PERMANENT
COUNTRY REPORT

Romania

Developed within the project Performance Risk Management for Energy Efficiency through Training – PERMANENT – IEE/08/657/SI2.528420

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1. INTRODUCTION TO THE PROJECT

1.1 Investment Potential in Energy Efficiency

The directive regarding energy efficiency for final users and energy services provides that EU Member States commits to reduce final energy consumption with at least 9% in a nine years period (2008-2016) versus the average consumption over the past five years for which data are available (2001-2005).

Intermediate target set for Romania for the year 2010 is of 940.000 toe (tones of oil equivalent) , which means 4,5 % from the average consumption of 2001-2005.

For the target settlement it was considered Romania's energy savings potential, in different economy sectors, namely industry, residential, tertiary and transport branch.

The economic potential (costs efficient) of energy savings was:

Branch	Average potential of energy savings, estimated as a percentage of consumption [%]	Maximal values for energy savings potential [ktoe/year]
Industry	13.0	1590
Residential	41.5	3600
Transport and communications	31.5	1390
Tertiary branch (services)	14.0	243
TOTAL	100	6823

Source: National Strategy for Energy Efficiency

Through the Sectorial Program for Research and Development in Industry, a study is being developed aimed at upgrading the energy savings potential in industry, transportation, residential branch, agriculture, tertiary branch (services), and cogeneration.

The national electricity consumption is forecasted to increase steadily by 3% per year, until 2020.

A synthesis of the energy saving target is shown in the table below:

The average for 2001- 2005 period [thousands of toe]	20.840
The target of 9% energy savings until 2016 [thousands of toe]	1.876*
Energy saving target adopted by Romania until 2016 [thousands of toe]	2.800
Intermediate target for 2010 [thousands of toe]	940

* minimal value according to the directive regarding energy efficiency for final users and energy services

Average annual decrease of final energy consumption in 2008 – 2016 period, will be 1.5%.

Types of investments

The investments in energy efficiency envisaged under the Romanian SOP 'Increase of Economic Competitiveness' include the following:

- specific types of investments in installations/equipments (such as compressed air, pumps, ventilation, process heating and cooling plants, boilers, burners, heat exchangers) of industrial operators in order to achieve energy savings (leading to reduction of the energy bill), based on energy balance.
- investments in installations for their energy consumption reduction at industrial users (switching, adjustment and control automatic systems, frequency converters, electrical motors with high efficiency, power factor mitigation, integrated energy consumption management systems)
- The main target sectors are metallurgy, construction materials, glass industry, chemical products, food industry, cellulose and paper products
- The high share of the energy cost in total production cost justifies the intervention in the above industrial sub-sectors (i.e. about 20% in metallurgy, about 45% in lime and cement industry, about 22% in ceramics industry, 23% in glass industry). Priority will be given to projects coming from these fields.

Characteristic features of potential projects on energy efficiency

Energy-efficiency investments for industrial users vary widely according to type of industry and activity. There can also be wide variations in the scale and cost of such investments. However, 'typical' investments would include:

- Lighting: compact fluorescents lamps, high efficiency fluorescent lamps, day lighting, low loss ballasts, de-lamping; efficient security lighting, improved lighting controls / automated lighting.
- Cooling and chilling: high efficiency air conditioners, high efficiency refrigerators, air condition maintenance, air conditioner timers;
- Combustion: improved controls, burner replacement, boiler replacement, boiler insulation, combined heat and power (CHP) installations.
- Industrial applications: high efficiency motors, variable speed motors, improved compressors.
- Energy efficient buildings (insulation, energy-efficient design, day lighting, improved ventilation/natural cooling, intelligent buildings)
- Metering and controls: energy management systems, sophisticated controls and improved metering (when combined with improved management techniques such as Monitoring and Targeting).

These types of energy-efficiency investments could be further distinguished as follows:

- Typical EE investments - meaning relatively small investments in improving pumps, boilers, burners, insulation, controls, metres, compressors, chillers, lighting, etc. Values range from EUR 4,000 to 500,000, with the number of possible projects falling as values rise. The vast majority of typical energy efficiency investment projects fall into this category.
- High-value EE investments, in industries such as cement, paper, metallurgy, glass, and ceramics.
- Combined heat and power, where a heat only boiler (HOB) would be replaced with a CHP unit.

