and other professional publications. It defines the editorial policies of EMO.

Commissions
Chamber Executive Board constitutes commissions for various activities to be carried out efficiently. The Board appoints people to take place in commissions. The commissions are liable to the Executive Board.

Branches
The branches have been established in order to improve the relations of the Chamber with its members. Structure of Branches:

- Branch General Assembly
- Branch Executive Board
- Branch Inspection Board
- Supporting Bodies
- Branch Coordination Council
- Branch Advisory Board
- Commissions

Branch General Assemblies convene biennially. They consist of members of the corresponding branches. The following must be on the meeting agenda of the Branch General Assemblies:

a) Election of the Presidential Council
b) Reading operating, financial and audit reports
c) Determination of Branch Executive Board and Chamber General Assembly candidates, elections

Branch Executive Boards have seven full and seven alternate members. The following are the main duties of Branch Executive Boards:
1) Execute the decisions taken in the Branch General Assembly
2) Represent the Chamber in the area of responsibility
3) Set up commissions when required
4) Take measures to protect honors, rights and interests of members
5) Cooperate with the Chamber Headquarters
6) Audit the Chamber Representatives within the area of responsibility
7) Call the Branch General Assembly for a meeting if required

3.5.4 Tekirdag (local level)

3.5.4.1 Funding programs

Energy sector has traditionally been under the authority of the central government in Turkey. All decisions regarding investments in generation, transmission and distribution have traditionally been taken by the central government and similarly all legislation regarding energy efficiency has always been undertaken by government programs. Specific local finance opportunities do not exist in Turkey except perhaps for the rather recent establishment of the 'Development Agencies' that are now directly connected to the Ministry of Development. Thrace region has one such agency overlooking the whole of the region and the mandates of the Thracian Development Agency typically cover energy efficiency and renewable energy topics. It is possible for Municipalities in the Region to apply and receive grants regarding low carbon development in the building sector particularly municipally owned building stock.

3.5.4.2 Political initiatives

The stakeholders and citizens' opinions and expectations from the executive power of Tekirdağ are listed as follows[54];

- environmental protection and main utility services
- the protection and improvement of green areas
- resolving infrastructure issues
- solving the problem of traffic and transport
- emphasis and promotion of tourism
- effective structural services in compliance with the demands of the public
- cultural activities
- zoning and town planning services
- contribute to the solution of unemployment

[54] Tekirdağ Municipality Strategic Plan 2010-2014

Some of these expectations are already part of the legal obligations of the Municipality. The Municipality is planning to achieve the following targets;

- perform preventive health services continuously for the people of Tekirdağ
- increase the efficiency, productivity and qualifications of the personnel
- work in cooperation and coordination with NGOs
- increase recreation areas
- provide healthy and high quality drinking water
- increase the capacity of social services, institutional structure and social solidarity
- raise the quality of life in terms of public and environmental health by improvement o license audit and inspection services
- build, maintain and repair the main infrastructure of the city
- establish a sustainable and safe transportation system
- provide sustainable urban development compatible with the ecology
- collect waste on site on a timely manner and ensure recycling

Additionally the following actions should be taken;

- execute trainings and awareness programs especially on EE for residents, businesses and for industry
- develop effective network of training, counseling and consulting (chamber of engineers, other institutions, etc.)
- attract external resources for developing communal infrastructure
- enhance the capacity of personnel
- coordinate activities between other public institutions, NGO's

3.6 Ukraine

3.6.1 Funding programs (national level)

The programs of energy efficiency and emission reducing in Ukraine are funded from the following sources:

- government funding of the national programs aimed at improving energy efficiency and reducing emissions;
- funding from the regional and local budgets;
- funds directed to reduce emissions under the Kyoto Protocol;
- preferential loans, including international organizations;
- grants from international organizations, designed to stimulate the processes of increasing energy efficiency and reduce emissions.

The requirement for co-financing projects in a certain proportion for each project participant is often mandatory. In Ukraine, there are now several national and sectoral programs with the tasks of increasing energy efficiency in the construction and communal services sectors:

- The state target economic program for energy efficiency and the development of energy generation from renewable energy sources and alternative fuels for 2010-2015;
- The program of reforming and developing housing and communal services for 2009-2014;
- The sectoral program of efficiency and conservation in the residential sector for 2010-2014;
- The sectoral energy efficiency program in construction for 2010-2014.

The activities, objectives and indicators of the state target programs of the Ukraine are also included in to the programs of developing the Autonomous Republic of Crimea, other regions, districts, cities. The state target economic program for energy efficiency and the development of energy generation from renewable energy sources and alternative fuels for 2010-2015 by the decision the Cabinet of Ministers of Ukraine No. 243 of March 1, 2010 has been approved. The program includes[55]:

- creating the conditions for approximating the energy intensity of the gross domestic product of Ukraine to the level of the developed countries and the European Union standards;
- reducing the energy intensity of the gross domestic product during the term of the program by 20% compared to 2008 (3.3% annually);
- increasing the use of efficiency energy resources and the competitiveness of the national economy;
- procedures for optimizing the energy balance in which the share of energy produced from renewable energy sources and alternative fuels in 2015 will be

[55] Про затвердження Державної цільової економічної програми енергоефективності і розвитку сфери виробництва енергоносіїв з відновлюваних джерел енергії та альтернативних видів палива на 2010-2015 роки. Available at: http://zakon1.rada.gov.ua/laws/show/243-2010-%D0%BF

not less than 10 percent, by reducing the share of imported fossil energy, particularly natural gas, and their replacement for alternative energy resources (including secondary ones), provided by programs funds.

For housing and communal services in the program the following main tasks are identified:

- carrying out the rehabilitation of residential houses, buildings and social institutions that are completely funding the state budget, including the development of design documentation;
- carrying out the rehabilitation of social facilities which are fully maintained at the expense of local budgets;
- developing model projects on modernization and replacement of boilers with their transfer to alternative fuels and heat pumps;
- implementing the technologies of heat accumulation, electrical heating for objects of communal property and social sphere;
- implementing cogeneration technologies using alternative fuels for municipal heating;
- promoting the population to the introduction of energy-efficient equipment, technologies, materials and execution of the works on loans obtained in financial institutions.

The fund of the programs is 346 billion hryvnia (UAH), including 7.7 billion – at the expense of the state budget, 15 billion UAH – at the expense of local budgets, 323.3 billion UAH – from other sources (see the Table 3.6-1).

Table 3.6-1: Planned volumes and sources of funding.

Sources of funding	Volumes of funding, billion UAH	Years					
		2010	2011	2012	2013	2014	2015
State budget	7.7	0.6	0.91	0.827	1.77	1.77	1.85
Local budgets	15	1.8	2	2.3	2.65	2.95	3.3
Other sources	323.3	6.78	27.94	40.58	62.88	86.41	98.72
Fund of the programs	346	9.18	30.85	43.71	67.3	91.13	103.87

Funding of the programs from the state and local budgets for each year is specified within the possible limit of costs. The program of the reform and development of housing and communal services for 2009-2014 has been approved by the law of Ukraine on June 24, 2004 No. 1869-IV[56].

The purpose of the program is to identify the principles of implementing the state policy of reforming housing and communal services, implementing the measures to

[56]Про Загальнодержавну програму реформування і розвитку житлово-комунального господарства на 2009-2014 роки. Available at: http://zakon2.rada.gov.ua/laws/show/1869-15

improve the efficiency and reliability of its functioning, sustainable development to meet the needs of the population and economic complex of housing and communal services in accordance with the established world and national standards. The main objectives of the program are:

- to develop the mechanism of state regulation of natural monopolies in the market of public services;
- to form the housing policy and to create the competitive environment;
- to implement the comprehensive reconstruction of blocks (neighborhoods), obsolete houses;
- to attract investors on a competitive basis;
- to ensure breakeven operation of housing and communal services;
- to implement technical re- housing and communal services;
- to use the specific indicators of energy and material resources necessary for the production (provision) of utility services;
- to create the effective and transparent mechanism for promoting the use of alternative energy sources and fuels;
- to attract investments, cooperation with international financial institutions and donor organizations;
- to involve public at large to the processes of formation of housing policy, housing reform and others.

The program is financed by the state budget, local budgets, funds of enterprises and other sources not prohibited by the legislation, as well as by introducing special tax regime to value added tax of utility services and / or services for the supply of heat energy (see the Table 3.6-2).

