PERMANENT
COUNTRY REPORT

Poland

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

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Jerzy Piszczek
Szymon Liszka
FEWE

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1. INTRODUCTION TO THE PROJECT

1.1 Investment Potential in Energy Efficiency

The issue of the energy efficiency potential in Poland has been has been approached by many institutions and researchers. Some general findings have been publicized along with conclusions and recommendations. The Polish National Energy Conservation Agency, which is a governmental body, presents in its web site the following description and general findings, regarding the ongoing situation in Poland (excerpts from: http://www.kape.gov.pl/EN/index.phtml):

"In fact very little is known about energy efficiency in Poland. The available data is very scarce and hardly compatible to international standards. Poland is one of the very few countries which do not posses action plan for energy efficiency. The following data show that the factors are improving slowly anyway they remain well behind international levels in energy sustainable consumption.

The state of art regarding energy efficiency in Poland is as follows:

- The GDP energy intensity is 1.5...2.5 times higher than the average indicators in EU countries "PEEREA Report In-depth report.....",
- It is likely that low energy efficiency remains a barrier between Poland and EU after accession unless immediate action to strengthen appropriate capacity is immediately taken.

Measures to improve energy efficiency have been far focussed in particular on the residential sector. The Thermo-Modernisation Programme and Fund, which have been in operation since 1999, provide technical and financial support for energy end-users improvements in residential buildings, reduction of energy loses in heat distribution networks and substitution of conventional energy by non- conventional sources, including renewables.

Energy efficiency potentials and measures to promote energy efficiency in the tertiary and transport sector still need to be addressed.

According to the Assumptions for Poland's Energy Policy until the year 2020, renewables will play an important role in fostering security supply and help to achieve Kyoto targets. The implementation of renewable energies is also beneficial for energy diversity and for the development of local markets, energy infrastructure and employment.

The state of art regarding renewable energy sources in Poland is as follows:

- In year 2000 renewables contributed to total electrical energy consumption less than 2 % (excluding one big water power station it was 1,4 %),
- Official target for 2010 aims at 7.5 % of electricity from renewables which is well below the EU target 22.1 %."

In the further part of this cited web-report, the following perpectives for Poland have been described by KAPE (*ibidem*):

„Poland has also made major progress towards an environmentally more sustainable energy system, both in terms of more stringent regulations concerning emissions from fossil fuelled generating plants, as well as with regard to the gradual substitution of coal to natural gas.

A policy in favour of energy efficiency should incorporate three key elements:

- Potential for cost-effective energy savings;
- Acceptance on the part of energy users of improved technology and/or modified patterns of behaviour; and
- Access of consumers to resources, products and skilled assistance to help them make informed decisions.

Consequently, the energy policy should integrate procedures and methods for encouraging the consumers to the uptake of energy efficient technology and behaviour through an improved understanding of their motivation and need for information on EE.

Renewables also play a role in the environmental policy of the country. The "National Strategy for Development of Renewable Energy" was adopted by the Government in 2000. In conclusion it is written that the share of renewable energy in Poland's fuel and energy balance should increase to minimum 14% in the year 2020.

The main issues for the enlargement process are the following:

- Development of efficient, effective and equitable energy policy
- Internal energy markets (gas, electricity); speeding-up of the liberalisation process
- Building up of oil stocks
- Need for restructuring/closure of existing plants, which use solid fuels
- Promoting energy efficiency (e.g. labelling and minimum efficiency standards of electric appliances, minimum standards for liquid and gaseous fuel-fired boilers) and the use of renewables.
- Promoting co-generation.
- Developing demand side measures.
- Nuclear safety.

In energy it is important to enhance energy efficiency with a strong focus on demand side management, in particular in the building sector (responsible for around 40% of final energy demand), support the development of new and renewable energy sources, to maintain a relative autonomy in European energy supply and find common solutions to common problems.

One priority for energy and environment sectors is the option of greater and faster market penetration of more efficient energy and renewable technologies. New and modern energy efficient technologies and renewables development, which are cost effective, contribute to limit external fuel dependency by communities, enhance market competitiveness thereby stimulating economic growth and employment and improve environment in Europe (...)".

To contribute to the outlined sustainable energy policy the main activities are urgent at present in Poland:

- adoption of EU legislation on energy efficiency and renewables by proposition of coherent legal system covering sustainable energy issues related to these two elements,
- strengthening organisational framework of governmental, regional, local institutions capable of implementing the adopted legislation,
- making necessary analyses and studies in order to deepen our quantitative knowledge on possible impact of increased energy efficiency and renewables on Polish economy in the process of EU accession,
- preparation of different methods, tools and measures for overcoming barriers in energy efficiency and renewables."

The key document issued in November 2009 at the Poland's governmental level, by the Ministry of Economy is the Energy Policy of Poland until 2030, came into force in March 2010. This document (available for downloading from http://www.mg.gov.pl/English/Programmes/Polands+Energy+Policy+until+2030.htm)outlines main issues and Action Plan regarding energy efficiency improvement in Poland. On the next pages, some excerts from this document are cited:

„Improving energy efficiency is one of the priorities of the EU energy policy, whose goal is a 20% reduction in energy consumption by 2020 as compared to the "business as usual" scenario. Poland has made significant progress in this respect. Although GDP energy intensity declined by 30% within the last 10 years, efficiency of the Polish economy calculated as GDP (at euro exchange rate) per energy unit remains twice as low as the European average. Economic development, resulting from the use of new technologies, reveals a considerable increase in electricity consumption accompanied by a relative decrease in the use of other energy forms. Energy efficiency is given priority in the energy policy; and progress in this respect will be of key importance to implementing all of its objectives. Therefore, all possible steps will be taken to enhance energy efficiency".

This document defines basic objectives of enhancing energy efficiency. These are the following (*ibidem*):

- "To achieve zero-energy economic growth, i.e. economic growth with no extra demand for primary energy;
- Reducing the energy intensity of Polish economy to the EU-15 level.
- To enhance efficiency of power generation by building highly efficient generation units;
- To achieve a twofold increase (as compared to 2006) in power generation with the use of highly efficient cogeneration technology by 2020;
- To limit grid loss during transmission and distribution by i.a. modernising the existing and building new grid, replacing low efficiency transformers, and developing distributed generation;
- To increase efficiency of end-use of energy;
- To increase the ratio of annual demand for power to the maximum demand for powerat peak usage hours, which allows to limit the total cost of meeting the demand forpower."

