PERMANENT

SUMMARY
COUNTRY REPORT

Prepared within the project:

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

Vladimíra Henelová, ENVIROS, s.r.o.
Petar Kamburov, EnEffect Consult
Michael ten Donkelaar, ENVIROS, s.r.o.

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1. INTRODUCTION

1.1 The aim of the PERMANENT project

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 languages. With these protocols, energy efficiency can be seen as a significant investment opportunity, and thereby encourage the establishment of commercial energy efficiency lending products and services 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 energy efficiency 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.

The project will support the dissemination and acceptance of the following techniques and approaches:

- Measurement of project results - with the use of common practices for measuring results, there can be effective management of performance risk;
- Verification of guaranteed energy saving predictions - with the use of common practices for verification of energy savings achieved, investors can select projects built on good foundations, and enter investments with less fear of success.

This will lead to financing far more energy savings projects without additional collateral (beyond that of the project itself). When applying these common practices, financiers do not need to take a charge on other assets of the project owner, thus opening up more energy saving projects to available financing.

1.2 Why Country Reports

The country reports should provide an overview of existing situation in beneficiary countries of the project related to:

- Market potential for energy efficiency
- Existing regulatory and legal framework for energy efficiency and its relation to IPMVP and financing energy efficiency in the countries
- Existing barriers in financing energy efficiency projects and priorities in financing energy efficiency
- ESCOs and existing barriers to energy services wider utilisation
- Best practices (if any) in M&V

The Country report should also provide recommendations as to:

- additions to IPMVP
- additions to IEEFP

The additions should be based on existing practices in the countries, on existing legal and regulatory framework, on existing experience and knowledge. The whole process of adoption of IPMVP (the International Performance Measurement and Verification Protocol) and IEEFP (the International Energy Efficiency Financing Protocol) also involves target groups which should be trained in basics of the Protocols and some of them in its details during the training and awareness raising activities to be performed as part of the PERMANENT project.

2. ENERGY EFFICIENCY FRAMEWORK

The energy savings potential in the EU is large: 19% in industry; 20% in transport; 30% in households and services. Reducing energy consumption and eliminating energy wastage are among the main goals of the European Union (EU). At the end of 2006, the EU pledged to cut its annual consumption of primary energy by 20% by 2020. To achieve this goal, it is working to mobilise public opinion, decision-makers and market operators and to set minimum energy efficiency standards and rules on labelling for products, services and infrastructure.

2.1 Policy framework in the EU

The EU agenda on energy efficiency policy is developed around so called 'five pillars':

1. the general policy framework and the actions taken under the **Action Plan for Energy Efficiency (EEAP)**;
2. the National Energy Efficiency Action Plans based on the framework Directive on end use efficiency and energy services;
3. the legal framework for the most important consumption sector buildings – and energy consuming products;
4. policy instruments such as targeted financing, provision of information and networks like the Covenant of Mayors and Sustainable Energy Europe; and
5. international collaboration on energy efficiency.

The Energy efficiency action plan (EEAP) (COM(2006)545)

Targeting buildings, transport and manufacturing, the plan foresees a series of new Directives from 2007 to 2012. The action plan contains over 70 initiatives. The implementation of the action plan is ongoing. One third of the actions were completed in November 2008 (latest review, COM (2008)772). Measures included in the EEAP are considered to achieve energy savings of about 13% by 2020 if properly implemented by Member States.

Tax harmonisation plans are a particularly contentious area, moreover resistance from key industries, energy related product manufacturers, and changing consumer behaviour will also be potential barriers to success.

A revised energy efficiency action plan, based on the review of progress since the 2006 plan, was expected in November 2009. This has, however, been delayed and is now expected in mid 2010. The action plan is intended to outline the new legislation to be proposed in the EU on energy efficiency to achieve the 20% primary energy consumption target. Options suggested include: a national mandatory energy efficiency target; a binding obligation for Member States to establish white certificate systems; and a strong focus on energy efficiency in buildings (e.g. including the refurbishing of 15 million homes by 2020 under the European Building Initiative). The role of cogeneration is also anticipated to be boosted. One other important point is the set up of targeted finance schemes (e.g. targeting 20% bottom performing buildings).

Table 1: Energy saving potentials by final energy consuming sector and key drivers, actors and barriers of energy efficiency improvements

Sector	Share in final energy cons. (2006)	Saving potential by 2020[38]	Key drivers for energy efficiency	Key barriers	Key actors
All sectors	100%	21%	• Energy policies • Market forces/ energy prices • Financing and taxation • Awareness • Technological development	• Incomplete implementation of energy efficiency legislation • Lack of awareness • Market failures	• Everybody
Households and commercial buildings	41%	30%	• EU and national/regional legal requirements • Technological developments • Financial and fiscal incentives • Energy services Companies • Information instruments (e.g. labelling, certificates, metering, campaigns) • Behaviour trends	• High up-front costs • Owner-tenant dilemma • Lack of awareness on the benefits • Overestimation of the investment needs • No access to attractive financing options • Energy efficiency not recognized as business opportunity	• Property owners and tenants • Construction business • Financial institutions • Consumer associations • National/local authorities • EU institutions
Transport	31%	20%	• EU and national/regional legal requirements • Consumer awareness • Information campaigns • Labelling • High energy prices	• Lack of information • Limited commitment from transport industry • Insufficient infrastructure (e.g. poor urban planning, limited public transport) • Behaviour patterns	• Transport companies • Associations • Citizens • National/local authorities • European institutions
Industry	28%	19%	• High energy and carbon prices • Voluntary and mandatory agreements • Improved energy efficiency of production processes	• High up-front costs • Limited commitment • Low awareness of the benefits • Overestimation of the investment needs • Lack of financing • Low share of energy in production costs	• Companies • Industry associations • National/local authorities • European institutions