The sectoral program of energy efficiency and energy conservation in housing and communal services for 2010-2014 has been approved by order of the Ministry of Housing and Communal Services on November 10, 2009 N 352[57].

Table 3.6-2: Planned volumes and sources of funding.

Tasks	Activity	Planned volumes of funding, million UAH	Years				
			2010	2011	2012	2013	2014
1. Scientific and technical support of objectives of the		20	10.0	6.5	2.0	1.0	0.5

[57] Про затвердження Галузевої програми енергоефективності та енергозбереження у житлово-комунальному господарстві на 2010 - 2014 рр. Available at: http://document.ua/galuzeva-programa-energoefektivnosti-ta-energozberezhennja-u-nor17772.html.

program. Regulatory support of objectives of the program							
2. Retooling objects for housing and communal services Fund of the projects:		23325.9	2900.7	5977.0	6751.6	5118.1	2578.5
Including:	1) Promotion of the implementation of investment projects:						
	• Repair and reconstruction of residential buildings with energy-efficient technology and equipment;	1758.0	227.2	383.1	339.5	420.0	388.2
	• Reconstruction of centralized water and wastewater systems using energy-efficient equipment and technologies;	1415.2	340.3	586.5	227.6	140.8	120.0
	• Reconstruction of the heat supply systems using energy-efficient equipment and technologies;	2850.8	686.3	1182	458.7	283.8	240.0
	• Land improvement of district centers and small towns	3163.9	352.3	799.1	1345.9	546.6	120.0
	• Energy conservation, urban electric transport	932	180	192	204	204	152
	2) Providing equipment of controlling and regulation of water and heat energy for houses	1042.2	179.7	262.7	444.1	115.7	40.0
	3) Facilitating the development and implementation of the pilot (innovative)	808.3	149.5	285.8	132.9	122.0	118.1

	projects in housing and communal services, aimed at improving the management of the housing stock, reducing processing costs and the loss of resources, the introduction of advanced technologies						
	4) State support for investment projects of technical upgrading and overhaul of apartment buildings with participation of condominium;	10580.5	685.4	2060.8	3373.9	3060.2	1200.2
	5) Partial repayment of principal and interest on loans, lease payments;	1000	100	225	225	225	200
3. Cooperation with international financial institutions and donor organizations; Fund of the projects:	Development of institutional mechanism of cooperation with international financial institutions and donor organizations.	8	2	2	2	1	1
4. Public involvement in the processes of formation of the housing policy and housing reform		9	3	2	2	1	1
5. Development of mechanism of state regulation of natural monopolies in the market of public services	Training for local government officials and public employees on issues related to the reform and development of housing and communal services	2.1	0.5	0.5	0.5	0.4	0.2
Total of:		23365.0	2916.2	5988.0	6758.1	5121.5	2581.2

The program aims at addressing the problems of increasing efficiency and reducing the energy consumption of housing complexes. The main goal of the program is to reduce volumes of energy use for heating in residential and public buildings and facilities, to increase the volume of use of alternative and renewable energy sources, to innovate technical, technological, organizational decisions, to use economically attractive conditions for investing in to the projects of housing and communal services. The main tasks of the program are:

- systematic reduction of energy consumption of products, works and services (3-5% in accordance with the objectives of "The energy strategy of Ukraine until 2030");
- improvement managing production, supply and consumption of heat and electricity in the industry;
- provision of prioritization of technical, technological, economic innovations in the field of energy efficiency and conservation;
- creating systems of energy audit, models of energy supply to industries for improving the legislative, regulatory, technical and economic activities;
- providing equipment of control and regulation;
- implementation of pilot projects and the most effective solutions for the production and consumption of energy resources in the industry;
- decrease in the loss of energy, heat and water in municipal utilities;
- promoting the establishment of energy management system of municipal heating systems, etc.

Program funding is implemented in the following directions:

- creating a regulatory methodological and scientific-technical base at the expense of the State budget of Ukraine for financing of applied research, tasks of government programs;
- standardization of works and projects of mass application;
- creating a serial production of modern energy efficient materials, machinery and equipment from the State budget of Ukraine (partially);
- introducing modern energy efficient technologies, machinery and equipment, taking other energy-saving measures at the expense of local budgets, enterprises own funds (including the share of funds received by the savings FER), investment grants from international organizations, individuals, etc.

The volume of financing technical activities of the program (2010-2014) is 10800 mln UAH. The sectoral program on energy efficiency in buildings for 2010-2014 was approved by the order of the Ministry of Regional Development and Construction of Ukraine of June 30, 2009 No. 257[58].

The program provides for the establishment of the targeted actions aimed at improving the energy situation in Ukraine and ensuring universal values – saving the planet for future generations. The program also provides for the harmonization of national regulatory frameworks with the EU requirements for energy efficiency in

[58]Про затвердження Галузевої програми енергоефективності у будівництві на 2010 - 2014 роки. Available at: http://document.ua/pro-zatverdzhennja-galuzevoyi-programi-energoefektivnosti-u--doc1166.html.

buildings. The program is the tool of “The energy strategy of Ukraine till 2030” in the construction industry. The program aims at creating the conditions for:

- optimization of the energy balance of the construction industry;
- reduction of specific energy consumption of buildings to the level of the developed countries in the world;
- reduction of energy consumption per unit of domestic building materials and products;
- reduction of operational losses of energy and water resources on construction sites;
- reduction of the state share in the energy balance of the natural gas sector through the use local renewable energy and alternative fuels;
- reduction of budget costs for the use of energy and water resources in budgetary institutions;
- harmonization of the regulatory framework of energy efficiency construction projects with European norms and standards.

The main tasks of the program are:

- development and improvement of the legal and regulatory framework to ensure the energy efficiency of construction projects;
- creation of the regulatory basis for the introduction of an energy audit and energy certification of construction projects;
- development, implementation of training and certifying energy auditors construction projects;
- development of the National Register and use of results of energy audits of housing and civil objects;
- creation of regulatory basis for the introduction of monitoring compliance with the minimum requirements on the energy performance of housing and civil objects;
- creation of basic design decisions of energy efficient buildings and equipment, the creation of conditions for their distribution in the regions of Ukraine;
- development of organizational methods and the introduction of monitoring compliance with laws and regulations on energy efficiency;
- development of maximum allowable consumption of fuel and energy resources per unit of production for construction purposes;
- development activities for integrating of regional features of energy efficient solutions in construction;
- creation of the conditions for experimental verification of energy efficiency equipment, systems engineering, architectural and structural systems, etc.;
- analysis of the characteristics of products and status production of equipment for heating, hot water and cooling systems using alternative and renewable energy sources (solar, heat pumps, etc.);
- creation of structural units in the sphere of energy management;
- replacement or heat insulation of exterior doors and windows;
- equipping windows with systems of shading;
- heat insulation of enclosures;
- modernization or replacement of heating systems in public buildings;

- replacement of incandescent light bulbs for energy-saving lamps;
- introduction of integrated monitoring.

Planned volumes and sources of funding are showed in the Table 3.6-3.

Table 3.6-3: Planned volumes and sources of funding.

Planned sources of funding	Planned volumes of funding, million UAH	Years				
		2010	2011	2012	2013	2014
Own funds of companies	2130	450	450	400	400	430
State budget	5430	1100	1100	1050	1050	1130
Local budgets	10310	2070	2070	2060	2060	2050
Loans, grants, etc.	140	40	50	50	-	-
Other sources	490	150	150	150	40	-
Total:	18500	3810	3820	3710	3550	3610

Financing energy efficiency in the construction sector and for the housing and communal services are also financed through projects and programs that are implemented under the auspices of the National Environmental Investment Agency of Ukraine in the framework of the United Nations framework convention on climate change and the Kyoto protocol[59].

To reduce the assigned amount of emissions of greenhouse gases (GCC), the Japanese side agreed to fund 536 different projects in 24 regions of Ukraine worth $ 3813.5 mln. The expected (annual) reduction in greenhouse gas emissions is 116.9 thousand tons of CO2-eq.The projects include among others:

- 529 projects for overhauling social facilities (insulation of facades and roofs, replacement of windows and doors) totaling 1920.9 mln, which are carried out mainly in the educational and healthcare institutions in almost all the regions of Ukraine;
- the project of re-equipping fixtures based on incandescent lamps on LED technology in Novograd-Volynsk and Zhytomyr region (23.4 mln.);
- the project for reconstruction of the boiler No. 165 with using heat pumps, Dzerzhinsk and Donetsk region (62.3 mln.);
- the project for reconstruction of heat supply system in the neighborhoods "Sunny" and "Builder" in Gorlovka, Donetsk region (1 turn) (149.7 mln.);
- the project for the introduction of energy efficiency with the use of modern high-performance technologies in GPU «International children's center «Artek»» (1 launch facility) (194.9 mln.).