This document also defines measures to improve energy efficiency. These are the following (*ibidem*):

- "Setting the national objective of enhancing energy efficiency;
- Introducing a systemic mechanism to support measures aimed at attaining the nationalobjective of enhancing energy efficiency;
- Stimulating development of cogeneration through support mechanisms, taking into account cogeneration from sources up to 1 MW and appropriate commune policy;
- Using mandatory energy performance certificates for buildings and apartments upon their marketing or renting;
- Determining energy intensity of devices and power-consuming products, introducing minimum standards for power-consuming products;
- Committing the public sector to serve as a role model of economical energy usage;
- Supporting investments in energy saving through preferential loans and grants from domestic and European funds, also under the Act on supporting thermomodernisation and renovations, the Operational Programme Infrastructure and Environment, and the National Fund for Environmental Protection and Water Management;
- Supporting research and development on new solutions and technologies reducing energy consumption, in all kinds of its processing and use;
- Applying Demand Side Management techniques, stimulated by diversification of distribution prices during the day and of electricity prices on the basis of reference prices as a result of

introduction of an intra-day market and sending price signals to customers with the use of remote bilateral communication via electronic meters;
- Informational and educational campaigns promoting efficient energy use."

In addition, the indicative target stemming from the Directive 2006/32/EC2 will be implemented, which assumes energy savings of 9% of the annual average amount of end-use energy consumption from the period 2001–2005 by 2016 (i.e. by 53,452 GWh) laid down in the National Action Plan for Energy Efficiency, adopted by the European Committee of the Council of Ministers on 31 July 2007 and other measures stemming from the document, which are not listed herein."

„ Expected effects of measures to improve energy efficiency as a result of implementing the proposed measures, the increasing consumption of energy by the Polish economy is expected to slow down, thus increasing energy security. Reducing energy consumption has also a measurable effect which consists in avoiding emission of pollutants by the energy sector. Finally, stimulating investments in modern energy-saving technologies and products will contribute to enhancing innovation in the Polish economy. Energy savings will significantly add to the improvement of economy efficiency and competitiveness."

Improving energy efficiency is a Priority No. 1 in this governmental document. The following measures have been defined for the uppermost level, to achieve the predefined objectives (*ibidem*):

- „Setting the national objective of enhancing energy efficiency
- Introducing a systemic mechanism to support s aimed at attaining the national objective of enhancing energy efficiency
- Stimulating development of cogeneration through support mechanisms, taking into account cogeneration from sources up to 1 MW and appropriate commune policy
- Using mandatory energy performance certificates for buildings and apartments upon their marketing or renting
- Determining energy intensity of devices and power-consuming products, introducing minimum standards for power-consuming products
- Committing the public sector to serve as a role model of economical energy usage
- Supporting investments in energy saving through preferential loans and grants
- from domestic and European funds
- Supporting research and development on new solutions and technologies reducing energy consumption, in all kinds of its processing and use
- Applying Demand Side Management techniques, stimulated by diversification of distribution prices during the day and of electricity prices on the basis of reference prices as a result of introduction of an intra-day market and sending price signals to customers with the use of remote bilateral communication via electronic meters
- Informational and educational campaigns promoting efficient energy use"

The document specifies the following most important elements of energy policy at the regional and local level (*ibidem*):
- „ Aiming at fuel and energy savings in the public sector by implementing measures laid down in the *National Action Plan for energy efficiency*;
- Maximising the use of the local renewable energy potential, both for the generation of electricity, heat, cold, cogeneration, as well as for generating liquid biofuels and biogas;
- Increasing the use of technologies of high-efficiency cogeneration of heat and electricity, as a favourable alternative for supplying energy to heat systems and large facilities;
- Developing the locally centralised heating systems which allows to improve efficiency and environmental parameters of the heat supply process and to increase the local level of energy security;

- Modernisation and adjustment of the electricity distribution network to the current needs of the customers, in particular the modernisation of networks in rural areas and the networks supplying the areas characterised by low energy consumption;
- Expanding the natural gas distribution network in areas with poorly developed gas network, in particular in northern and eastern Poland;
- Supporting the infrastructural investments of strategic importance for energy security and development of the country in the communes, in particular the construction of transmission networks (for power, gas, crude oil and liquid fuels), storage infrastructure, energy resources mines and large system power plants."

More detail assessment of the existing potential related to energy efficieny has been analysed by FEWE[12] in the areas of economy that have been recognized during the analytic work.

Potential for energy efficiency

Construction and retrofitting of new power sources involves reconstruction of those existing power generation capacities that should be turned-off due to technical decapitalization. Another step is retrofitting and modernizing of the existing power plants regarding their operation beyond 2030 to follow environmental requirements and technical development. Final step is construction of new power plants to follow energy demand from the Poland's economy and tertiary sector.

By the year 2020 the amount of 6500 MW capacity shall be withdrawn from the power sector (coal power plants) and by the year 2030 – next 10068 MW. In order to cover the forecasted power demand, and to rebuild the witdrawn capacity it is necessary to erect new generating plants:

- by 2020 - 8680 MW
- by 2030 - 23300 MW.

Energy efficiency potential in households, buildings and SME-s includes the following components:

- streets and indoor lighting,
- heating and preparation of hot tap water in buildings, local boiler stations and public heating plants,
- service of cooling / freezing, boiling / cooking, washing etc.,
- small and medium power electric drives,
- heat and power grids,
- production industry (potential not analized for quantity),
- transportation (potential not analized for quantity),
- public CHP (potential not analized for quantity).

The value of energy efficiency potential was computed for the following undertakings:

- thermomodernization of external walls, windows, roofs etc.,
- installing of automation equipment,
- modernization of heating system,
- heat recovery from ventilation,
- modernization of heat-only-boiler plants,
- modernization of through-flow hot tap water heaters,
- use of PV,
- modernization of local (settlement) boiler plants,
- modernization of DH heat sources.

[1] Raport "*Możliwości zwiększania efektywności energetycznej polski w ramach wdrażania pakietu energetyczno-klimatycznego UE*", 2010
[2] FEWE, PKE, INFORCE: "*Report on energy efficiency potential in selected groups of end users…*", Katowice, 2009

The analysis shown that economic feasibility for specific components of this potential is strongly sensitive to increase of fuels and energy prices. Within the total potential exceeding 520 PJ/year, the amount of ca 161 PJ/y can be considered economical as for the present pricing breakdown. Regarding the costs for conserved energy (CCE) there is a range of energy efficiency potential for which it would be very feasible to use some 'leverage' mechanisms (e.g. low-interest loans, donations, tax releases, white certificates, etc.) because it is undoubtedly better to the economy to support financially a certain part of enercy conservation costs rather than to pay CO_2 emission fees.