Source: COM (2008)772

2.2 Legal framework for energy efficiency in the EU

Existing EU legal and regulatory framework in energy efficiency relates to:

- Energy end-use efficiency and energy services
- Cogeneration
- Energy efficiency: energy performance of buildings
- Energy efficiency of products
- Clean and energy-efficient road transport vehicles

- Tyre labelling
- Household appliances: energy consumption labelling
- Energy efficiency of office equipment: The Energy Star Programme (EU - US)
- Energy efficiency: energy efficiency requirements for ballasts for fluorescent lighting
- Hot-water boilers
- Domestic refrigeration appliances: energy efficiency

In November 2008, the Commission proposed an Energy Efficiency Package consisting of the following elements:

- a proposal for a recast of the Energy Performance of Buildings Directive;
- a proposal for a revision of the Energy Labelling Directive;
- a proposal for a new Directive containing a labelling scheme for tyres;
- a Commission decision establishing guidelines clarifying the calculation of the amount of electricity from cogeneration;
- a communication on cogeneration

Buildings Directive (directive 2002/91/EC + recast proposal COM (2008) 780)

Energy efficiency in buildings is one of the priorities of the European energy efficiency policy. Buildings altogether contributes to 40% of final energy consumption, while the cost effective CO_2 savings potential is estimated to be equal to 30%. That is why buildings are considered crucial sector for CO_2 emissions reduction.

The Directive on Energy Performance of Buildings (2002/91/EC) is the main legislative instrument at EU level to achieve energy performance in buildings. Under this Directive, the Member States must apply minimum requirements as regards the energy performance of new and existing buildings, ensure the certification of their energy performance and require the regular inspection of boilers and air conditioning systems in buildings.

On 18 November 2009 (2008/0223 (COD)) a final political agreement was reached between the Council, the European Parliament and the Commission on the proposed directive recast. Negotiations revolved around the following main issues: a) targets relating to low energy buildings and their definition; b) financing of energy efficiency measures; c) the calculation method to draw up energy performance requirements for buildings.

The final agreement includes the following main provisions:

- Starting from 2021, new buildings will be at nearly zero energy consumption under the new EPBD. New construction accounts for just a very small percentage of all buildings (1% per year). The starting date is later than hoped for in the EEAP (which was 2015).
- Starting from 2013, all buildings (not only buildings above 1000 square meters as in the previous directive) and building elements undergoing major renovation will need to observe minimum energy performance requirements. The methodology for such calculation will be drafted by the Commission by 30 June 2011 through the comitology procedure.
- The initial proposal of restricting the public incentives only for the construction or major renovation of buildings (or parts thereof, including building components), the results of which comply at least with minimum energy performance requirements, was diluted into a simple recommendation. Also, no additional financing was foreseen either from the EU or from national budgets to speed up renovations.

Financing is a crucial element for energy efficiency measures, which can often entail substantive up front costs. European funding, though the EIB and EBRD, is available, but often technical capacity and administrative barriers prevent take up of funds. The budget review foresees a review and expansion of funding for energy efficiency. Recently, the structural funds regulation review (as part of the economic recovery plan) included energy efficiency in social housing among the measures that are eligible for funding (up to 4% of total ERDF allocations) in all Member States;

Ecodesign directive (Directive 2005/32, amended by Directive 2009/129 recast)

The energy efficiency action plan highlighted the enormous energy savings opportunities in the products sector. The European Parliament, in its resolution of 31 January 2008 on the action plan, called for strengthening of the provisions of Directive 2005/32/EC. Also the Sustainable Consumption and Production (SCP) action plan. (COM(2008)397) recommends the revision of the eco-design directive and the extension of its scope.

The recent recast of the eco-design directive (2009/125/EC), adopted on 21 October 2009, expands the scope of the directive from covering only energy□using products (EuP) to all energy related products, defined as „any product having an impact on energy consumption during use" (e.g. windows, construction products, insulation materials, detergents and water□ using products).The ecodesign directive is meant to harmonize both the environmental and trade aspects of energy related products.

The ecodesign directive is a framework directive. It does not introduce directly binding requirements, but it defines a process, conditions and criteria for setting requirements regarding environmentally relevant product characteristics to be met for products to be placed on the market. Standards for products will take into consideration the life cycle of the products from their manufacture onwards with consideration given to energy consumption, waste generation, water consumption and extension of lifetime.

An indicative list of additional product groups was identified by a recent Commission Communication (COM(2008)660) outlining the work plan for the implementation of the Directive. So far, nine eco-design regulations have been put in place (including: standby; simple set□top boxes; lamps and ballasts (leading to the phase out of incandescent light bulbs); external power supplies, industrial motors, circulators, televisions, refrigerators and freezers) which are expected to save about 315 TWh electricity per year by 2020 if fully implemented. This is more than the annual electricity consumption of Italy.

Important implementing measures of the eco-design directive are expected. After two years of preparation, in March/April 2010 the EC is expected to vote in regulatory committee (under the comitology procedure) on mandatory standards for heating and cooling appliances, under the ecodesign directive. These measures are estimated to be equal to around half of the energy saving potential and CO2 emissions abatement potential of the directive.

The Parliament will be called to contribute to this under the 'comitology' procedure in July 2010. Early engagement in this process is key – given the technical nature of documentation it is recommended to start reviewing this now to ensure an effective response when consulted.

A review of the eco-design Directive is foreseen in 2012 and will consider the extension of its remit to non energy related products. The SCP action plan also foresees an eco-design labelling Directive to complement the eco-design Directive.

Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC.