[59]Державне агентство екологічних інвестицій. Проекти цільових екологічних (зелених) інвестицій. Оновлений звіт про реалізацію проектів за схемою зелених інвестицій в Україні. Available at: http://www.seia.gov.ua/seia/control/main/uk/publish/article/633387.

The joint implementation projects aimed at reducing anthropogenic emissions or increasing the absorption of greenhouse gases in accordance with article 6 of the Kyoto protocol to the UN framework convention on climate change have been approved in the following directions:

- reconstruction of heat and water supply systems – 22;
- reconstruction of TPP and CHP – 11;
- introduction of energy-saving light sources – 8.

Financing of projects aimed at improving energy efficiency in the construction sector and housing and communal services performed within programs the international organizations in Ukraine (Financing of important projects) is carried out:

- The United Nations Development Program (UNDP);
- The International Finance Corporation (IFC), a member of the World Bank Group;
- The European Bank for Reconstruction and Development;
- The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH;
- The European Investment Bank (EIB);
- The Housing Initiative for Eastern Europe (IWO);
- The World Bank;
- The European Commission;
- The United States Agency for International Development (USAID);
- The Nordic Environment Finance Corporation (NEFCO).

UNDP implements the following programs in Ukraine[60]:

- Capacity building for low carbon growth in Ukraine – the project aimed at supporting the Government of Ukraine in steering the country to a low emission pathway for Ukrainian long-term economic development. To this effect, the project will strengthen the institutional capacity of Ukraine to design and implement long-term policies and measures directed at reducing emissions of greenhouse gases and enhancing absorption by sinks;
- GEF small grants program in Ukraine – the GEF small grants program (SGP) embodies the very essence of sustainable development. SGP channels financial and technical support for activities that conserve and restore the environment while enhancing people's well-being and livelihoods;
- Transforming the market for efficient lighting – The project's foremost objective is resolving the key problems related to reduction of greenhouse gas emissions in Ukraine by the market transition to more energy efficient lighting technologies and gradual phase from inefficient lighting sources / fittings in residential and public buildings, schools; improvement of awareness and educational level of domestic consumers on energy-efficient lighting, reproduction and distribution of project results.

[60]UNDP in Ukraine. Environment & Energy. Available at: http://www.ua.undp.org/content/ukraine/en/home/operations/projects/environment_and_energy.html.

The International Finance Corporation implements the following programs in Ukraine[61]:

- Ukraine sustainable energy finance program – The program encourages investments in energy efficiency projects across the country. The project helps financial institutions and companies to assess modernization projects, and supports banks in building their internal capacity to develop new financial products to develop the market for energy-efficiency financing. By participating in public information campaigns, the project also raises general awareness about the need for greater energy efficiency in Ukraine;
- Promoting energy efficiency in Ukraine's residential housing – The IFC Ukraine residential energy efficiency project is designed to create an effective legal and institutional platform to support Ukrainian homeowner associations and housing management companies in obtaining the access to financing the energy-efficient modernization of multifamily buildings. Through the project, IFC aims a facilitating energy efficiency investments in Ukraine's residential sector.

The European Bank for Reconstruction and Development implements the following programs in Ukraine[62]:

- Legal EE infrastructure: Dnipropetrovsk – The EBRD is considered to provide a loan to the Municipal Energy Managing Enterprise of Dnipropetrovsk for financing energy service company (ESCO) energy efficiency investments in public buildings and street lighting in the city of Dnipropetrovsk;
- Luhansk district heating – The EBRD is considered to provide a loan to municipal district heating utility "Luhansk Municipal Communal Enterprise "Teplokomunenergo"", operating in the city of Luhansk to finance installation of individual sub-stations, network replacement with pre-insulated pipes, modernization of boilers and control systems, installation of monitoring and dispatching "SCADA" system. The project aims at significantly improving the energy efficiency, reducing energy losses, gas and electricity consumption and improving the quality of heat and hot water supply services in the city;
- Donetsk district heating project – The EBRD is considered to provide a loan to municipal district heating utility "Donetskmiskteplomerezha" operating in the city of Donetsk to finance installation of individual sub-stations, network replacement with pre-insulated pipes, modernization of boilers and control systems, installation of new gas engine units for simultaneous co-generation of heat and electricity, installation of dispatching and monitoring system. The project aims at significantly improving the energy efficiency, reducing energy losses, gas and electricity consumption and improving the quality of heat and hot water supply services in the city.

[61]International Finance Corporation. Europe, Middle East & North Africa. Europe & Central Asia. IFC in Ukraine. Available at: http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/countries/ukraine+country+landing+page.
[62] European Bank for Reconstruction and Development. Countries. Ukraine. Available at: http://www.ebrd.com/pages/country/ukraine.shtml

- Lviv district heating – The EBRD is considered to provide a loan to the municipal district heating utility operating in the city of Lviv to finance installation of individual sub-stations, network replacement with pre-insulated pipes, modernization of boilers and control systems, installation of new gas engine units for simultaneous co-generation of heat and electricity. The project aims at significantly improving the energy efficiency, reducing energy losses, gas and electricity consumption and improving the quality of heat and hot water supply services in the city;
- Ternopil district heating modernization – The EBRD is considered to provide a loan to the municipal district heating utility operating in the city of Ternopil to finance the installation of individual heating substations, installation of a bio-fuel boiler, modernization and rehabilitation of existing boilers and sections of networks, installation of controlling and monitoring equipment. The project aims at significantly improving the energy efficiency, reducing energy losses, gas and electricity consumption and improving the quality of heat and hot water supply services in the city of Ternopil;
- Zaporizhzhia energy efficiency project – The EBRD is considered to provide €12.5 million loan to finance the installation of new gas engine units for simultaneous co-generation of heat and electricity and the installation of individual heating stations at the building level in the district heating system of the city of Zaporizhzhia in Ukraine. The project is designed to increase the overall efficiency of the district heating system in the city of Zaporizhzhia and focus on reduction of fuel consumption. The transaction will have significant demonstration effect for other cities and utilities in Ukraine concerning ways to improve energy efficiency of district heating operations and reduce fuel consumption. It will also increase the penetration of combined heat and power technologies for which there exists a substantial market potential in the country;
- Zhytomyr district heating project – The proposed project involves the loan to the municipal district heating company “ZhytomyrTeploKomunEnergo”, the municipal enterprise wholly owned by the city of Zhytomyr in Ukraine. The loan will finance the rehabilitation and modernization of existing boiler houses, replacement of pipes, and introduction of new, compact individual heating sub-stations in residential apartment buildings in the city equipped with meters as well as installation of small co-generation plants;
- Ivano-Frankivsk district heating project – The EBRD is considered to provide a senior loan to Ivano-Frankivsk Teplokomunenergo, a district heating company wholly-owned by the city of Ivano-Frankivsk, to finance the priority capital expenditure programs aimed at reducing energy losses, reducing gas and electricity consumption and improving the quality of service of heat and hot-water supply system in certain areas in the city;
- Energodar district heating – The EBRD is considered to provide a senior loan to Energodar Teplovodocanal, a combined water and district heating utility company wholly owned by the city of Energodar, to finance the priority capital expenditure program aimed at reducing costs and increasing the quality of energy supply for the population. The project will include the change in

heating the town: not from a local thermal power plant to the nuclear power plant, which already serves the remainder of the city.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH implements the following programs in Ukraine[63]:

- Energy efficiency in buildings – the objective is to contribute to the reduction of primary energy use and associated greenhouse gas emissions in Ukrainian housing and construction sectors by improving national and local energy efficiency policies and practices for existing and new buildings. The project is advising the Ukrainian Government on drawing up draft legislation to increase energy efficiency in the construction sector and on developing financial support programs and incentive mechanisms for energy savings in buildings. At the regional level the focus is on introducing energy management systems in four pilot cities of Chernigov, Ivano-Frankivsk, Mirgorod and Novohrad-Volynskyi. The experience in energy efficiency in buildings is being shared between the regions in Ukraine through joint workshops with other cities;
- Energy efficient pilot project – The aim of the project is to develop and implement an energy efficient and resource protecting building concept for new building projects. They consult on planning, construction and running of a new complex of residential and office buildings in Kyiv. The complex, with a total area of approximately 158,000 sq m, will be completed in two phases. After completion of the construction work, the running costs, energy consumption and greenhouse gas emissions will be measured for an annual cycle, which will demonstrate how much is saved in terms of costs and energy compared with conventional buildings. The project will supervise the commissioning of the buildings' technical facilities to ensure their full potential, and instruct the future users and operating staff for the proper use of the new technology.