1.2. Key Barriers To Investing in Energy Efficiency

Energy efficiency project market surveys in Romania, invariably find a series of energy efficiency investment projects with high financial rates of return (for example, over 20 percent), which remain unimplemented. These projects are often classified as "win-win" projects: they are financially beneficial to the enterprises involved, and also beneficial to society's environmental interests.
After a few good years of practice, it could be provided a good summary of the main impediments commonly found to uptake of win-win energy efficiency retrofit projects. They include the following:

- Lack of information
- Lack of trained personnel or technical or managerial expertise, or lack of ability to identify obvious energy efficiency measures
- Below long-run marginal cost pricing and other price distortions (in some cases)
- Regulatory biases or absence
- High transaction costs
- High initial capital cost or lack of access to credit
- Mismatch of the incidence of investment costs and energy savings
- Higher perceived risks of the more efficient technology
- Lack of knowledge of energy efficiency benefits and techniques for managing risks
- Lack of commercially viable financing (unattractive terms & tenor) or lack of knowledge of financing options
- Lack of procurement rules at Local Authority level
- Weak exchange of information between Local Authorities
- Small investments and benefits, and high transaction costs
- Complex transactions with energy service companies (ESCOs)
- The absence of the tradition of grouping financing investments and of using ESCO financing
- Some complex technologies
- Low priority and rates of return
- Limited technical capabilities
- Low (subsidized) energy prices
- Financial Management Capacity

One of the most significant barriers is a lack of commercially viable financing for EE activities. The shortage is *not* caused by a lack of funds per se, but rather by the inability of energy users to access existing funds at local financing institutions (LFIs) on commercially attractive terms. This lack of access is caused by a "disconnect" between the traditional lending practices of LFIs and the financing needs of EE projects. LFIs typically apply traditional "asset-based" corporate lending approaches for EE projects, lending a maximum of 70%-80% of the value of assets financed (or collateral provided). Unfortunately there is often little or no collateral value in EE equipment once installed in a facility. Rather, the value is in the certainty of future cash flow generated by project installation and transparent documentation of actual savings. To date, most LFIs (due to lack of knowledge) have not recognized, nor appear to believe that meaningful cash flow can be generated from EE projects, or that such cash flow can be relied upon to repay the related loans. Consequently, LFIs generally assign no collateral value to the future cash flow generated and require energy users to encumber their other credit capacity for the full value of the EE installation. This requirement for additional credit capacity is usually reason enough for energy users to not use commercial financing.

Common to many of the barriers is *disbelief* that planned project results will be achieved and can pay back the investment in a sustainable manner. Lack of confidence in project savings impedes investment even where energy audits or other engineering analyses demonstrate sound investment opportunities. However successful energy efficiency projects, mainly Third Party Financing (TPF or ESCO) projects, have demonstrated some key techniques for managing risks through: measuring project results, verifying achievement of guaranteed savings, and financing energy savings projects *without* the need for collateral beyond that of the savings cash flow from the project itself.

1.3. The Role of PERMANENT

The PERMANENT project aims to significantly enhance the rate of investment in EE projects in new European Member States by educating key stakeholders about how perceived risks in the EE projects can be managed. This education process addresses the common concern for performance risk by:

- adapting the widely used International Performance Measurement and Verification Protocol (IPMVP) and the International Energy Efficiency Financing Protocol (IEEFP) to local conditions and language. With these protocols, EE can be seen as a significant investment opportunity, and thereby encourage the establishment of commercial EE lending products that are attractive to end users.
- training instructors to impart knowledge on performance risk management, during and after the life of the PERMANENT project.
- educating energy end users, financiers and energy services suppliers on ways to manage the risks in EE project design, implementation and measurement. Education will be at varying levels of detail, first creating awareness of the opportunity and needs. Further details will be provided in followup half day, one day or two day training in relevant topics for target audiences.

1.4. Target Audiences For Training In Romania

Target market sectors are, in general:

- Users of large amounts of energy: industrial, commercial, multiple residential, institutional (e.g. education, health care), and Public Sector establishments (e.g. defence, prisons, etc.). The main target industrial sectors are metallurgy, construction materials, glass industry, chemical products, food industry, cellulose and paper products
- Financiers: local financial institutions (LFIs)
- Governments as both consumers of the knowledge for their own facilities and enablers of markets.