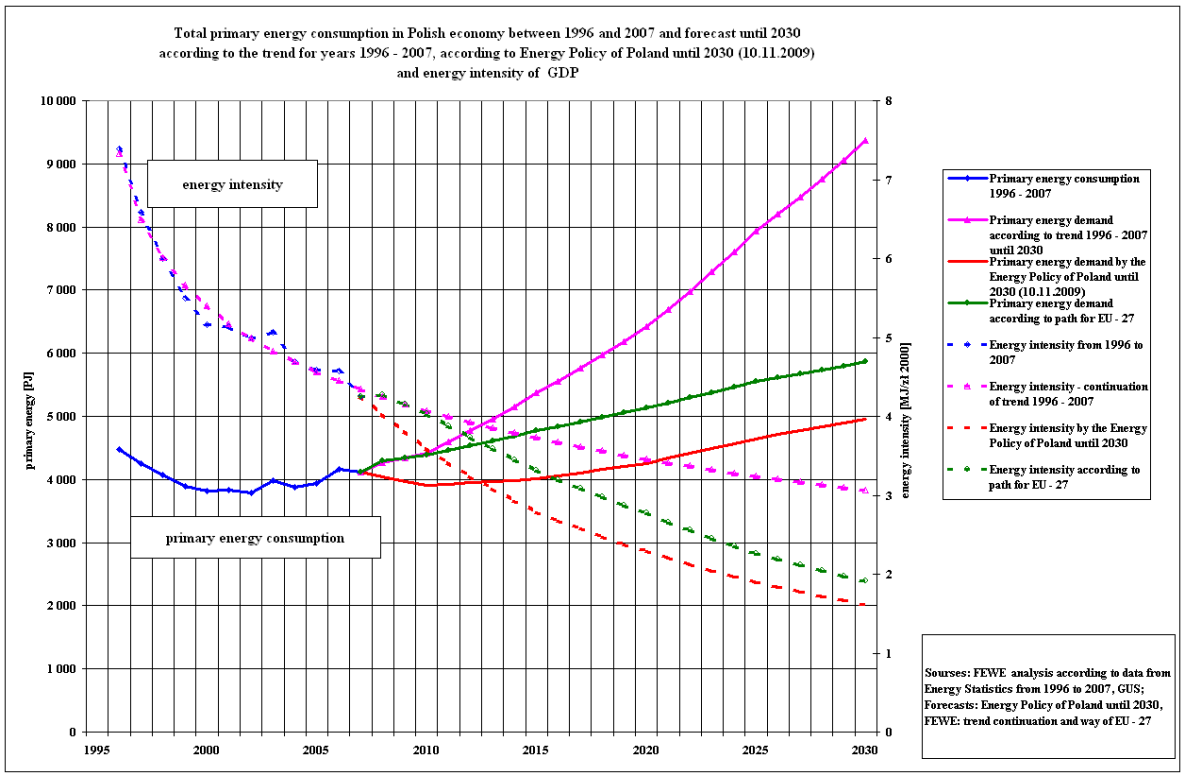
Electric drives

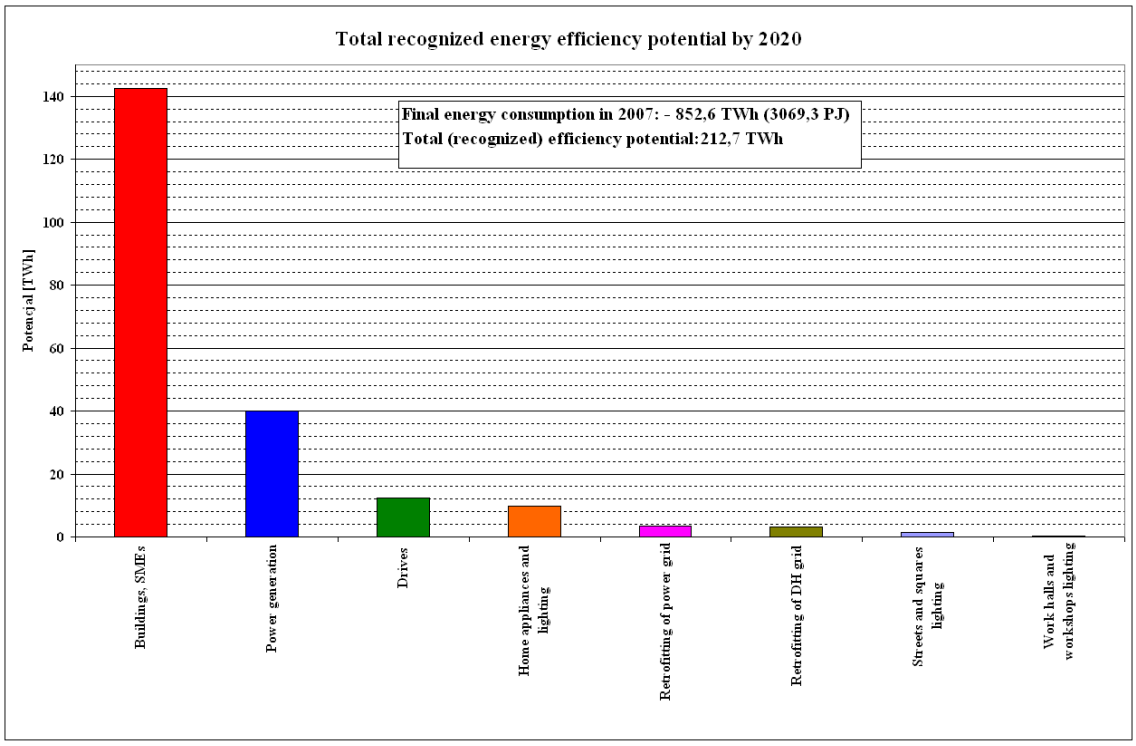
The electricity savings potential related to electric drives was estimated for the following groups of devices:

- electric motors 0,75 – 3000 kW power,
- frequency control (VSD) for the a/m power interval,
- centrifugal pumps (replacement), between 4 and 130 kE,
- circulation pumps (replacement from C and D class with A class), power above 3 kW.

As for the three first groups, the energy savings potential reaches 11,7 TWh with highly economical results as well for energy savings as CO_2 emission mitigation.