The European Invest Bank implements the following programs in Ukraine[64]:

- Green for growth fund II – The fund mission is to contribute to enhancing energy efficiency and renewable energy in the targeted regions, in the form of a public-private partnership with layered risk-return structure;
- Oschadbank loan for SMEs & mid-caps – A dedicated EIB loan to finance projects promoted by SMEs and mid-caps in Ukraine. The projects considered as priority under the Mandate (i.e. local private sector development, development of social and economic infrastructure, and climate change mitigation and adaptation) carried out by eligible promoters of any size can also be funded, provided that financing thereto does not exceed 30% of the overall EIB loan amount;
- Sberbank Ukraine loan for SMEs & mid-caps – A dedicated EIB loan to finance projects promoted by SMEs and mid-caps in Ukraine. The projects considered as

[63]Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Ukraine. Available at: http://www.giz.de/en/worldwide/302.html

[64]European Investment bank. Projects to be Financed. Ukraine. Available at: http://www.eib.org/projects/pipeline/index.htm?start=2008&end=2013&status=&region=&country=ukraine&sector=

priority under the EIB's External Mandate (i.e. local private sector development, development of social and economic infrastructure, and climate change mitigation and adaptation) carried out by eligible promoters of any size can also be funded, provided that financing thereto does not exceed 30% of the overall EIB loan amount;

- Erste group bank SME & energy env loan – A dedicated loan for SMEs (at least 70%), including an up to 30% tranche for small and medium scale energy/environment projects promoted by mid-caps and public entities through the Erste Bank Group's subsidiaries in Ukraine and Moldova.

The Housing Initiative for Eastern Europe implements the following programs in Ukraine[65]:

- Awareness raising campaign on energy efficiency for construction related stakeholders in Russia, Belarus and Ukraine (ARCEE) – The project activities include the following: to understand and discuss the limitations and opportunities to implement energy efficiency measures in the three countries Russia, Belarus and Ukraine; to present and discuss sound technical solutions under the current conditions, to provide expertise and knowledge about the measures for energy saving and efficiency enhancement by trainings in the target countries;
- Seminars "Energy efficient buildings" in support of owners of residential buildings in Ukraine, 2012-2015. Seminars of the "Energy efficient refurbishment of residential buildings" have been held in Ukraine in 2012-2013, in line with the educational conceptions of "Manager of energy efficient refurbishment".

The World Bank implements the following programs in Ukraine[66]:

- CTF in Ukraine – The objective of the CTF project preparation grant is to support the implementation of energy efficiency project under the CTF investment plan for Ukraine and, in particular, the scaling-up of municipal EE financing by helping to identify and resolve potential implementation issues and ensuring that municipal EE investments are based on sound analytical work and aligned with country priorities for poverty alleviation and social objectives;
- UA-energy efficiency – The development objective of the energy efficiency project is to contribute to improved energy efficiency by industrial and commercial companies, municipalities, municipal sector enterprises and energy service companies by facilitating sustainable financial intermediation for financing of energy efficiency investments. One of components of the project is as follows: Ukreximbank has a successful track record of lending to industrial companies for energy efficiency projects under a parallel credit line provided by the European Bank.

[65]Housing Initiative for Eastern Europe. Ongoing projects. Available at: http://www.iwoev.org/Projects.7.0.html?&L=1

[66]World Bank. Ukraine. All Projects. Available at: http://www.worldbank.org/en/country/ukraine/projects/all?qterm=&lang_exact=English&os=0

The European Commission implements the following programs in Ukraine[67]:

- The INOGATE Program – An "INOGATE Project" is the project supporting energy policy cooperation in the INOGATE Partner countries in the topics of the four INOGATE areas of cooperation: converging energy markets on the basis of the principles of the EU internal energy market taking into account the particularities of the involved countries; enhancing energy security by addressing the issues of energy exports/imports, supply diversification, energy transit and energy demand; supporting sustainable energy development, including the development of energy efficiency, renewable energy and demand side management; attracting investment towards energy projects of common and regional interest;
- The grant project "Sustainable energy planning in Eastern Europe and the Southern Caucasus – in the Covenant of Mayors – Moldova, Ukraine and Azerbaijan". The main goal is to reduce the dependence on fossil fuel in cities, improving the security of equipment, the opportunity to participate more actively in measures to mitigate the climate change by strengthening the ability of local authorities and relevant stakeholders in the planning of sustainable energy by developing "Action plan on sustainable energy» (SEAP).

The United States Agency for International Development implements the following programs in Ukraine[68]:

- Municipal heating reform project – The project assists the Government of Ukraine and local governments to create a financially viable and sustainable municipal heating sector, able to deliver reliable, quality heating services to the population, public institutions, and local industries;
- Partnership for cleaner energy project East Europe Foundation – USAID is partnering with the Dnipropetrovsk oblast and District Councils, and Donbas fuel and energy company to develop a five-year strategy to save energy and reduce CO2 emission in the manufacturing, agriculture, communal and housing sectors of Dnipropetrovsk oblast. Through demonstration projects, the project seeks to attract investment in energy efficiency and CO2 reduction technologies and disseminate knowledge and best practices.

The Nordic Environment Finance Corporation implements the following programs in Ukraine[69]:

- Energy saving credits – NEFCO offers small scale financing for energy saving measures in municipally owned buildings such as schools, day care centers, hospitals and sports facilities in Russian and Ukrainian municipalities. The maximum loan amount granted from this facility is the equivalent of EUR

[67]European Commission. Соглашение Мэров. Проекты и инициативы, связанные с Соглашением. Available at: http://www.soglasheniemerov.eu/about/related-initiatives_ru.html#3
[68]USAID. Ukraine. Environment and Climate Change Environment and Climate Change. Available at: http://www.usaid.gov/where-we-work/europe-and-eurasia/ukraine/environment-and-climate-change
[69]Nordic Environment Finance Corporation. Financing Instruments. Available at: http://www.nefco.org/financing/financing_instruments

400,000 in local currencies. The loan is provided in RUB in Russia or UAH in Ukraine. NEFCO can finance up to 90% of project costs;
- Cleaner production credits – The cleaner production investments aim at conserving raw materials and energy, eliminating toxic raw materials and reducing the quantity and toxicity of all emissions and wastes before they leave the process. Loans are provided both to private and municipal enterprises in Russia, Ukraine and Belarus;
- Testing ground facility – The Baltic Sea region testing ground facility (TGF) is a regional carbon finance facility structured as the public private partnership between governments and private sector utilities and industrial companies in the Baltic Sea region. It is a compliance vehicle which purchases ERUs (and some AAUs) from energy related and other projects on behalf of its investors.

3.6.2 Political initiatives (national level)

The basic political initiatives to ensure the cost-effective operation of utilities and conditions for introducing energy efficient technologies in the industry are set out in the program of economic reforms for 2010-2014 "Prosperous society, competitive economy, and effective state"[70]:

- transfer of regulatory functions in utility tariffs to the central level by creating a single independent regulator to increase the efficiency and transparency of regulation of the industry;
- gradual changes of tariffs for housing and communal services to the level that covers the economically justified costs and investment component;
- transition to a tariff model of reducing costs and resources, stimulating energy efficiency for both suppliers and consumers;
- reforming the system of social support.