The purpose of the Directive is to make the end use of energy more economic and efficient by:

- establishing indicative targets, incentives and the institutional, financial and legal frameworks needed to eliminate market barriers and imperfections which prevent efficient end use of energy;
- creating the conditions for the development and promotion of a market for energy services and for the delivery of energy-saving programmes and other measures aimed at improving end-use energy efficiency.

The Directive applies to the distribution and retail sale of energy, the delivery of measures to improve end-use energy efficiency, with the exception of activities included in the greenhouse gas emissions trading scheme, and, to a certain extent, the armed forces.

This Directive requires Member States to adopt a national indicative energy savings target of 9 % within 9 years (This target represents a reduction in the annual average consumption over the years 2002 to 2006 by 9% and its achievement is expected to take place in the period from 2008 to 2016) and aims at creating the conditions for the development and promotion of a market for energy services and other measures aimed at improving end□use energy efficiency. Member States must adopt and achieve an indicative energy saving target of 9% by 2016 in the framework of a national energy efficiency action plan (NEEAP). They must also appoint one or more new or existing independent public sector authorities or agencies to ensure overall monitoring of the process set up to achieve these targets.

Member states have the duty to submit to the European Commission the following Energy Efficiency Action Plans:

- First Energy Efficiency Action Plan not later than 30 June 2007
- Second Energy Efficiency Action Plan not later than 30 June 2011
- Third Energy Efficiency Action Plan not later than 30 June 2014.

The second and third Energy Efficiency Action Plans shall:

- include a thorough analysis and evaluation of the preceding plan,
- include the final results with regard to the fulfilment of the energy savings targets,
- include plans for additional measures, which address the removal of any and all existing or expected shortfall vis-á-vis the target and the anticipated effects of such measures,
- in accordance with Article 15(4) of the Directive, use and gradually increase the use of harmonised efficiency indicators and benchmarks, both for the evaluation of past measures and estimated effects of planned future measures.

Methods to evaluate the measures implemented to achieve the 9% energy savings target set out in the directive were recently completed by the Commission in collaboration with Member States under the EMEES project.

All Energy Efficiency Action Plans shall describe (as required by the Directive) the energy efficiency improvement measures planned to reach the targets as well as to comply with the provisions on the **exemplary role of the public sector** and provision of information and advice to final customers set out in Articles 5(1) and 7(2) of the Directive.

Promotion of energy end-use efficiency and energy services - Member States must ensure that energy distributors, distribution system operators and energy retail businesses that sell electricity, natural gas, heating oil and district heating:

- refrain from any activity which could hamper the supply of energy services, programmes to improve energy efficiency and other measures aimed at improving general energy efficiency;
- supply information on their final customers needed to develop and implement programmes to improve energy efficiency;
- at the discretion of the Member States, possibly using voluntary agreements or other market-based measures, offer and promote energy services to their final customers or offer and promote energy audits and/or measures to improve energy efficiency or contribute to the financial instruments for improving energy efficiency.

Member States must ensure that market operators are provided with transparent information on programmes and measures to improve energy efficiency.

Qualification, certification and accreditation schemes for suppliers of energy services may also be put in place where Member States consider this necessary.

Member States must also repeal or amend national legislative provisions and regulations which unnecessarily or disproportionately impede or restrict the use of financial instruments or other measures for making energy savings on the energy services market. Model contracts for financial instruments must be made available to interested parties.

In addition, incentives in transmission and distribution tariffs that lead to unnecessary energy consumption must be abolished.

Member States may, if they so wish, set up financing mechanisms or adopt other measures to promote more efficient end-use of energy.

They must also develop high-quality energy auditing systems for all final customers aimed at determining which measures can be taken to improve energy efficiency and which energy services it must be possible to provide and prepare for their implementation. Certification following such audits is equivalent to that obtained under the Directive on the energy performance of buildings.

Member States must also ensure that end-users are provided with competitively priced individual metering and informative billing that shows their actual energy consumption. As far as possible, bills must be based on actual energy consumption and must include, in addition to other information, the following: current actual prices and consumption, a comparison of current consumption with consumption for the previous year, contact details of bodies from which information on improving energy efficiency can be obtained. Individual meters must be installed at a competitive price wherever economically and technically feasible.

A revision of the Energy end□use efficiency and services directive (2006/32/EC) (ESD), which could include, among others, a provision for public incentives to be only provided to measures that guarantee a measurable energy saving, is expected in 2010.

The directive on the promotion of cogeneration (2004/8/EC) provides harmonisation of definitions of efficient CHP, establishes a framework for a scheme for a guarantee of origin of CHP electricity, and sets the general target of having electricity production from cogeneration

increased to 18%. A recent decision includes guidelines on definitions and a methodology for calculation of high efficiency cogeneration. More actions on CHP are to be included in the new EEAP. An electricity/heat cogeneration plant operates by means of gas turbines or engines. Natural gas is the form of primary energy most commonly used to fuel cogeneration plants. However, renewable energy sources and waste can also be used.

The objective of this Directive is to establish a transparent common framework to promote and facilitate the installation of cogeneration plants where demand for useful heat exists or is anticipated. This overall objective translates into two specific aims:

There are already examples of regulatory developments in some Member States, such as Belgium (green certificates and cogeneration quotas), Spain (a decree on the sale of cogeneration electricity) or Germany (a law on cogeneration).

The Commission has established harmonised efficiency reference values for separate production of electricity and heat (see under “Related Acts”) and will review these harmonised values for the first time on 21 February 2011, and every four years thereafter, to take account of technological developments and changes in the distribution of energy sources.