Further energy savings potential is available for modernization of transmission and distribution power and heat grids, lighting of streets, squares, production halls and workshops.





The total energy efficiency potential estimated for the analysed group of 32 undertakings reaches as much as 213 TWh/year. The effect of reducing heating demand, improving of energy generating and distributing was recalculated into TWh. The share in that respect reaches 25% of the total final energy consumption reported as for the year 2007.

Undertaking	Potencjal [TWh/year]	Potencjal PJ/r
Buildings, SME-s thermal retrofitting	142,5	513,0
Power generation	40,0	144,0
Drives	12,4	44,7
Home appliances and lighting	9,7	34,9
Retrofitting of power grid	3,5	12,5
Retrofitting of DH grid	3,1	11,0
Streets and squares lighting	1,3	4,7
Work halls and workshops lighting	0,2	0,9
TOTAL	**212,7**	**765,8**

The highest share of energy savings and efficiency belongs to heat use in buildings (67%), the next position belongs to improvement in power generation (ca 19%) and improvement of electric drives efficiency (5,8%). Last but not least places on this ranking refers to high efficiency home appliances (4,6%).

The priority given to the energy efficiency issue within the energy policy resulted from the fact that in the nearest 5 –8 years to come, the effects of reducing electricity use will in practice become the only one mean to reduce the shortage appearing in the electricity balance: supply-demand of energy *versus* electricity efficiency undertakings lead to reducing the costs coupled with production of commodities and services and to mitigate the effects of growing electricity prices. In the cited *Report*, potentials for energy efficiency improvement were analyzed for buildings, small and medium enterprises, households, electric drive systems and street lighting local and district heat plants. In order to utilize the potential assessed in

the quoted *Report*, a proposal of instruments was guide lined, including information, educational, regulatory, financing, legal and institutional instruments, needed as a condition for using this potential.

1.2 Key Barriers To Investing in Energy Efficiency

It is necessary to make use of the existing energy conservation potential and to launch relevant energy policy instruments such as the Energy Efficiency Law. At the same time it is necessary to revise the existing energy efficiency mechanisms and to propose new ones in order to overcome the existing and forthcoming barriers, that cause a relatively poor interest of many economic entities in implementing energy conservation projects.
This finding refers to the public sector, housing associations and service companies and can be mostly observed in housing settlements supplied with heat from local boiler stations and small / medium district heating systems. In such cases, usually the basic issue comes down to the cost intensity of small project related contracts, which is high from the viewpoint of financing institutions.

It is also important to conclude that the operating model '*local government – program – supporting financial institution – operator – house owner*' is not strong enough.

The existing barriers resulted in a few spectacular collapses of ESCO undertakings in the past, while now some next ESCO entities struggle against organizational and financial problems.

An important issue that may raise barriers is the financial ability of self-governments and the regulatory limits of incurring into debt by them. Sometimes an action including financing of an ESCO may be helpful in avoiding debt related problems of municipal budget deficit (shortage).

Competition from available financial support

At present, the major barrier can be identified in the market position of the ESCOs. The ESCO formula is potentially attractive, however, in the Polish practice, energy efficient undertakings in the sectors that are predominantly carried out using any available forms of donations, grants etc, wherever such opportunity can be used. This means, that if an energy efficiency oriented investment can be co-financed from e.g. a National budget financing line (like it is in case of thermal retrofitting law) such option is always approached in the first order, by potential investors / ESCO clients. ESCO promises energy effects but requires investment and active participation of the investor during the entire project lifetime, while effects can come relatively late after the investment money has been spent. In opposite to this, supported / donated EE undertakings give energy effects in a way "for free" which situation generates a strong market competition against ESCO formula. This case can be specially exemplified in the construction sector, including public service buildings, such as education objects or health care objects. Operator and managers first of all search for EU donations or support from National budget. Availability of supporting financial opportunities 'moves' the ESCO proposals to a more remote position in the row.

Project preparation procedure

Another question that is a strong barrier is related to the technical complexity of energy efficiency undertakings. Usually it is pretty difficult to prepare a good EE project, if numerous technical details must be thoroughly analyzed and selected. Usually, those potential ESCO clients who are obliged to run the Public Procurement procedure have not enough skilled staff that would be technically educated in a way to prepare tender materials and to correctly define an EE project. Such project planning needs to take into account definition of operational criteria, project lifetime, obligations of the operator and precisely defined financial engineering. These aspects require different works to be done by profile-skilled staff. In order to make a correct plan and tender documentation, a specialized entity should be invited, but here another problem appears: an ESCO company that might help in that respect, should rather be excluded from tendering in that project.

One more aspect appears in that respect: the local authorities (municipal) are obliged under the Public-Private Partnership (PPP) Law to prepare an Analysis of the Undertaking which is in fact – in its scope - almost equivalent to a feasibility study. Therefore there is a need to analyze legal aspects and risk of the subject undertaking. On the other hand such analysis may rather be done once the private partner is known, because legal aspects and risk elements are partner-specific and are included in the bidding documentation, to a large extent impacting the tender results. So 'the circle closes'. This is another condition that makes preparing of a PPP undertaking analysis a difficult task to the local authorities.

These reflections do less apply to private companies (as ESCO clients) who are not obliged under law to follow the Public Procurement regulations.

Lack of an Facilitator institution

The situation described above is well known to any ESCO in Poland and to many public investors as well, and potentially could be solved by establishing, under relevant legal regulations, the institution of project facilitator, like it is practiced in other countries. The facilitator could be an independent body involved to support public investors in correct preparation of tender documentation, including detailed technical aspects and legal formulas and provisions to be put into the future EE contract. Unfortunately, such institution does not exist in Poland. Because most of potential ESCO clients are state owned or public entities, obliged to follow the Public Procurement Law, the ESCO formula will always struggle problems until the facilitator institution is not established. The process of preparing all documents and action plans is very complicated and it is hard to require from the potential ESCO clients who often operate in areas laying far away from the energy issues, to prepare really good project proposals. This is why a facilitator would be very helpful in preparing a project from the very beginning through the entire planning process up to the moment of signing up the contract.

A facilitator entity can be any independent organization, such as KAPE, FEWE, lawyer office, Energy Regulation Office or whoever else who could help investors to prepare ESCO undertakings, and follow the Public Procurements Law, at the same time. This Law – unfortunately – in very most cases defines the price as the main bidding criterion which provision is often 'inconvenient' to the ESCO companies. However, in that respect some positive changes can already be observed: also the 'in-merits' contents of tender offers can be taken into account during the selection procedure. This means that tender price has lost its monopoly as a criterion.