Also it is proposed [64,71,72]:

- to develop and implement the programs supplying consumers with water meters, heat and gas;
- to eliminate the ban for collecting penalties for late payments;
- to form the legislative basis for developing associations of condominiums;
- to set up the center of promoting and supporting condominiums;
- to establish a fund for co-financing (the state and condominiums) overhaul of apartment houses;
- to develop public-private partnerships for infrastructure modernization;
- to develop standards of public services quality;
- to develop rules for assessing energy performance of construction projects;

[70]Програма економічних реформ на 2010-2014 роки "Заможне суспільство, конкурентоспроможна економіка, ефективна держава". Available at: http://zakon1.rada.gov.ua/laws/file/docs/5/d325760.pdf
[71]Енергетична стратегія України на період до 2030 року. Available at: http://zakon4.rada.gov.ua/laws/file/text/8/f197393n9.zip
[72]Про затвердження Галузевої програми енергоефективності у будівництві на 2010-2014 роки. Available at: http://document.ua/pro-zatverdzhennja-galuzevoyi-programi-energoefektivnosti-u--doc1166.html

- to develop manuals for tests and evaluation of energy efficiency indicators of construction projects;
- to develop mechanisms for promoting energy saving technologies, designs, products for construction projects;
- to develop procedures for the examination of new technologies and design solutions in terms of their energy efficiency;
- to develop new technologies in the construction and building materials industries;
- to establish a system of energy certification of construction projects;
- to provide scientific and technical support for the development, implementation and operation of new technical solutions to improve the efficiency of construction projects;
- to form a bank of normative technical documents concerning energy saving in the construction and operation of housing, civil buildings and structures;
- to analyze structures of construction industry enterprises for production development of efficient building thermal insulation and construction materials in the regions;
- to analyze the climatic characteristics of the regions of Ukraine to rational use of renewable energy sources and alternative fuels in the regions;
- to develop albums and catalogs of standard designs of buildings with higher rates of energy efficiency for all the regions of Ukraine.

3.6.3 Mykolayiv (local level)

3.6.3.1 Funding programs

Currently in Mykolayiv several programs are realized:

- The program of economic and social development of the city of Mykolayiv for 2011-2014;
- The program of development of housing and communal services of the city of Mykolayiv for 2010-2014;
- The program attracting of domestic and foreign investment for of the city Mykolayiv for the period up to 2017;
- The program of ensuring maintenance buildings and increasing the efficiency of services of the residents of hostels of the city of Mykolayiv for 2012-2015.
- Some activities are funded in Mykolayiv through existing the regional programs:
- The regional program of modernization of municipal heat power system for 2010-2015;
- The targeted program for improving energy efficiency of Mykolayiv region for 2010-2015.

The regional energy efficiency programs are implemented in accordance with decree No. 1567-r of the Cabinet of Ministers of Ukraine “On the programs of energy efficiency and reduction of consumption of energy resources” dated December 17, 2008, decree No. 891-r of the Cabinet of Ministers of Ukraine “On approval of the

2010 action plan aimed at implementation of the state regional development strategy until 2015" dated August 29, 2009.

"The regional program of modernization of municipal heat power system for 2010-2015" was approved by the decision of Regional Council of 6 August 2010 No. 5. The program aims are[73]:

- the rehabilitation, modernization and construction (if necessary) of new modern municipal heat capacities to improve their efficiency and reliability and reduce the cost of thermal energy;
- the reduction of energy consumption for thermal energy production, decrease of heat energy losses during transport, supply and consumption;
- the minimization costs of fuel and energy resources, in particular a reduction by 20-30 per cent natural gas consumption by saving (10-15 percent) and substitution to alternative fuels (10-15 percent);
- the optimization of the use of energy resources by enterprises of the municipal power system through the development of electric heating and the share of alternative and renewable energy sources;
- the optimization of consumer spending and budgets of all levels to pay for heat and energy resources.

The main tasks of the Program are:

- development and introduction of new resource-saving technologies to achieve energy savings and reduce the cost of production, transportation and delivery of thermal energy;
- development of heating schemes settlements and implementation of measures for optimization of heating systems;
- implementation of energy and environmental audits, technical surveys of municipal power system, energy certification of residential and public buildings, tracking activities on the modernization of municipal energy;
- installation of systems metering and control of heat, water, gas;
- creation of favorable conditions for attracting investment in the sector of municipal power system.

The financial resources for the implementation of the Program constitute 315.9 million UAH. Funding for the program is provided by:

- subventions of the state budget to local budgets for social and economic development of the regions, budgets and investment programs;
- the local budgets;
- the regional budget (determined by a separate decision of the Regional Council for a specific list of objects);
- own funds of enterprises of municipal power system;
- other sources not prohibited by applicable laws.

[73] Миколаївська обласна рада. Рішення обласної ради за 2010 р. XXXVIII сесія 06.08.2010 р. Про затвердження обласної Програми модернізації комунальної теплоенергетики на 2010-2015 роки. Available at:http://www.oblrada.mk.ua/index.php?option=com_docman&task=doc_download&gid=627&Itemid=437

"The targeted program for improving energy efficiency of Mykolayiv region for 2010-2015" approved by the decision of Regional Council of October 22, 2010 No. 2. Planned volumes and sources of funding are showed in the Table 3.6-4.

Table 3.6-4: Planned volumes and sources of funding.

Sources of funding	Volumes of funding, million UAH	Years					
		2010	2011	2012	2013	2014	2015
Own funds companies	608.907	0.0	95.287	156.022	148.540	102.729	106.329
State budget	697.489	5.700	112.844	131.029	140.109	150.988	156.819
Local budgets	83.106	0	20.351	17.681	17.333	14.107	13.634
Loans, grants, etc.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total of:	1389.502	5.700	228.482	304.732	305.982	267.824	276.782

The program aims are[74]:

- reduction of energy consumption per unit of output, work performed or services rendered;
- minimizing the cost of energy resources;
- reduction in the use of budget funds by the implementation of energy efficiency measures;
- optimization of the structure of production and consumption of energy resources to increase non-conventional fuels and renewable energy sources.

"The program of economic and social development of the city of Mykolayiv for 2011-2014" was approved by the City Council, No. 02/08 from 2010-12-30. The program aims are[75,76]:

- creating basic prerequisites for economic growth;
- attracting investment in the city;
- formation of maximal assistance to business;
- modernization of the infrastructure of the city;
- more efficient use of municipal property and land resources;

[74]Миколаївська обласна рада. Рішення обласної ради за 2010 р. XL сесія 22.10.2010 р. Про затвердження Цільової програми підвищення енергоефективності Миколаївської області на 2010-2015 роки. Available at: http://www.oblrada.mk.ua/index.php?option=com_docman&task=doc_download&gid=691&Itemid=437

[75]Нормативні акти Миколаївської міської ради та виконкому. Про затвердження Програми економічного і соціального розвитку м.Миколаєва на 2011-2014 роки. Available at: http://ngik.gorsovet.mk.ua/ru/showdoc/?doc=16359

[76]Нормативні акти Миколаївської міської ради та виконкому. Про внесення змін та доповнення до рішення Миколаївської міської ради від 30.12.10 No. 2/8 «Про затвердження Програми економічного і соціального розвитку м. Миколаєва на 2011 – 2014 роки». Available at: http://ngik.gorsovet.mk.ua/ru/showdoc/?doc=21224

- ensuring stability of environmental conditions.

The objectives and priorities of the program in housing and communal services for 2011-2014 are as follows:

- introducing energy-saving technologies;
- improving the management system in the communal area of the city;
- creating associations of condominiums and attracting people to the maintenance of the housing stock;
- stimulating the creation of associations of condominiums;
- changing the mentality of the residents in relation to the environment;
- more efficient use of energy and other resources, reducing energy production, increasing energy efficiency in buildings, creating incentives and conditions for the transition on economical use of energy resources;
- encouraging innovation, investment and energy conservation for business entities;
- raising funds for the development of the industry.

The ways and measures to solve the main problems and goals:

- introduction of new tariffs for maintenance of buildings, structures and adjacent territories under applicable laws;
- continuation of the development of the competitive environment of housing and communal services;
- preparation of proposals for the government for changes of the rules for the provision of services on the contents of houses and adjoining areas, and development of systems standard contracts at the state level;
- preparation of proposals for the government for the approval at the state level of testing the quantity and quality of housing and communal services;
- development of community organizations to manage housing and communal services and creation of the material-technical base for them;
- creating the data bank of specialists, namely the manager in Good Governance in housing and communal services;
- continuation of the adoption of departmental housing in communal property, including dormitories of organizations in accordance, with the law;
- improvement of work of urban settlement center and the single database of consumers of utility services;
- improvement of the procedure for obtaining grants for reimbursement for housing and communal services, the purchase of liquefied natural gas, solid and liquid stove fuel;
- retooling housing for reducing the use of energy and material resources on the production of housing services, development of the mechanism for promoting the use of alternative energy sources and fuels;
- training of residents of condominiums, for effective work in the sphere of housing and communal services;
- attracting additional investment flows to solve problematic issues of housing communities;

- enforcing energy efficiency measures in housing and communal services at their own expense and investments;
- preparation technical certificates for residential buildings, as well as the introduction of electronic certification of buildings, etc.