Financing messages will be delivered in half hour and half day sessions to:

- CEOs within LFIs, to encourage them to approve introduction of a new lending products
- Senior lending officers within LFIs, to encourage them to establish a plan to develop a new lending product
- CFOs within large energy users, to help them appreciate the opportunities, risk management methods and new financing strategies for energy efficiency projects.
- Senior managers within governments and regulatory bodies, to help them understand their roles in removing barriers to energy efficiency through encouraging or regulating proper performance risk management.

In Romania these individuals will be found in banks, financial institutions, Romanian Energy Efficiency Fund (FREE), Ministry of Economy and Commerce and other financial market major players.

Technical messages about transparent reporting of actual energy and money savings will be delivered in half hour, half day, and one day or two day sessions to:

- Senior managers, middle managers and project/plant managers and engineers within
  - large energy users, and
  - suppliers of energy efficiency services and products

  to help them understand best practice in ‘measuring’ savings and transparent reporting of results.
- Senior policy advisors and program designers within governments and regulatory bodies to alert them to best practices and to help them properly specify use of best practices in ‘measuring’ savings and transparent reporting of results.

In Romania these individuals will be found in **Romanian Energy Regulatory Authority – ANRE, Industrial sector, Mayoralties, Local Authorities.**

2. DETAILS OF COUNTRY ANALYSIS

2.1. Market Potential (from research by others)

A) Potential annual energy savings (in USD), at 5 and 10 year payback (if available) in small residential, large residential, commercial buildings, and industrial sectors.
B) Potential EE investments (in USD), by sector, for 5 and 10 year payback.

This chapter presents project proposals who received effective support from the UNDP / GEF in 2003 – 2006 period, it also reflects estimates of the amount of CO2 savings and investments in energy efficiency projects.

UNDP / GEF has provided significant support to the investment proposals in form of technical assistance (TA) and / or direct contributions (DC) for the purchase of equipments related to energy efficiency.

The total value for the 34 implemented projects was of 69.791.790 USD.

The investments value supported by UNDP / GEF, the CO2 emission reduction and the energy savings for each implemented project, is presented in the table below:

Type and number of investments in the specific sector	Investment value [USD]	CO2 emission reduction [tones]	Energy savings [MWh/year]
Public Lighting (3 investments)	1.098.430	404	721,43
Public Buildings (8 investments)	1.829.024	1.290	2.303,57
District Heating Systems (7 investments)	8.433.900	12.047	21.512,5
Water supply systems (3 investments)	3.985.230	457	816,07
Residential end-users (4 investments)	431.378	683	1.219,64
Industry (2 investments)	1.744.072	1.669	2.980,36
Renewable energy (3 investments)	1.529.175	5.162	9.217,86
Cogeneration units (CHP) (4 investments)	50.740.577	109.814	196.096,43
TOTAL INVESTMENTS	69.791.788	131.526	234.867,86

Energy efficiency improvement measures in industrial, residential and public services sectors, to be taken are the following:

a. ***Energy efficiency improvement at industrial operators by long-term agreements (LTA)***: by using LTA, industry undertakes to adopt energy savings measures, in order to reduce energy demand and to achieve identified potential savings, by modernization of technological processes, of technological equipments and energy efficiency. According EU countries estimates, where LTA have been applied, the resulting energy savings is between 10-20%
b. ***Energy efficiency improvement at industrial operators by managing energy demand and energy balance achievement***: reducing energy demand by monitoring energy consumption by cost centers and efficient use of energy. Awareness of industrial operators regarding the energy saving potential by identifying losses and applying measures to reduce / eliminate them
c. ***Energy efficiency improvement by supporting funding investment projects intended to reduce energy demand***
d. ***Energy efficiency improvement at industrial operators by accomplishment investment projects*** co-financed by EU funds.
e. ***Thermal insulation and ventilation in multistage residential buildings built-up in 1950-1990 period:*** It is estimated that by the implementation of thermal rehabilitation of residential buildings included in the multiannual program, an energy saving can be obtained of about 25% from baseline. Thermal rehabilitation measures can be implemented in phases, Thermal rehabilitation measures can be implemented in phases, their effects, in terms of energy consumption reduction, will be added up, the investment can be returned in about 6-8 years, depending on the package of measures developed.
f. ***Energy efficiency improvement at heating / cooling systems in individual housing:*** energy consumption reduction in individual housing by using equipments and appliances that meet minimum energy performance requirements and usage of renewable energy sources.
g. ***Promoting high-efficiency cogeneration:*** this measure will lead to: savings of primary energy sources towards separate production of electricity; greenhouse gas emissions reduction and in particular CO2 emission reduction. This measure is more effective if in the cogeneration process renewable energy sources are used as fuel, mainly biomass.
h. ***Public lighting system improvement:*** In Cluj-Napoca, after the replacement of lighting equipment a reduction of about 40% of active and reactive power consumption will result. In Brasov, by using devices for reducing the light flux on the trunk ways in the periods with low traffic, a reduction of 10%/year of electrical energy specific consumption is estimated.
i. ***Promoting the use of energy efficient household appliances and lamps***
j. ***Promoting development of energy service companies – ESCOs***: Through energy efficiency projects designed and implemented for different customers, energy service companies (ESCO), provide energy cost reduction so that the economy obtained to cover the final costs of project funding. ESCO services are convenient, as they offer to the clients, amongst others: ensuring project performance in energy field, project implementation in compliance with the beneficiarys annual operating budget, and also flexible funding possibilities.

2.2. EE Stakeholder Identification

List all of the major governmental, non-profit and private sector entities in the local market that have influence over energy efficiency, environmental, finance, legal or banking policy and commercial market activities, with a focus on those entities that have an interest in M&V or EE project financing:

A) Ministry of Energy
B) Government and EE Development Agencies (local and regional)
C) Development Banks (local and regional)
D) Government Structural Funds
E) Commercial Banks
F) ESCOs and other EE Developers
G) Large EE Vendors and Contractors
H) Other Government Agencies and bodies

The people who can guide the project (Local Advisory Group) are presented in Appendix A.

The specific financing persons to review financing materials (IEEFP Working Group) are in Appendix C.

2.3. Best Practices and Barriers:

EE Finance: (Summary of results obtained from Questionnaire provided by T. Dreessen to financial candidate trainers)

- Highlight the current lending procedures for EE projects
- Review the current level of understanding of EE projects in local financial institutes
- Highlight current barriers to financing of EE projects

M&V:

- Review current "in country" best M&V practices. Note differences from IPMVP form. See two example M&V Plans and Savings Reports in Appendix B.
- Outline local legislation governing M&V

For the Measurement and Verification Protocol in Romania it could be applied the National Energy Balance Elaboration Guide. The national guide describes the way to perform en energy balance, energy audit and how to accomplish the measurement. The verification part of the M&V is not regulated in Romania.

In Romania, The Measurements are made according to the Electric Energy Measurements Rules and Thermal Energy Measurements Rules, elaborated by ANRE (Romanian Energy Regulatory Authority).

For the electric energy measurement, the rules are according to:

1. CEI 60044-1 - Current transformers
2. CEI 60186 - Voltage transformers
3. CEI 60044-2 - Inductive voltage transformers
4. CEI 60687 - Alternating current static watt-hour meters for active energy classes 0.2S and 0.5S
5. CEI 61036 - Alternating curent static watt-hour meters for active energy classes 1 and 2
6. CEI 61268 - Alternative current static var-hour meters for reactive energy classes 2 and 3
7. CEI 60521 - Class 0.5, 1 and 2 alternating-current watt-hour meters
8. CEI 60870 - 2 - 1 - Telecontrol equipment and systems. Part 2: Operating conditions. Section 1: Power supply and electromagnetic compatibility.
9. CEI 60870 - 4 - Telecontrol equipment and systems. Part 4: Performance requirements.
10. CEI 60870 - 5 Telecontrol equipment and systems. Part 5: Transmission protocols.
11. CEI 61107 - Data exchange for meter reading, tariff and load control. Direct local data exchange
12. CEI 61334-4 - Distribution automation using distribution line carrier systems. Part 4: Data communication protocols
13. CEI 62056-61 - Electricity metering – data exchange for meter reading, tariff and load control – Part 61: Object identification system (OBIS)
14. CEI 62056-62 - Electricity metering – data exchange for meter reading, tariff and load control – Part 62: Interface classes
15. CEI 62056-46 - Electricity metering – data exchange for meter reading, tariff and load control – Part 46: Data Link layer using HDLC protocol
16. CEI 62056-53 - Electricity metering – data exchange for meter reading, tariff and load control – Part 53: COSEM Application Layer