Member States must ensure, on the basis of the harmonised efficiency reference values and within six months of their adoption, that the origin of electricity produced from high-efficiency cogeneration can be guaranteed according to objective, transparent and non-discriminatory criteria laid down by each Member State.

Member States must ensure that the guarantee of origin of the electricity enables producers to demonstrate that the electricity they sell is produced from high-efficiency cogeneration.

A guarantee of origin must:

- specify the lower calorific value of the fuel source from which the electricity was produced, specify the use of the heat generated together with the electricity and the dates and places of production;
- specify the quantity of electricity from high-efficiency cogeneration that the guarantee represents (this quantity being calculated in accordance with Annex II);
- specify the primary energy savings calculated in accordance with Annex III based on harmonised efficiency reference values established by the Commission.

Member States must analyse the national potential for the application of high-efficiency cogeneration. Following a request by the Commission at least six months before the due date, Member States must evaluate progress towards increasing the share of high-efficiency cogeneration for the first time by 21 February 2007 at the latest and thereafter every four years.

Member States or the competent bodies designated by the Member States must evaluate the existing legislative and regulatory framework with regard to authorisation procedures. Such evaluation is carried out with a view to:

- encouraging the design of cogeneration units to match economically justifiable demands for useful heat output and avoiding production of more heat than is useful;
- reducing the regulatory and non-regulatory barriers to an increase in cogeneration;
- streamlining and expediting procedures at the appropriate administrative level and
- ensuring that the rules are objective, transparent and non-discriminatory.

Industrial Emissions Directive (IPPC recast)

The EU has adopted in 1996 a set of common rules for permitting and controlling industrial installations in the IPPC Directive (Directive 96/61/EC on Integrated Pollution Prevention and Control). In essence, the IPPC Directive is about minimising pollution from various industrial sources throughout the European Union. Operators of industrial installations operating activities covered by Annex I of the IPPC Directive are required to obtain an environmental permit from the authorities in the EU countries. About 52.000 installations are covered by the IPPC Directive.

The Industrial Pollution Prevention and Control Directive is currently under revision (recast) together with six other directives, including the Incineration of Waste Directive. This process will eventually lead to the recasting of these Directives under one single Directive, the Industrial Emissions Directive (IED).

This Directive has been considered as one of the major legal instrument in increase of energy efficiency in installations and companies operating the installations and the industrial site. In practice the UK experience has been effective, combining achievement of energy efficiency targets set in integrated permit for operation with Climate change levy agreements – in the agreements energy savings have to be reported and are evaluated (not verified most probably).

In the Czech Republic the companies installations of which are subjected to the Directive (Czech Law on Integrated pollution prevention and control) have to submit energy audit. It has not been checked by the authority what measures will be implemented and when and the results of the implemented measures.

2.3 Standards Prepared for the Area of Energy Savings

In addition to the duties imposed upon Member States, the Directive 2006/32/EC addresses some of the duties to other entities. Pursuant to the Directive, documents facilitating or directly conditioning the fulfilment of the duties by Member States should be created.

Article 8 called "Availability of Qualification, Accreditation and Certification Schemes" can serve as an example. Another example is Article 14 called "Reports", pursuant to which the Commission "shall publish a cost/benefit impact assessment examining the linkages between EU standards, regulations, policies and measures on end-use energy efficiency". A number of duties are addressed to the Commission in Article 15 called "Review and Adaptation of the Framework". This article addresses the following:

- Adaptation of the evaluation of savings and their calculations to technical progress,
- Measurability of savings, their estimates, determination of the accuracy of these estimates, harmonised lifetime of saving measures and verification of savings by a third party,
- Increase the proportion of savings evaluated using the "bottom-up" method,
- Creation of a set of harmonised energy efficiency indicators and benchmarks based upon them.

The harmonised energy efficiency indicators are prepared in cooperation with the CEN – Comité Européen de Normalisation in scope of the QACS (Quality Assurance & Control System) Programme. A fundamental pillar, on which the QACS is based, involves standards, and therefore, a requirement for new standards was created in linkage to the above mentioned directive in the CEN group engaged in the "Energy Management". The highest priority was given to the following:

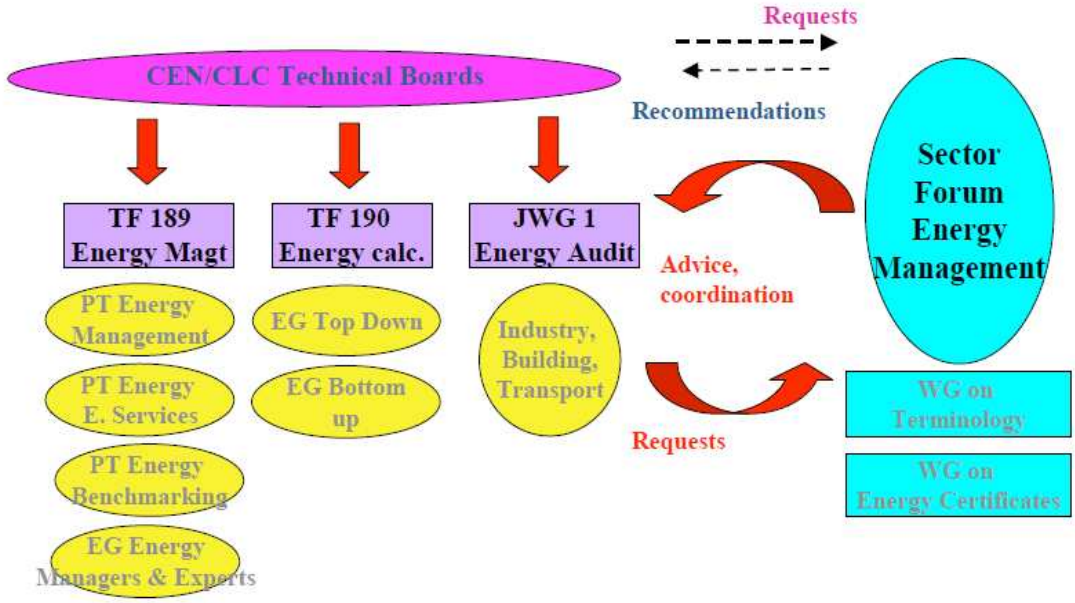
- Energy Service Companies
- Energy Managers and Experts
- Energy Management System
- Energy Efficiency and Savings calculations.