"The program of reforming and development of housing and communal services in Mykolayiv for 2010-2014" has been approved by the Council of Mykolayiv City, the decree number 48/12 of 02.09.2010[77].

The main objectives of this program are to increase the efficiency and reliability of the housing and communal life support systems of the city's population, improving the quality of housing and communal services, and improving the management of enterprises and organizations of housing and communal services. Planned volumes and sources of funding are showed in the Table 3.6-5.

Table 3.6-5: Planned volumes and sources of funding.

Sources of Funding	Volumes of funding, thousand UAH	Year				
		2010	2011	2012	2013	2014
Total	1329996.53	118547.60	261982.00	287850.63	318617.00	342999.30
Local budget	925879.00	95693.30	177636.55	196460.88	217727.69	238360.57
Other sources	404117.53	22854.30	84345.45	91389.75	100889.31	104638.73

The main tasks of the program are as follows:

- harmonization of the economic interests of the state and entities;
- solutions of the communal problems for the community of Mykolayiv city;
- stimulating the creation of associations of condominiums;
- more efficient use of energy and other resources, the radical reduction of energy consumption, increasing energy efficiency in buildings, creating incentives and conditions for the economical use of energy resources;
- minimizing the anthropogenic impact of the industry on environment and human in general;
- improving the management in housing and utilities infrastructure;
- encouraging innovation, investment and energy saving;
- creating the competitive environment in the market of housing and communal services through tenders, etc.

"The program of ensuring the maintenance of buildings and increasing the efficiency of services of the residents hostels of the city of Mykolayiv for 2012-2015" has been

[77]Нормативні акти Миколаївської міської ради та виконкому. Про затвердження Програми реформування та розвитку житлово-комунального господарства м. Миколаєва на 2010-2014 роки. Available at: http://ngik.gorsovet.mk.ua/ru/showdoc/?doc=15724

approved by council of Mykolayiv city, decree No.12/16, 23.12.2011. The program aims are[78]:

- to increase the level and quality of housing and communal services, and ensuring reliable operation of engineering systems of life support in hostels and dormitories;
- to reduce wasteful expenditure of material and energy resources, the creation of mechanisms of stimulating fuel and energy resources saving.

Planned volumes and sources of funding are showed in the Table 3.6-6. Every year, during the formation of the city budget provides funds for the implementation of the program. The volume of financing the program is limited by the financial ranges are provided of the budget.

Table 3.6-6: Planned volumes and sources of funding.

Sources of funding	Volumes of funding, thousand UAH	Year			
		2012	2013	2014	2015
Local budget	3520.0	1180.0	780.0	780.0	780.0

"The program attracts domestic and foreign investment for of the city of Mykolayiv for the period up to 2017" has been approved by the council of Mykolayiv city, the decree No. 22/17, 22.11.2012[79].

The objective of the implementation of the investment policy is to promote investment, innovation, attracting domestic and foreign investment to the city, promoting the city's image as the area attractive for investment and cooperation, the implementation of competitive investment projects, as well as investment projects, which materially can improve the lives of citizens.

The investment portfolio of the city of Mykolayiv includes several projects aimed at improving energy efficiency in buildings (see the Table 3.6-7).

In order to stimulate the development of condominiums in the city budget for 2010, the funds (for the first time) of about 1 mln. UAN for the projects for major repairs and reconstruction of housing and public utilities of condominiums were allocated.
The citizens who created condominiums got fund co-financing: 90% – the city budget, 10% – condominiums. The apartment buildings, in which condominiums were reregistered, got funds co-financing: 50% – the city budget, 50% – condominiums.

The city officials are collaborating with international organizations and investment funds that operate in Ukraine to modernize housing and communal services for improve energy efficiency.

[78]Нормативні акти Миколаївської міської ради та виконкому. Про затвердження Програми забезпечення утримання будівель та підвищення якості обслуговування мешканців гуртожитків м. Миколаєва на 2012-2015 роки. Available at: http://ngik.gorsovet.mk.ua/ru/showdoc/?doc=18282
[79]Нормативні акти Миколаївської міської ради та виконкому. Про затвердження міської Програми залучення вітчизняних та іноземних інвестицій у м. Миколаїв на період до 2017 року. Available at: http://ngik.gorsovet.mk.ua/ru/showdoc/?doc=21024

Table 3.6-7: Projects aimed at improving energy efficiency in buildings.

No.	Name of project	Initiator	Amount of investment, thousand $ USA
1.	Installation of heat pumps	Department of Housing and Communal Services	5000.00
2.	The integrated technologies of energy-savings and overhauling for 10-storey residential buildings Series 96-K in the neighborhood "Namyv" in Mykolayiv (8 pcs)	Department of Housing and Communal Services	12500.0
3.	The Integrated technologies of energy-savings and overhauling for 10-storey residential buildings Series 96-K in the neighborhood "Namyv" in Mykolayiv (8 pcs) Reconstruction of the heating system, hot water, ventilation. Installing heat pumps and introduction of new energy-saving technologies for 10-storey residential buildings Series 96-K in the neighborhood "Namyv" in Mykolayiv (8 pcs)	Department of Housing and Communal Services	33549.906
4.	Thermal insulation of facades of residential buildings involving community organizations	Department of Housing and Communal Services	2610.0

The city officials are collaborating with the UN development program in Ukraine (UNDP). Funding of overhauled condominium homes under this program is as follows: 45% – funds from the city budget, 45% – funds of UNDP, 10% – funds of condominium. The administrator of all funds is the condominium, which in the media announces a tender to identify a contractor to perform the work.

In 2011 the administration of Mykolayiv, together with the International Finance Corporation (IFC), the member of the World Bank, is co-financing the project to assess energy efficiency in public buildings (schools and kindergartens). As a result, there were examined several typical buildings of kindergartens and schools and a list of measures aimed at improving energy efficiency were developed.

The reduction in energy costs, emissions, the amount of investment required, time of payback were examined. The lack of sufficient funds is the main problem for the implementation of energy-efficient technologies. From the budget of city has been allocated the following funds to finance energy saving measures in public organizations and institutions (see the Table 3.6-8).

Table 3.6-8: City budget to finance energy saving measures.

Sources of funding	Year			
	2010	2011	2012	On 2013
The local budget, thousand UAH	4625.71	3469.025	2678.066	2190.257

Main directions of funding energy efficiency measures:

- upgrade and repair of roofs;
- gradual replacement of doors and windows;
- gradual replacement of system lighting;
- repair of power equipment, networks;
- installation and replacement of control and measuring devices.

3.6.3.2 Political initiatives

The initiatives of executive power of Mykolayiv city are as follows[80]:

- to set up the comprehensive centralized system of information support business;
- to form protectionist policies for business on the local level;
- to set up modern, high-performance system to ensure comfortable and safe living;
- to raise funds for the development of the communal infrastructure;
- to change the awareness of residents to the environment;
- to create a system for generating investment proposals and to increase the investment potential;
- to organize the effective system of promoting the city and its investment opportunities;
- to develop the system of reducing investment risks.

The following actions should be taken[74]:

- to develop effective network of training, counseling and consulting;
- to improve the quality of services provided by the city government;
- to develop the system of representation and protection of the rights of entrepreneurs;
- to develop social partnership and social responsibility;
- to develop the system of financial support for small and medium businesses;
- to conduct the comprehensive audit in the utility sector;
- to develop a new program of reforming housing and communal services;
- to introduce competition in services and housing sector;
- to attract external resources for developing communal infrastructure;
- to take inventory of land and build the modern automated system of inventory;
- to form the of investment proposals database.

[80]Миколаївська міська рада. Стратегічний план економічного розвитку міста. Available at: http://www.gorsovet.mk.ua/potential/strategy.ua

4. Comparison and conclusions

Findings – Conclusions

The "Collection of information about funding opportunities, programs and political initiatives at EU, national and local level and evaluation in order to meet the needs of partners" study, a study implementing Activity GA1.2, has revealed a lot of interesting issues. Energy efficiency is an important issue for all six countries participating on BSBEEP project. During last five years, a wide spectrum of international organisations and bodies has been involved on preparation and funding of mid-term programmes and short term projects, concerning energy efficiency either on building sector or in a more integrate approach. Depending to each country's level of development all six countries have received funds or development aid in order to decrease their environmental impact or in a more indirect way to adopt the approach of using energy in an efficient way and adapting their institutions and operations to this issue.