17. CEI 62056-21 - Electricity metering – data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange

18. CEI 62056-42 - Electricity metering – data exchange for meter reading, tariff and load control – Part 42: Physical layer services and procedures for connection-oriented asynchronous data exchange

For the thermal energy measurement, the rules are according to:

	Indicative	Title	Year of publication
1	SR EN 1434 –1	Thermal energy meters, Part 1: General View.	1998
2	STAS 6696	Taking samples (measurements)	1986
3	EN 1434–2,3,4,5,6	Heat meters	1997
4	ISO/IEC 7480	Information technology – Telecommunications and information exchange between systems -- Start-stop transmission signal quality at DTE/DCE interfaces	1991
5	ISO/IEC 7498-1	Information technology -- Open Systems Interconnection – Basic Reference Model: The Basic Model	1994
6	PE 002	Regulation for the provision and use of thermal energy	1994
7	PE 003	Nomenclature of inspections, testing and proof of installation, commissioning and start-up of power plants	1984
8	PE 502-8	Norms for providing technological facilities with measuring devices and automation. Heat Points	1998
9	SC 001	Framework solutions for metering installation to plumbing and heating installations in existing buildings	1996
10	SC 002	Framework solutions for metering water consumption, natural gas and thermal energy associated with installations from apartment blocks	1998
11	OIML R 75	(International Recommendation) Thermal energy meters	1988
12	NTM-3-159-94	Metrological verification of thermal energy meters	1994

2.4. IPMVP and IEEFP Adaptation Activities

See Appendices F and G for recommended amendments/additions to IPMVP and IEEFP. Include materials for IPMVP Vol I, Appendix C.

These amendments will be reviewed in the Zagreb meeting and finalized with EVO thereafter.

2.5. Training Target Audiences

- Target audience groups and ways to access each on topics of:

- M&V
- Financing (current financiers and those not engaged already).
- List in Appendices D & E those people or organizations to reach/engage.

3. APPENDICES

A. **Local Advisory Group ("LAG")** – list of targeted people from the EE Stakeholders' list that will help promote the PERMANENT program and its events

	Local Advisory Group Romania - IPMVP
1	Dr. Cristian Tantareanu – ENERO
2	Mr. Florin Pop – EnergoBit
3	Mr. Vasile Grasin – Eco Erg
4.	Ms. Geta Padurean - Eco Erg
5.	Mr. Cornel Corha – ARCE (National Agency for Energy Conservation)
6.	Dr. Corneliu Rotariu – ANRE (National Authority for Energy Regulations)
7	Mr. Mihai Voronca – Executive Director Romanian Energy Efficiency Fund
8	Dr. Stefan Gadola – Vice-president Romanian Energy Efficiency Fund

B. **M&V Plans and related Savings Reports** - two examples of each by candidate trainers

C. **IEEFP Working Group** – list of people to be targeted to help develop and promote the local presentations and workshops (may include LAG members)

	IEEFP Working Group
1	Dr. Cristian Tantareanu – ENERO
2	Mr. Florin Pop – EnergoBit Group CEO
3	Mr. Calin Vac – Romanian Opportunities – Financial Consultant
4	Mr. Petru Petrut - BRD Groupe Societe Gererale
5	Ms. Dana Morar – KIWI Finance
6	Dr. Corneliu Rotariu - ANRE
7	TBD – Insurance Company

D. **M&V Trainees** - list of people to be targeted for training

To be completed after the first agree of the training sessions.

E. **IEEFP Introduction Participants** - list of people to be targeted to attend the first "IEEFP Introduction Forum"

To be completed after the first agree of the training sessions.

F. **Recommended IPMVP Amendments** - specify recommended changes to current text of IPMVP. Show page reference, current text, proposed text and reasons for change.

   To be completed after the final verification of the translation

G. **Recommended IEEFP Amendments** - Specific changes recommended to current text of IEEFP. Show page reference, current text, proposed text and reasons for change.

   To be completed after the final verification of the translation