Energy efficiency (EE) investments are not being made at a fast rate for many reasons, as summarized below.

The table presents averaged results of 12 questionnaires filled-in by different experts involved with the energy efficiency issues that are subject to this report.

The responders have been selected among individual stakeholders groups defined in the source table suggested in the Report Template. Some of the responders have filled-in all columns and some of them only the columns directly addressing their professional profile.

The detail source result table of this questionnaires can be found in the last part of this report.

AVERAGED RESULTS OF 12 QUESTIONNAIRES DISSEMINATED BY FEWE AMONG SELECTED STAKEHOLDERS AND PRACTITIONERS					
BARIER **Score „2" – very important** **Score „1" – important** **Score „0" – not affecting**	**"EE" STAKEHOLDERS AFFECTED**				
	Energy Users	**Lenders (Debt)**	**Investors (Equity)**	**EE Product & Service Suppliers**	**Public Interest NGOs & Gov't Agencies**

Fragmented and diverse industry of energy users and product/service suppliers	**1,0**	**1,0**	**1,0**	**0,9**	**1,3**
Inadequate legal/regulatory framework	**1,6**	**1,3**	**1,2**	**1,3**	**1,7**
Lack of knowledge of EE benefits and techniques for managing risks	**1,6**	**0,9**	**1,2**	**0,9**	**1,4**
Lack of commercially viable financing (unattractive terms & tenor)	**1,6**	**0,4**	**0,8**	**1,4**	**0,9**
Small investments and benefits, and high transaction costs	**1,7**	**1,1**	**1,5**	**1,1**	**1,7**
Complex transactions with energy service companies (ESCOs)	**1,9**	**1,1**	**1,5**	**1,3**	**1,7**
Some complex technologies	**0,7**	**0,4**	**0,3**	**0,3**	**0,6**
Low priority and rates of return	**1,6**	**1,1**	**1,5**	**1,1**	**1,3**
Limited technical capabilities	**0,8**	**0,0**	**0,2**	**0,3**	**0,3**
Low (subsidized) energy prices	**1,0**	**0,4**	**0,8**	**1,0**	**0,7**
Other	**1,0**	**1,0**	**1,0**	**2,0**	**1,0**

Specific comments attached by the experts:

Expert FEWE:

- Lack of aid financing

Expert Industrial Development Agency, SA :

- Lack / too less preferences in ways to receive financing grants, missing low interest rate offers, mortgages.
- Lack / insufficient systems of educating the technical staff
- Lack of regulations how to consider energy use costs (LCC) in the pubblic procurements

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 follow-up half day, one day or two day training in relevant topics for target audiences.

1.4 Target Audiences For Training In Poland

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.).
- 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.

Technical messages about transparent reporting of actual energy and money savings will be delivered in half hour, half day, 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.

The Polish “Long List” of potential Audiences is presented in the further part of the Report.

2. DETAILS OF COUNTRY ANALYSIS

2.1 Market potential

General approach[3]

Health care objects (public)

Bog hospitals who are potentially the best candidates for ESCO contracting almost entirely can become subject to such undertakings. This refers to their local boiler plants that can be retrofitted either remodeled into cogeneration units. Everywhere the local potential of RES can be used, e.g. solar collectors, ground heat exchangers, perhaps PV units etc. The problem is that Polish hospitals suffer from shortage of money for their basic /statutory activities, are permanently subject to reforming and the managers are usually not able or even not allowed to make contracts with time span longer than 1 year. This problem derives also from the formula of the National budget allocation system. Generally a promising solution – which is however still awaited – would be to commercialize the health care system for better control of budget and better quality of the basic tasks of health care system.

Municipalities and housing (residential) units

The ESCO potential mainly refers to heat management in buildings administrated, owned or operated by municipal authorities. In that respect one of the major issues is to achieve a full agreement between particular actors of municipal authorities, that means between the President (or Mayor) of a municipality, its Board and Council. Discrepancies between these bodies result in failures of ESCO related ideas because usually any energy efficient undertakings in municipalities require a long payback time and consequent discipline of ESCOs and buildings administrators. The investment potential that could be explored by ESCO is very high, for instance in Krakow there are a few hundred municipal objects / of which only ca 10% have been retrofitted in terms of heat / energy conservation. Big municipalities are in better position, because they usually have practical experience and methodology related to bidding procedures and good preparation of EE projects. Administration staff of big municipal units often hires an engineer who is familiar with the energy conservation issues that should be solved and he recognizes the ways to struggle against the problems. Big municipalities also hire experienced lawyers who solve any non-technical issues related to ESCO contracting.

Smaller administrative units may establish or join inter-municipal associations that are stronger and so they potentially have more technical and financial possibilities to solve the problem of hiring an ESCO company, but this requires a very deep and reliable agreement and confidence between the parties and also requires to formulate tasks into packages.

Another story are housing cooperatives and associations who operate significant resources of housing in municipalities but are too small for good development of projects. Usually such smaller units who operate residential buildings launch their own competitions to select energy operator because they are not obliged to fully follow the Public Procurement Law. This area of tertiary sector opens a promising potential for ESCO, however is a next very clear evidence that a facilitator institution to support such units in contracting ESCO would be definitely useful and advantageous.

[3] Based on own FEWE's experience and interviews with industrial practitioners from ESCO. Also consulted with the above mentioned Banks.

Industry

A very high energy efficiency potential to be explored by ESCOs exists in the industry. This refers to heat efficiency and recovery as well as to power management (e.g. electric drives). In terms of energy amount to be potentially conserved, the amounts are huge (see the Table in Chapter 1), however in case of industry there exists another bottle-neck, namely - the acceptable payback time. The market situation of industrial enterprises, especially in the heavy industry is liable, so that the industry is usually not interested in any energy saving projects that assume payback time longer than 3-4 years.

From the technical viewpoint, there are many good opportunities, ranging from using additional turbines to decompress media, utilization of waste heat, modifications of old heat consuming technologies, utilization of solid / liquid waste, etc.

Whatsoever – the 'prospect horizon line' for investments and ESCO contracts remains limited to next 3-4 years.