It is obvious that EU member states (Greece and Romania) are almost exclusively dependent on EU structural funds to promote energy efficiency, while the other countries (Moldavia, Ukraine, Armenia and Turkey) have been successively active to attract funds from a much more differentiated type of donors. EU funded initiatives are abundantly funded, have a middle-to-long term perspective, are part of a comprehensive approach for the overall development of EU and finally having a quite "permanent" character, as they constitute part of EU cohesion policy targeting the convergence of EU regions. At the other hand, programmes and projects implemented at rest four countries are documenting their ability to attract funds from a wide array of institutions, proving their extroversion.

Donors' perspective

It worth to investigate the activity presented to previous chapters from the perspective of donating institutions. We discovering that among international institutions out of EU, UNDP has a long time presence in the Black Sea area, acting on Moldavia, Ukraine, Armenia and Turkey, implementing an big list of programmes/projects. World Bank backed with International Finance Corporation (IFC), has been also proved very active in the area, working at Ukraine, Armenia and Turkey. USAID is active on Ukraine and Armenia, only.

A quite big number of European institutions are working intensively in non-EU Black Sea area countries, trying to disseminate the objective of energy efficiency. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, has been proved as the most active one, as is working on Moldavia, Ukraine and Turkey. KfW Development bank has choose to work in Armenia, and French Development Agency (AFD) has choose to work in Turkey. It is remarkable that Ukraine is attracting funds from a big number of donors – at least ten.

Further analysis for Turkey

Electricity demand has been growing between 7 and 8 percent annually on average, driven by Turkey's rapid economic growth, industrialization and steady population growth. Energy efficiency (EE) has emerged as a policy priority due to the relative high energy intensity of the economy and its need to maintain its competitiveness. Although total primary energy supply per capita in Turkey is still low-1.44 tons of oil equivalent (toe)/capital in 2010, compared to the OECD average of 4.39 toe/capita--the Turkish economy is comparatively energy intensive. In 2010, the economy required 0.19 ton of oil equivalent (toe) for every US$1,000 of GDP, compared with the OECD average of 0.14.

Energy efficiency is critical to Turkey's energy security and a key component in Turkey's National Climate Change Strategy and Action Plan.

The industrial and building sectors offer an aggregated energy savings potential of over 15 million toe of energy consumption per year, or 14 percent of total consumption, with corresponding greenhouse gas (GHG) emission reduction potential. Among its various initiatives, the Government has also taken measures to support specialized renewable energy and EE credit lines, including the use of the Clean Technology Fund (CTF). In an effort to accelerate the realization of Turkey's EE potential, the Government approved a new National Energy Efficiency Strategy in February 2012. The new Strategy sets an overall target of reducing Turkey's energy intensity (energy consumption of energy per unit of GDP) by 20 percent by the year 2023 from the year 2011 level. This is a realistic and achievable target as Turkey's economy is still relatively energy intensive. The Strategy identifies the following main activities to improve Turkey's EE: (a) promote EE in the industry and service sectors; (b) reduce energy demand of buildings; (c) promote energy efficient appliances and products; (d) improve the efficiency of electricity generation, transmission and distribution; and (e) building capacity, market and financing for EE products, investments and services.

Considerable achievements have been made in setting up regulatory and institutional frameworks to promote EE, but further support to the Ministry of Energy and Natural Resources is needed.

The legal, regulatory/pricing an institutional set-up to promote EE includes a comprehensive set of regulations issued in 2008 and 2011 under the 2007 Energy Efficiency Law. The work on alignment with relevant EU acquits and regulations is also ongoing and has mostly been completed. Work is also ongoing to align the government programs and legislative/regulatory framework to achieve the targets outlined in the adopted national EE strategy. The Electric Power Resources Survey and Development Administration (EIE), mandated with policy making and implementation of EE promotion, was integrated into the Ministry of Energy and Natural Resources (MENR) in November 2011. The reorganization is expected to streamline the institutional framework in the long-term, but requires additional resources and personnel in MENR in the near-term to ensure that the capacity is maintained and developed further. While the progress on regulatory framework is

noteworthy, the recent institutional reorganization has led to an uncertainty in the policy development for EE and need for support.

In order to support this process further, the European Commission, MENR and the Ministry for EU Affairs are collaborating closely on the preparation of a multi-year technical assistance program with the World Bank for the enhancement of Turkey's energy sector, in line with Turkey's EU accession process.

The funding source for these programs will be EU's Instrument of Pre-Accession Assistance (IPA) for Turkey. For 2012, EUR 11.8 million was allocated to this program, which includes the following components:

- Institutional review, capacity building and policy alignment with EU for MENR;
- Support for unbundling of the national gas company, BOTA$, and design for gas trading platform;
- Review of current situation, barriers and action plan in scaling up Renewable Energy;
- Market development and capacity building for Energy Efficiency; and
- Visibility and public awareness activities.

The program will provide the much needed support from the institutional and policy perspectives, and will support the further development of the energy sector policy framework of Turkey.

SME Sector Context: SMEs play a very important role in the Turkish economy owing to their crucial role in generating income and employment.

The last Investment Climate Assessment-From Crisis to Private Sector Led Growth (May 2010)-found that there are strong indications that SMEs are disproportionately burdened by business regulations, face severe access to finance constraints, and seem to lack the ability to adopt and use the knowledge needed to make them and, ultimately, the entire Turkish economy more competitive internationally 4. SMEs play an important role for the economic development of Turkey since SMEs are estimated to account for 99 percent of all enterprises, 78 percent of employment, *55* percent of value added, *65* percent of sales, 50 percent of investments, and *59* percent of exports yet only receive 22.8 percent of total loans.5 The Turkish government has committed itself to a significant array of programs aimed at making industrial SMEs more competitive, more capable of applying modern technologies to improve production processes, and more effective exporters. One of the major priority areas for SME policies has been access to finance.

After being severely underserved in the aftermath of the 2008 global financial crisis, SMEs have been making inroads in gaining access to credit.

While the largest proportion of loans *(45* percent) is being allocated to corporate clients, SME credit accounts only for 22.8 percent of total banking sector credit (from a low of 21 percent in 2009)6. Nevertheless, while SMEs are usually in the market for medium- and long-term financing, banks do not usually have adequately structured

resources to offer them. This is mostly a result of the short-term maturity structure of the Turkish banks' liability base, which leaves SMEs open to severe liquidity and interest rate risk, as evidenced by the events in the aftermath of the global financial crisis when major banks significantly cut their exposures to SMEs in a matter of weeks. In addition, lack of cash flow based financing (especially in the SME segment) and high collateral requirements further constrain access to finance to SMEs.

Consequently, market barriers exist for scaling up financing for EE investments in SMEs, including:

- Lack of knowledge among banks and SMEs about EE opportunities, Project performance and risks
  Turkish banks have insufficient experience assessing EE opportunities and project benefits, assessing technical and repayment risks, and verifying EE savings estimates. As a result, perceived risks and thus risk premiums are prohibitively high. Further, there is a general lack of understanding CBRT Financial Stability Report, BRSA and Standard & Poor's- Ratings Direct 4 A majority of surveyed firms noted access to finance as a key constraint to growth (26 percent of firms cited this as their single most important constraint). Tax rates (18 percent) and policy instability (18 percent) rank second and third, respectively. Data from Turkish Statistical Institute (TUIK) and Banking Regulation and Supervisory Authority 6 Data from Banking Regulation and Supervisory Authority and thus low priority among SME and other managers about the opportunities for operational cost savings through EE investments.

- High transaction costs for small SME EE investments
  Turkish banks lack developed approaches to identify and assess projects for smaller investments, as technical reviews of detailed energy audits are only practical for much larger loans. Since investments in the SMEs are smaller (most under $1 million), the transaction costs for each project (identification, loan origination, technical assessment, energy savings estimation, technology review, etc.) can be prohibitively high. This has resulted in a lack of developed financing strategies and products (e.g., leasing, cash flow-based financing, energy Service Company or "ESCO" lending) which limit the potential market to only highly creditworthy SMEs with sufficient collateral/project equity and technical capacity to pursue EE improvements.