The following standards were added later:

- Energy Efficiency Services
- Energy Labelling (Benchmarking)
- Energy Terminology
- Energy Audits
- Green and White Certificates, Certificates of Origin

Task Forces 189 and 190 have been established to prepare the relevant documents. Their responsibility is shown in the figure hereinafter.

Picture 1: Scheme of CEN-coordinated works on standards related to the Directive 2006/32/EC:



Source: CEN/CENELEC Conference Brussels March 2010, Mr. Inge Pierre - presentation Energy Management System

Standards already developed include:

- EN 16 001 on Energy management Systems, publication 1st of July 2009 (TF 189 PT EMS, SIS). Standard for Energy Management Systems has been in effect since June 2009. According to this document, an organization should receive an overview of its energy situation and of the possibilities to improve this situation systematically and gradually.
- EN 15900 on Energy Efficiency Services, CEN/CLC Enquiry until June 2009, publication November 2010 (TF189 PT EES, UNI). This document contains the minimum requirements for providing energy services by providers and enables the customers to choose such a provider based on the quality assessment of the service offered. **The standards says: the improvement of energy efficiency shall be measured and verified over a contractually defined period of time through**

contractually agreed methods. Verification requires development and implementation of the measurement and verification plan for the assessment of the actual energy efficiency improvements.

Standards under way

- Working drafts on Top down and Bottom up energy efficiency and savings calculations, June 2009, (TF190, NEN)
- CEN/CLC Enquiry on CEN/ CLC Technical report on Terminology in July/August 2009 (SFEM WG, AFNOR)

New standardisation work

- CEN/TC320/WG10 on Energy consumption and GHG emissions in relation to transport services : started December 2008, AFNOR
- CEN/CLC/TF189/PT Benchmarking methodologies for energy uses : started March 2009, NEN
- CEN/CLC/TF189/WG on Energy Managers and Energy experts: feasibility study to be sent to CEN/CLC BTs by end of 2009, UNI

What is next ….

- CEN/CLC/WG on Energy Audits, BSI (to start September 2009)
- CEN/CLC/ WG on Guarantees of Origin, SIS.
- Other works on the standards for energy audits are not at an advanced level of elaboration, they are limited to the standards for energy audits of buildings and industrial sectors and calculations of overall national energy savings as required by Article 4 of the Directive.

The joint working group registered initially under the number TF190 became after the JWG4. It is chaired by France (J-L PLAZY, ADEME and AFNOR, as convenor) and administrated by Netherland (Bert DJISKTRA, NEN, as secretary). Terms of reference for JWG4 included to take in account the following topics :

- methodology and general rules of calculation,
- terminology and definitions,
- choice of parameters and data, to be used including data quality and data sources.

Ten European countries bring regularly their contribution to this JWG work .

Use the EU standard as a basis for an international one :

- Possible Cooperation with the SAC (China) for preparing an ISO standard on this topic if the SAC's proposal is approved by ISO members.
- ISO member states have to give their answer on the request ISO/TS/P 212 at ISO Secretariat **before the 18th of August 2010**.

2.4 Energy Efficiency Framework in Partner countries

All member states of the European Union have to adopt their laws so that they incorporate European Directives and accept into their legal systems European Regulations.

That is why similarities exist between partners countries of PERMANENT – national legislations stipulate requirements as to energy efficiency in buildings, cogeneration, minimum energy efficiency standards for certain goods, energy efficiency labels for appliances, etc..

The countries differ nevertheless in the way the national authorities adopted the requirements of the mentioned Directives. National authorities can be always more active than the original Directive requires and may adopt more stringent requirements or larger scope of impact. Following table presents an overview of selected instruments set by laws of individual partner countries:

Table 2: Summary of legal requirements

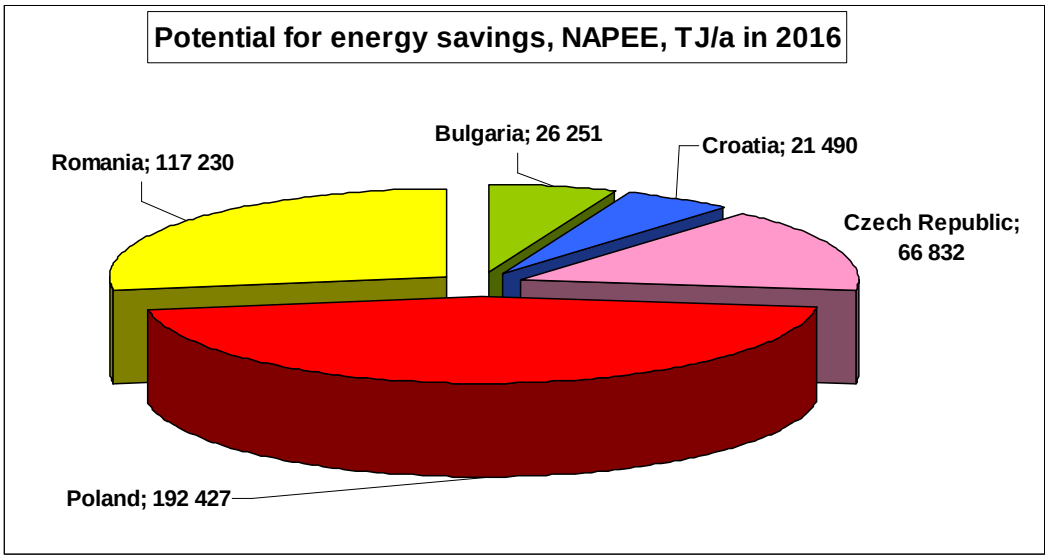
Legal/regulatory framework for energy supplies, RES and energy efficiency ("X" = exists)	Czech Republic	Bulgaria	Romania	Poland	Croatia
Open market for electricity supplies	X	X	X	X	X
Open market for gas supplies	X	X	X	X	X
Market-based pricing for oil, gas, electricity and heat supplies	X			X	
Compulsory energy audits public sector	X	X	X		X
Compulsory energy audits in industries and private sectors	X	X			
Obligation to implement recommended measures by the energy audit – public buildings	X	X			
Energy saving targets adopted on national level (NEEAP)	X	X	X	X	X
Energy saving targets adopted on local level		X			
Legally set obligation to introduce energy management into public buildings		X			
Authorised energy auditors	X	X	X		X
Legally stipulated content of energy services		X			
Act on renewables	X	X	X	X	X
Fixed feed-in tariffs for RES	X	X	X	X	X

3. POTENTIAL FOR INVESTMENTS INTO ENERGY EFFICIENCY

Detailed analysis of possibilities in reducing energy consumption in existing and new buildings, in industries and transport were made for the National Energy Efficiency Action Plans, which specify potential reduction of energy consumption after implementation of either improved existing or newly adopted energy saving measure.

These measures do not to be just technical but also legal, institutional, administrative, organisational, economic and financial. National energy efficiency Action plans were studied by partners and mainly targets set by 2016. In all Action plans a comprehensive list of actions to be taken has been specified. Following is the stated expected achievement in the NEEAPs:

Figure 1: Potentials for energy savings as per NAPEE developed in 2007



Within the measures to be adopted also ESCO business and EPC development and support is included - which is in line with the requirement of the Energy Service Directive 2006/32/EC.

In terms of investments needed following amounts have been estimated in each of the partner countries. The total investment potential for ESCOs has been estimated at the level of 648 mil. EURO by 2016.

Table 3: Estimated ESCO sales Potential by country

Partner country	Estimated investment in mil. EURO	
	MIN	MAX
Bulgaria	150	380
Croatia	248	571
Czech Republic*	80	125
Poland*	80	200
Romania	90	180
Total	648	1 456

Source: estimates of partnets and own reductions

Only buildings included in residential sector

4. BEST PRACTICES AND BARRIERS

4.1 Barriers to financing of EE projects

One of the main goals of the Permanent project is the identification of barriers to investments in energy efficiency and renewable energy projects in the partner countries, in order to develop recommendations for problems on **how to overcome them**. The identified barriers are classified in three groups:

- Legal, institutional and administrative barriers;
- Economic and financial barriers;
- Lack of awareness, human capacities and professional skills.

As it follows from the more detailed description in the individual country reports, perceived barriers to energy efficiency exist mainly in following areas:

- Lack of state actions and interest in energy efficiency - governments are either passive or slow in designing and implementing EE policies and programs, current budgetary restrictions make investments into energy efficiency neglected. State support to energy efficiency is low or none. Lack of cooperation between different ministries and agencies as well as between authorities at the national and at the local level
- Legislation is either missing related to clear definition of activities which should be performed by state and other public financed facilities, or in private companies, or it is not well developed and interlinked. On the other hand most of the countries have still lots of influence over energy prices. Absence of dedicated public procurement guidelines for acquisition of energy-efficient equipment and requests for provision of energy services to public entities;
- Tariff related barriers – in most partners countries the tariffs do not fully correspond to the cost (Ro, Bg, Hr, Pl) according to the individual country reports. Moreover, the tariffs are relatively low compared to other MS in the EU. Utilities and distributors do not have then adequate financial means for infrastructure improvement;
- Public ownership of the energy companies, which creates a conflict of interest between the company profitability and the pursuit of political interests through socially popular pricing policies;
- Impacts of financial crisis and resulting strict measures adopted by the banking sector – strict requirements applied by the banks on creditworthiness of their clients, on the other hand secondary debtness and increasing problems of part of the clients due to economic recession.
- Lack of skills at both public and private organisations, no interest or belief in financial benefits of energy efficiency projects. This barrier does not relate to most industrial companies, which mostly have recognised benefits of energy efficiency measures but have problems with competing investment needs.
- Lack of understanding to energy performance contracting, lack of trust to energy services and to legal enforcement of contracted guarantees, lack of trust to private businesses by public officers even if they are aware of the “win-win” scheme.

- Lack of awareness on the side of consumers, which are used to regard energy more like a public service than a valuable good and are very reluctant to change their consumption behavior unless this implies a tangible improvement of their living standard;
- There exist a "disconnect" between the traditional lending practices of local financing institutions (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**.

Summary of major barriers to energy efficiency

For PERMANENT project most important barriers include those that hinder the extension of energy services and other private initiatives in energy efficiency – have influence on economics of energy saving projects, on scope for private services (subsidies may compete with private services in case they address the same range of clients), ability of end-users to identify suitable projects, select and contract ESCOs).