Potentials Summary[4]

Undertaking	Investment size - Cc	Energy use - E_ref	Energy use - E_effect	Energy savings potential (Eref-Effect)	Heat price	Energy cost - Ke_ref	Energy cost - Ke_effect	Energy savingpotential (Ke_ref - Ke_effect)
	mln PLN[5]	TJ/y GWh/y	TJ/y GWh/y	TJ/y GWh/y	zł/GJ zł/MWh	mln PLN	mln PLN	mln PLN
Modernization of transmission network (district heat)	16 165,08	239 834	227 342	12 491	48,21	11 562	10 960	602
Modernization of transmission network (power)	23 205,00	223 160	215 883	7 277	128,80	28 743	27 806	937
Streets and squares lighting	2 627,15	2 627	1 314	1 314	500,00	1 314	657	657
Lighting of halls and workshops	407,85	476	229	248	500,00	238	114	124

[4] Developed by FEWE
[5] 1 EUR = 4,2 PLN

2.2 EE Stakeholder Identification

A) Ministry of Economy

B) Government and EE Development Agencies (local and regional)

C) Development Banks (local and regional), Government Structural Funds, Commercial Banks:

Banking offer

Another barrier is connected with a rather poor banking-market offer in terms of supporting ESCO undertakings. There exists a bank guaranty credit line (BGK – described below) addressed to the investors, but the practice shows that this offer does not differ significantly from other similar banking products widely available in the market. It does not comply clear preferences tailored to support ESCO undertakings, for example by means of specially dedicated financial instruments. This line has almost not been used by now. In the mean time there appeared an idea to use this financial line for supporting of establishing the facilitator institution but this idea never came into reality.

The Bank Gospodarstwa Krajowego*: The GEF Energy Efficiency Program*

http://www.bgk.pl/fundusze/inne/gef.jsp

Based upon an agreement with the Ministry of Economy and Labor, the Bank Gospodarstwa Krajowego is managing Energy Efficiency Project financed by GEF – an organization administrated by the World Bank. The objective is to achieve improvement of the environment through implementing forecasts and projects contributing to solving global problems. The master objective of this Project is to support (by 30th June 2011) any entities who undertake the investments oriented towards energy efficiency. The target group of the project involves individual persons, legal entities, local governments, cooperatives and companies that operate according to the ESCO formula. The Bank Gospodarstwa Krajowego grants guaranties for loan payback in the range of 50 – 70% of the loan sum, depending on the project characteristics (mode). The overall sum of guaranties cannot exceed PLN 2 Millions.

Breakdown of this line is as folows:

Guarantee Component – US$ 5,7 Mio, dedicated for securing of loans payback, in the form of guarantees, granted by commecial banks; the target tasks include energy efficient investment all over Poland.

Capital Grant Component – US 2,0 Mio, to support investments for energy efficiency with a long PBP, in the Małopolskie Voivodship, by the Przedsiębiorstwo Oszczędzania Energii ESCO Sp. z o.o.

Technical Assistance Component – US$ 3,0 Miofor supporting and monitoring the Project.

The GEF Guarantee is a liquid asecuration of a loan for energey efficient investments. The applicants (entities) must prove their creditability, even though they have problems with securing the loan. The real asset of the invest,ment location must belong to the entity. However, also the ESCO companies may apply for such guarantees granted by GEF.

The tasks that may be supported from this line shall include some of the following undertakings: modernization of lighting in public spaces, (indoor and outdoor), installation of RES especially for own use, necessary technical and economic analyses and documentation for the a/m undertakings, any actions that

qualify for obtaining thermomodernization bonus and thermomodernization of external buildings walls, along with modernization of heat sources, networks,, systems, HTW systems, ventilation induced and conventional, air heating and conditioning..
Terms: guarantee period of payback up to 10 years and 3 months, sum of guarantee – up to 70% of the loan sum and maximum sum – PLN 2,0 Mio. Normally an own , *in blanco* note is required.

The Bank Ochrony Środowiska: Loans for companies that invest under the the „*Third Party Financing*" formula.

Subject of crediting includes ecological investments aimed at saving of electricity, heat, water consumption or liabilities resulting from use of the environment as well as underkatings of waste landfilling or utilization, sewage treatment or water preparation. The undertankings shall guarantee the payback of a loan. Entities who may apply for such loan include companies who implement new technologies in the assets of the ordering party in order to generate incomes that derive from savings or fees.

Terms (http://www.bosbank.pl/index.php?page=ekologia_kredyty_w_formule_trzeciej_strony):

- Loan currency – PLN denominated,
- Maximum sum of loan up to 80% of the investment costs
- timespan – up to 10 years
- vacation – up to 6 months upon completing the task
- interest rate – variable: WIBOR 1M + margin
- preparation fee - between 0,5 and 4,0% of the applied loan size.

Loans aimed at energy saving undertakings include investments that lead to mitigation of energy consumption, such as replacement or retrofitting / development of street lighting, indoor and outdoor lighting in public service buildings, industry, service sector, replacement of industrial electric motors, retrofitting of cranes, including elevators in residential buildings, technology retrofitting towards less energy intensive, use of energy efficient commodities and equipment in new plants and other undertakings for saving electricity.

These loans may be granted to self-governments, companies (including micro-companies), housing associations.

a. Other Government and Non Governmental Agencies and bodies

Other important stakeholders, Governmental and Non-Governmental:

- **Public Procurement Office** follows the Environmental Criteria for GPP, addressing (in the scope of this Project): construction sector, electricity and office hardware and several other branches beyond this report subject.
- **Energy Regulatory Office** http://www.ure.gov.pl/portal/en/
- **Energy Efficiency Group**
- **Social Council for the National Emission Mitigation Program**
- **The Polish National Energy Conservation Agency** (linked and cited above in the text)
- **National Energy Conservation Agency** http://www.managenergy.net/actors/A2841.htm
- **Forum of Electricity and Gas Consumers**

Other Potentially interested Entities - Stakeholders

1. Instytut Energetyki
2. Instytut im. Adama Smitha
3. Instytut badań nad Gospodarką Rynkową
4. Instytut Kwiatkowskiego
5. Instytut Badań Systemowych PAN
6. Instytut Badań Strukturalnych (Maciej Bukowski)
7. Instytut Paliw i Energii Odnawialnej
8. Instytut Rozwoju i Promocji Kolei
9. Instytut Sobieskiego
10. Instytut Technologii Cieplnych
11. Instytut Energetyki Odnawialnej
12. Instytut na Rzecz Ekorozwoju
13. Główny Instytut Górnictwa
14. Narodowe Centrum Badań i Rozwoju