- Financing constraints due to high collateral requirements
  Under the current banking regulatory framework, the borrowing SMEs are often required to provide 100 - 120% of collateral. This high collateral requirement not only limits the borrowing capacity of the SMEs, but also often drives up the cost of credit as many borrowers are forced to purchase credit guarantees to supplement their collateral, which adds about 1% to their financing cost.

- Limited institutional capacity to identify, prepare bankable EE projects
  Smaller industries are generally unaware of the opportunities, costs and benefits of EE improvements, despite the recent legislative measures. High transaction

costs hinder EE among SMEs due to the small-size of improvements and modest returns of EE investments relative to other investments (i.e., production expansion). Irrespective of cost, the number of improvements needed to realize substantial EE savings may require too much time, knowledge and effort to make EE investments attractive for many SMEs. There is also a lack of efficient delivery mechanisms to link financing and EE projects with acceptable transaction costs. Service companies and ESCOs lack viable business and financing models, and credibility among potential clients and financiers. This vicious cycle results in a lack of demand, in the form of well-prepared, bankable loan applications and the perception among banks and ESCOs that this is not yet a viable market.

The ESCO model has also been unable to gain traction within the Turkish market to date.

ESCOs have, in many countries, proven to be an effective way of facilitating EE investments, including in emerging sectors and new technologies. ESCOs can provide a "one stop shop" solution to project owners, allowing them to effectively outsource the project from energy audit and development through implementation and monitoring. In some cases the ESCOs are also able to arrange or facilitate financing for the project. In order to promote the ESCO market, MENR has in recent years certified some 38 ESCOs under its accreditation program, mostly related to technical training. However, to date, none have undertaken actual ESCO projects and several have indicated they are unlikely to seek accreditation renewal. The only ESCO project reported is with an international ESCO for a large shopping mall in Istanbul. One main reason for this situation is the limitations of ESCO models being promoted in Turkey today, namely the Shared Savings and Guaranteed Savings models. The numerous small local ESCOs do not have sufficient balance sheets to take on the debt under a Shared Savings model, and lack a demonstrated track record and financial means to offer a credible performance guarantee under the Guaranteed Savings model. The slow uptake of ESCO models in Turkey as well as experience from other countries suggest that in order to strengthen the ESCO market in Turkey, it would be important to both broaden the range of ESCO models being promoted in Turkey today, as well as bring in other types of local companies (e.g., leasing firms, equipment suppliers, construction firms) into the ESCO market.

The three Financial Intermediaries, Türkiye Cumhurriyeti Ziraat Bankasi A.$. (Ziraat Bank), Türkiye Vakiflar Bankasi T.A.O. (VakifBank) and Türkiye Halk Bankasi A.$. (Halkbank) were chosen as the financial intermediaries for the Project given their strong SME client base and market presence in the SME sectors.

Strengthening SME business development is a strategic priority for Ziraat Bank, which has particular strength in the agro-industry and food processing sectors. Ziraat Bank has a privileged advantage of access to these sectors, especially in the underserved areas, and their SME portfolio is already 42 percent of their total corporate portfolio. VakifBank is an important player in SME business, with a long lasting relationship with strong number of clients, low granularity in SME portfolio, and geographically diversified lending practice. It has introduced sector focused products before,

including EE, and has experience in designing, marketing and implementing such sector specific loan products. VakifBank provides service to over 451,000 SME customers. Lastly, Halkbank is one of the leading SME lenders in Turkey. Halkbank's loans and advances to SME borrowers comprised 36 percent of its total loans and advances.

In addition to the changes made to the regulations and policies by the Government, the success of credit line operations in industrial EE investments contributed to an increase of support from IFIs to promote EE.

The World Bank has been providing financing to both renewable energy (RE) and EE through two financial intermediaries (FIs), Turkiye Sinai Kalkinma Bankasi (TSKB) and Turkiye Kalkinma Bankasi (TKB) in the Private Sector Renewable Energy and Energy Efficiency Project. The Project, approved in 2009 with additional finance provided in 2011, provided US$1 billion in total financing with US$100 million from the Clean Technology Fund (CTF), a multilateral donor fund aiming to promote Technologies which contribute to reduction in carbon emissions, to RE and EE investments. So far, the Project financed 20 EE investments, paving the way for industrial EE investment financing. The European Bank for Reconstruction and Development (EBRD) has established the Turkey Sustainable Energy Financing Facility (TurSEFF) to support small scale RE and EE through five commercial banks, and the International Finance Corporation (IFC) supports leasing companies on EE equipment. Other institutions, such as Agence Franqaise de D6veloppement (AFD), and Kreditanstalt fir Wiederaufbau (KfW), have also provided support mainly through FIs to EE 7 Under a shared savings model, the ESCO generally borrows from a bank and finances the project directly, with the client repaying the ESCO from the accrued energy savings. In the event the savings are below expectations, the ESCO must repair or replace the equipment, or risk nonpayment from the client. 8 Under a guaranteed savings mode, the ESCO can help identify suitable financing for the client, but the client is the borrower. The ESCO provides a performance guarantee which generally stipulates that if the actual energy savings fall below the amount needed to service the debt, the ESCO will pay the difference investments. Currently, the FIs that have credit lines specifically for EE include some of the largest in the Turkish market - such as Akbank, Garanti Bank, Deniz Bank, Is Bank, Seker Bank, and TEB. Despite all these efforts, the EE investment needs in Turkey are still greater than the support provided. The Project aims to supplement the market development efforts of other credit lines through its development of alternative business models, such as ESCOs.

The CTF is expected to provide additional financing for the Project to further promote the ESCO market.

Turkey has successfully implemented Phase I of its CTF Investment Plan, approved in 2009 by the CTF Trust Fund Committee. On November 3, 2012, the CTF endorsed Turkey's Phase 2 CTF Investment Plan for US$140 million. This includes US$50 million to be provided as additional financing for this Project at a later stage. The Investment Plan for Turkey, though endorsed, is not fully funded as resources are going through the CTF allocation process and the US$50 million CTF allocation for

this Project is thus not yet available. The US$50 million in CTF financing, provided at IDA terms, would be provided to scale up financing for ESCO transactions which are being piloted using GEF funds. The CTF would allow the FIs to leverage the risk coverage provided by GEF funds, while reducing the level of concessionality of financing provided to the ESCO market. The lessons learned during the GEF supported phase of the Project will be utilized when processing and designing the use of the additional financing from the CTF.

Table 4-1: Existing financial and fiscal mechanisms for the building sector.

Mechanisma	Relevance	Source of funding	Priority
Grants	High for large buildings	State budget, funds, international financial institutions, bilateral donors	Short term priority; aimed at determining the level of investment demand and supporting owners in loan applications; energy audits, feasibility studies; public buildings, commercial services, multi-apartment buildings
Preferential loans	High for commercial services and residential buildings	International financial institutions, Energy Efficiency funds, guarantee funds, development funds/banks, local commercial banks	Short term priority; assessed investment demand serves as a base for Government loan applications to international financial institutions
Third Party Financing (TPF) / ESCO (EPC)	Medium	Energy service companies, leasing companies	Mid-term; prerequisites: legislation, standardized monitoring and verification protocols, training, cost-reflective energy carrier prices
White certificates	Low	Developed countries	Mid- to long-term
Tax Rebates	Low to medium	State budgets; more suitable for companies	Mid-term
Tax Deduction	Low to medium	Income tax reduction for legal and natural persons investing in EEI of own buildings	Short- to mid-term
VAT Reduction	Low to medium	Suitable for measures with short payback	Short- to mid-term

Table 4-2: International organisations and bodies active at BSBEEP countries, funding Energy Efficiency programmes and/or projects.

	Greece	Romania	Moldavia	Ukraine	Armenia	Turkey
A. The European Union and its bodies						
The European Union	✓	✓	✓	✓		✓
The European Bank for Reconstruction and Development (EBRD)		✓	✓	✓	✓	✓
The European Investment Bank (EIB)		✓		✓		✓
B. Other European institutions and organisations						
The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH			✓	✓		✓
KfW Development bank					✓	
French Development Agency (AFD)						✓
The Nordic Environment Finance Corporation (NEFCO)				✓		
The Housing Initiative for Eastern Europe (IWO)				✓		
C. International organisation out of EU						
The World Bank				✓	✓	✓
The International Finance Corporation (IFC)				✓		
The Global Environmental Facility (GEF)					✓	
The United Nations Development Program (UNDP)			✓	✓	✓	✓
United States Agency for International Development (USAID)				✓	✓	

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