Table 4: List of major barriers in investing into energy efficiency

BARRIER ("X" = MAJOR DEFICIENCY)	Czech Republic	Bulgaria	Romania	Poland	Croatia
Fragmented and diverse industry of energy users and product/service suppliers	X	X	X	X	X
Inadequate legal/regulatory framework			X	X	X
Lack of knowledge of EE benefits and techniques for managing risks	X	X	X	X	X
Lack of commercially viable financing (unattractive terms & tenor)			X	X	X
Complex transactions with energy service companies (ESCOs)	X	X	X	X	X
Low priority and rates of return	X	X	X	X	X
Limited technical capabilities	X	X	X		X
Low (subsidized) energy prices		X	X	X	X
Complex technologies		X	X		X
Too much reliance on subsidies	X	X	X	X	X
Lack of energy management – skills and practical experience	X	X	X	X	X

4.2 Current lending procedures for EE projects

To date, most LFIs do not count cash flow resulting from saved energy and other operational costs as a source of repayment of 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.

Lack of understanding to technical and economic parameters of the projects bring about disbelief that planned project results will be achieved and can pay back the investment. Successful energy efficiency projects, though, 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.

Financing through LFIs

Current lending procedures for EE projects - Local financial institutions have become active in helping their clients with financing projects subsidized from EU funds. The subsidies are only disbursed to the applicant after the investments into energy efficiency are implemented. LFIs provide short term loans for the installation period, which starts after the application was approved – in the decision about the subsidy approval the amount of subsidy is known and also the share of repayment by the borrower and all repayment terms. The credit conditions very much depend on the share of the subsidy (subsidy is considered as guarantee).

LFIs in case of a project without any subsidy typically apply traditional "asset-based" corporate lending approaches lending a maximum of 70%-80% of the value of assets financed (or collateral provided). Banks do not consider EE projects as a risky business, but they do not take the savings as collateral. They assess the impact of the project on cash flow of the client. Documentation of actual savings (after construction) has not been required. This is not the case for renewable projects, in which the revenues due to guaranteed sales of energy produced have already become understood and accepted.

To date many LFIs have already recognized that meaningful cash flow can be generated from EE projects. In case of small projects they do not require any detailed analyses, for major investments they most often use external assistance to evaluate the technical soundness of the energy efficiency and renewable energy projects and their economic results (on the basis of energy audits or feasibility engineering studies). In these audits or feasibility studies no M&V plans are requested or developed, no description of the way in which energy savings will be measured, verified and demonstrated have been prepared.

ESCOs

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.

ESCOs operate in all partner countries of the PERMANENT project, in different conditions, though.

In the **Czech Republic** thanks to risk management by ESCOs and full guarantee for cost savings in the contract ESCOs sell the debts and future cash flow generated. This can be also due to the fact that nearly all EPC contracts were concluded with municipal and/or regional sector in which repayment conditions are very safe.

In **Bulgaria** energy services are specified by law, contracts and tender documentation have been standardised, the range of services are stipulated by legislation related to final results of buildings modernisation (requirement of A to B certificate). There exist numerous end-use ESCO project in public buildings, in which receivables are sold to a security fund after the project is implemented.

In **Romania** ESCO services have not yet developed to a standardised way of performance and lots of efforts are being made by private companies and national agency to improve understanding an acceptance of ESCO services in end use energy efficiency.

In **Croatia** very high potential for ESCO services has been identified in all sectors – DH systems, street lighting, buildings, CHP installations, etc. The legislative framework is not particularly supportive of the ESCO concept. The ESCO model is not recognized by the authorities as an individual business model. The result of this situation is that ESCOs cannot invoice their services as a package, and VAT must be paid for the equipment installed for the client, which may jeopardize the profits. Connecting CHP plants to the grid is also difficult. Similarly to many other countries, public procurement is complicated.

Poland - 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. A very high energy efficiency potential to be explored by ESCOs exists also in industry.

The banks in case of financing ESCO investments assess the ESCO client (energy users) and the value of the EE installation and require additional collateral behind the one of energy savings – sufficient track record and financial stability, etc.

Introduction of standardised M&V practice will improve understanding to reliability of energy savings and manners in which this reliability can be achieved. This may help in accepting energy savings as receivables and income.

4.3 Current M&V practices

4.3.1 M&V practices and efforts in the EU

The EU M&V practices are supported by the following directives:

- **Directive 2004/22/EC on measuring instruments**

Short name:	**Measuring instruments**
Base:	**European Parliament and Council Directive 2004/22/EC of 31 March 2004 on measuring instruments** (applicable from 2006-10-30) (OJ L 135, 2004-04-30)
Modification:	[-]
Directives repealed:	Directive **71/318/EEC** (gas meters); Directive **71/319/EEC** (meters for liquids other than water) Directive **71/348/EEC** (meters for liquids other than water - ancillary equipment); Directive **73/362/EEC** (material measures of length);

	Directive **75/410/EEC** (continuous totalising weighing machines); Directive **76/891/EEC** (electrical energy meters); Directive **77/95/EEC** (taximeters); Directive **77/313/EEC** (measuring systems for liquids other than water); Directive **78/1031/EEC** (automatic checkweighing and weight grading machines); Directive **79/830/EEC** (hot-water meters). Partial repeal: Directive **75/33/EEC** (cold-water meters, as concerns clean water meters)

Harmonized standards on M&V:

- Harmonised standards in the electrotechnical field (European standards adopted by CENELEC);
- Harmonised standards in the general field (European standards adopted by CEN).