Chambers

1. Krajowa Izba Biopaliw
2. Krajowa Izba Biogazu (Tomasz Bortkiewicz)
3. Izba Gospodarcza Energetyki i Środowiska
4. Polska Izba Gospodarcza Zaawansowanych Technologii
5. Krajowa Izba Biomasy
6. Izba Gospodarcza Gazownictwa
7. Izba Gospodarcza Ciepłownictwo Polskie
8. Polska Izba Gospodarcza Energetyki Odnawialnej
9. Izba Energetyki Przemysłowej i Odbiorców Energii
10. Ogólnopolska Izba Gospodarcza Recyklingu
11. Izba Gospodarcza Przemysłu Elektromechanicznego
12. Izba Gospodarcza Energetyki i Ochrony Środowiska
13. Krajowa Izba Gospodarcza (dr Mieczysław Bąk, dyr. Katarzyna Grzejszczyk)
14. Forum Odbiorców Energii (Andrzej Werkowski, Henryk Kaliś)
15. Hutnicza Izba Przemysłowo-Handlowa
16. Polska Izba Przemysłu Chemicznego

Associations

1. Polskie Stowarzyszenie Energetyki Wiatrowej
2. Stowarzyszenie Producentów Wełny Mineralnej (Maria Dreger)
3. Towarzystwo Rozwoju Małych Elektrowni Wodnych
4. Stowarzyszenie Elektryków Polskich
5. Polskie Stowarzyszenie Przewoźników Pasażerskich Międzynarodowego Transportu Samochodowego w Warszawie
6. Stowarzyszenie Rozwoju Kolei Górnego Śląska
7. Stowarzyszenie Polskich Energetyków
8. Polskie Towarzystwo Przesyłu i Rozdziału Energii Elektrycznej
9. Stowarzyszenie Gmin Przyjaznych Energii Odnawialnej
10. Stowarzyszenie Budowniczych Domów I Mieszkań
11. Polskie Stowarzyszenie Budownictwa Ekologicznego
12. Stowarzyszenie Młodych Inżynierów Lotnictwa
13. Polskie Towarzystwo Elektrociepłowni Zawodowych
14. Polskie Stowarzyszenie Audytorów Energetycznych
15. Polskie Towarzystwo Obrotu Energią
16. Polski Komitet Energii Elektrycznej
17. Koalicja Klimatyczna

Foundations

1. Fundacja na Rzecz Energetyki Zrównoważonej
2. Fundacja na rzecz Efektywnego Wykorzystania Energii
3. WWF Polska
4. Fundacja Poszanowania Energii
5. Fundacja Boll
6. Fundacja Boscha
7. European Climate Foundation (T.Terlecki)

Confederations / Employers/Agencies/Offices

1. Lewiatan KPP (Henryka Bochniarz)
2. Konfederacja Pracodawców Polskich (Andrzej Malinowski)
3. BCC
4. Ogólnopolski Związek Pracodawców Transportu Samochodowego
5. CECED-Poland (Wojciech Konecki)
6. Krajowa Agencja Poszanowania Energii

7. Konfederacja Budownictwa i Nieruchomości
8. Agencja Rynku Energii
9. Federacja Konsumentów
10. KASHUE
11. Urząd Ochrony Konkurencji i Konsumentów
12. Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej

D) Best Practices and Barriers:

Every-day practice

The issue of contracting is also important, because in any ESCO contracts, the contractual obligations aimed at energy efficiency lie with both the ESCO and the Client, who directly operates the system and decides on actual use of energy. The operator must eliminate its own 'bad habits' in terms of using energy in his objects and must show a strong self-discipline in that respect. Otherwise the ESCO contract idea will fail. All details in that respect shall be precisely defined in the contract.

Case Studies Examplifying the Best Practice result achieved or close to be achieved

Częstochowa:
(240 thousand inhabitants)
Target – entire city:

Sectors	*The year 2007*	*Intermediate objective – energy use reduced by 2% (2010)*	*Objective – energy use reduced by 9% (2016)*	*The year 2008*
	GWh	***GWh***	***GWh***	***GWh***
Public service sector	109 682*	107 488	99 811	125 618
Industrial sector	1 985 833	1 946 116	1 807 108	1 682 047**
SMEs	280 426	274 818	255 188	274 827
Households	1 380 834	1 353 218	1 256 559	1 397 905
Street lighting	25	25	23	17
Transportation	709 002	694 822	645 192	727 801
Total	**4 465 802**	**4 376 487**	**4 063 881**	**4 208 215**

The "Education Objects" Program, baseline as for 2008:

Verified energy use	214 603 GJ/year
Verified energy use costs	9 103 459 PLN/y
Specific energy cost	42,42 PLN/GJ
Energy Use Indicator	0,689 GJ/m^2

The "Education Objects" Program, status after completion of 3rd Stage, Y2020:

Investment	**55,5 Mio PLN**
Verified energy use	152 603 GJ/year
Verified energy use costs	6473 419 PLN/y
CCE for saved energy costs	109,39 PLN/GJ
Specific energy cost	42,42 PLN/GJ
Energy Use Indicator	0,490 GJ/m^2

A very roughly estimated potential of heat savings for the buildings administrated by the Social Buildings Association can reach 546,6 TJ.

Katowice:
(310 thousand inhabitants)
Potential of heat use reduction in public service buildings (schools, kindergardens, cultural objects, offices etc) can reach 129 TJ/year, which are 38,4% of the total use in 2007. The objects administrated by the City Residential Sector Management the potential value can be estimated at the level of 35-45%, i.e. 525 – 655 TJ/y. This is however a very rough value.

E) IPMVP and IEEFP Adaptation Activities:

No recommendations for the moment

F) Training Target Audiences:

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

Chambers

17. Krajowa Izba Biopaliw
18. Krajowa Izba Biogazu (Tomasz Bortkiewicz)
19. Izba Gospodarcza Energetyki i Środowiska
20. Polska Izba Gospodarcza Zaawansowanych Technologii
21. Krajowa Izba Biomasy
22. Izba Gospodarcza Gazownictwa
23. Izba Gospodarcza Ciepłownictwo Polskie
24. Polska Izba Gospodarcza Energetyki Odnawialnej
25. Izba Energetyki Przemysłowej i Odbiorców Energii
26. Ogólnopolska Izba Gospodarcza Recyklingu
27. Izba Gospodarcza Przemysłu Elektromechanicznego
28. Izba Gospodarcza Energetyki i Ochrony Środowiska
29. Krajowa Izba Gospodarcza (dr Mieczysław Bąk, dyr. Katarzyna Grzejszczyk)
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31. Hutnicza Izba Przemysłowo-Handlowa
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31. Polskie Stowarzyszenie Audytorów Energetycznych
32. Polskie Towarzystwo Obrotu Energią
33. Polski Komitet Energii Elektrycznej
34. Koalicja Klimatyczna

Foundations

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9. Fundacja na rzecz Efektywnego Wykorzystania Energii
10. WWF Polska
11. Fundacja Poszanowania Energii
12. Fundacja Boll
13. Fundacja Boscha
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20. Agencja Rynku Energii
21. Federacja Konsumentów
22. KASHUE
23. Urząd Ochrony Konkurencji i Konsumentów

ATTACHMENT

The below Table presents detailed results of the questionnaire action performed by FEWE among potential stakeholders and EE professionals

BARRIER	Energy Users										Lenders (Debt)								Investors (Equity)							EE Product & Service Suppliers								Public Interest NGOs & Gov't Agencies							
	SP	SL	GO	GP	PK	JW.	MP	JMP	DW	AVERAGE	SP	SL	JW.	MP	JMP	DW	BOS	AVERAGE	SP	SL	JW.	MP	JMP	DW	AVERAGE	SP	SL	SS	JW.	MP	JMP	DW	AVERAGE	SP	SL	JW.	MP	JMP	ARP	DW	AVERAGE
Fragmented and diverse industry of energy users and product/service suppliers	2	1	1	1	1	0	0	2	1	**1,0**	0	0	1	1	2	2	1	**1,0**	1	1	0	0	2	2	**1,0**	2	0	1	0	0	2	1	**0,9**	2	2	0	0	2	2	1	**1,3**
Inadequate legal/regulatory framework	2	1	2	2	1	1	2	1	2	**1,6**	1	0	1	2	1	2	2	**1,3**	1	1	1	1	1	2	**1,2**	2	1	1	1	1	1	2	**1,3**	2	2	1	2	1	2	2	**1,7**
Lack of knowledge of EE benefits and techniques for managing risks	2	2	1	2	1	1	2	1	2	**1,6**	1	2	1	1	0	1	0	**0,9**	2	2	1	0	1	1	**1,2**	0	2	1	0	0	1	2	**0,9**	1	2	0	1	2	2	2	**1,4**
Lack of commercially viable financing (unattractive terms & tenor)	1	2	2	1	2	2	2	1	1	**1,6**	0	0	0	2	0	1	0	**0,4**	1	2	0	1	0	1	**0,8**	2	1	2	1	1	1	2	**1,4**	1	1	1	0	1	0	2	**0,9**
Small investments and benefits, and high transaction costs	2	2	1	1	2	1	2	2	2	**1,7**	2	1	1	1	1	1	1	**1,1**	2	2	1	1	1	2	**1,5**	2	1	2	1	0	1	1	**1,1**	2	2	1	1	2	2	2	**1,7**
Complex transactions with energy service companies (ESCOs)	2	2	1	2	2	2	2	2	2	**1,9**	2	1	1	1	1	2	0	**1,1**	2	2	1	1	1	2	**1,5**	2	1	1	1	0	2	2	**1,3**	2	2	1	1	2	2	2	**1,7**
Some complex technologies	1	1	0	1	0	0	0	2	1	**0,7**	2	0	0	0	0	1	0	**0,4**	0	1	0	0	0	1	**0,3**	0	0	0	0	0	1	1	**0,3**	1	0	0	0	2	0	1	**0,6**
Low priority and rates of return	2	2	1	1	1	2	2	1	2	**1,6**	2	0	1	1	1	2	1	**1,1**	2	2	1	1	1	2	**1,5**	2	2	1	0	0	1	2	**1,1**	1	1	1	0	2	2	2	**1,3**
Limited technical capabilities	0	1	1	1	1	0	0	1	2	**0,8**	0	0	0	0	0	0	0	**0,0**	0	0	0	0	0	1	**0,2**	0	0	0	0	0	1	1	**0,3**	0	0	0	0	1	0	1	**0,3**
Low (subsidized) energy prices	1	1	1	1	2	1	1	0	1	**1,0**	2	0	0	0	0	1	0	**0,4**	2	1	1	0	0	1	**0,8**	2	1	1	1	1	0	1	**1,0**	1	1	1	0	0		1	**0,7**
Other[6]	1									**1,0**	1							**1,0**	1						**1,0**	2							**2,0**	0					2		**1,0**
																																							2		**2,0**
																																							2		**2,0**

[6] The "Other" suggestions are commented in the main text above

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

To be selected among the above listed stakeholders

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

Below are presented Estimations of energy efficiency potential made by FEWE. Any further M&V Plans shall include at least those issues and shall focus on local energy auditing. The below presented values to the possible extent pre-define the IPMVP baseline.. (Summarized results are presented in the text above).

Specific data[7]

Saving potential from retrofitting of DH grids:							
energy		12 491,34	TJ/year				
cost		602,21	mln PLN/year				
Average price for district heat:			48,21	zł/GJ			
Costs of retrofitting of DH grids:					16 165,08	mln PLN	
Saving potential from retrofitting of power grids:							
energy		7,28	TWh/year				
cost		937	mln zł/year				
Proce for electricity		*128,8*	*zł/MWh*	*Source: URE*			
Costs of retrofitting of power grids:				**23205,0**	**mln PLN**		

Assessment of energy consumption for streets and squares lighting:							
At the price:	0,5	zł/kWh					
Reference state		2627	GWh				
Efficient state		1314	GWh				
Reduction of installed power to result from lighting retrofitting:				50%			
Investment:		2627	mln zł				
		4000	zł/kW		After the Report by "Światłoprojekt"		
Reference power		656 787	kW		pcs	700	
Effective power		328 393	kW		power		
					before	140	kW
					after	84	kW
					Costs for modernization	560000	zł
						4000	zł/kW
					Operation time	4000	h

[7] By FEWE, for INFORCE and others

Number of entities registered in the 1st half of 2008 – by GUS			
G section 50 (workshops)		134 559	
O section 93 (other service)		82 962	
	total	217 521	
Assumption:			
Lighting power per unit:		750 W	ref
		360 W	ef

Total lighting power:		
Reference state	163 141	kW
Efficient state	78 308	kW
Lighting operation time	2920	h
Energy use:		
Reference state	476	GWh
Efficient state	229	GWh
Investment:	407,9	mln zł
price	2500	zł/kW

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

   To be selected among above mentioned stakeholders

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

   Listed in 4.0

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

   To be discussed

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

   No recommendations

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

   No recommendations