ESO	**Reference and title of the harmonised standard (and reference document)**	**Reference of superseded standard**	**Date of cessation of presumption of conformity of superseded standard** Note 1
CEN	EN 1359:1998 Gas meters - Diaphragm gas meters	-	
	EN 1359:1998/A1:2006		
CEN	EN 1434-1:2007 Heat meters - Part 1: General requirements	-	
CEN	EN 1434-2:2007 Heat meters - Part 2: Constructional requirements	-	
CEN	EN 1434-4:2007 Heat meters - Part 4: Pattern approval tests	-	
CEN	EN 1434-5:2007 Heat meters - Part 5: Initial verification tests	-	
CEN	EN 12261:2002 Gas meters - Turbine gas meters	-	
	EN 12261:2002/A1:2006		
CEN	EN 12405-1:2005 Gas meters - Conversion devices - Part 1: Volume conversion	-	
	EN 12405-1:2005/A1:2006		
CEN	EN 12480:2002 Gas meters - Rotary displacement gas meters	-	
	EN 12480:2002/A1:2006		
CEN	EN 14154-1:2005+A1:2007 Water meters - Part 1: General requirements	-	
CEN	EN 14154-2:2005+A1:2007 Water meters - Part 2: Installation and conditions of use	-	
CEN	EN 14154-3:2005+A1:2007 Water meters - Part 3: Test methods and equipment	-	
CEN	EN 14236:2007 Ultrasonic domestic gas meters	-	
CENELEC	EN 50470-1:2006 Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)	NONE	
CENELEC	EN 50470-2:2006 Electricity metering equipment (a.c.) - Part 2:	NONE	

ESO	**Reference and title of the harmonised standard (and reference document)**	**Reference of superseded standard**	**Date of cessation of presumption of conformity of superseded standard** Note 1
	Particular requirements - Electromechanical meters for active energy (class indexes A and B)		
CENELEC	EN 50470-3:2006 Electricity metering equipment (a.c.) - Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)	NONE	

4.3.2 Current "in country" best M&V practices

The common best practices within the countries – partners in PERMANENT project are:

- ESCO and EPC companies operating in all countries have accumulated a practical experience and developed their own methodology/methods for M&V in order to ensure the reliable data base for viable and profitable contracts;
- In Bulgaria the ESCO and EPC activities are supported by special regulation;
- In all countries the ESCO and EPC activities are well accepted and supported by the local communities, institutions, and end-users when M&V plans are the basis of the contracts and consequently the energy performance results are confirmed by the same method.

Bulgaria

In Bulgarian legislation there are no mandatory requirements for measurements as a supporting data to the standardized software calculations used for energy audits or energy savings assessments.
This is the reason that in the current practice are used only "ready" data for the energy and fuels consumption taken from invoices or other relevant documents.
In the training process the certified companies (listed in the Energy Efficiency Agency) there is some hours designated for measurement procedures matching technically with IPMVP.
The local companies which are involved in ESCO and EPC business, have specific interest on providing site measurements and verifications in order to make sure that the calculated energy savings are realistic and reliable as a basis of energy savings contracting.
For that reasons the IPMVP could complete and make more precise the certification process in Bulgaria. Accordingly, the IPMVP need to be recognized as a standard, mandatory procedure an supported legally and included in the training and certification process.

Methods for collection and processing of data for evaluation of energy savings
In Bulgaria the current practices which are close to IPMVP are based on two groups of methods:
A. Methods for collection and processing of data based on available documents and/or observations and B. Methods for collection and processing of data based on engineering estimate. The two groups of methods are recognized by the local regulation.

A. Methods for collection and processing of data based on available documents and/or observations

1. On the basis of invoices issued by local, regional or national energy suppliers (utilities)
2. On the basis of data about energy sales
3. On the basis of data about the sales of equipment and devices
4. On the basis of data about the loads at energy end-use

B. Methods for collection and processing of data based on engineering estimate – these groups of methods deviates from the IPMVP requirements concerning mandatory measurement

1. Under this type of evaluation no site visit is realized.
2. It is used as a method for evaluation of presumed energy savings
3. The calculations are based on engineering principles without direct measurement of the characteristics of the site.
4. The method uses assumptions based on the specifications of the equipment, the operation characteristics, the schedule of change of the state in the process of operation with implemented measures, statistical data etc.
5. Additional information for performance of engineering evaluation may be obtained also from an external expert through study of the respective site. On the basis of this approach more complicated simulation algorithms/models may be worked out, which might be applied to a larger number of sites (for instance buildings, equipment, vehicles). In this way the data, obtained only through engineering estimate, might be supplemented or adjusted.

Croatia

There is no particular M&V practice or specific legislation in Croatia supporting the IPMVP. HEP ESCO is producing M&V plans for its own purposes and not for performance contracting.

Two examples of M&V Plans and Savings Reports are available in Appendix B in Croatian Country Report.

Czech Republic

Best practices which are close to M&V in the country exists in two cases:

- In case of Energy Performance Contracts
- In case companies have introduced system of energy management based on Monitoring&Targeting (M&T).

Energy Performance Contracts in the Czech Republic

Standardised tender procedures and pilot contracts may belong to the reasons why Performance Contracting has become more and more used by the clients as a method of achievement “safe” energy savings – in the contract ESCOs guarantee, that these savings will be sufficient for the lifetime of the contract for repayments of the investment, debt service and energy management.

Monitoring&Targeting (M&T)

Energy management systems using automatic monitoring and targeting (aM&T)

Monitoring and Targeting is a management technique in which all plant and building utilities such as fuel, steam, refrigeration, compressed air, water, effluent, and electricity are managed as controllable resources in the same way that raw materials, finished product inventory, building occupancy, personnel and capital are managed. It involves a systematic, disciplined division of the facility into Energy Cost Centers. The utilities used in each centre are closely monitored, and the energy used is compared with production volume or any other suitable measure of operation. Once this information is available on a regular basis, targets can be set, variances can be spotted and interpreted, and remedial actions can be taken and implemented

The essential elements of M&T system are:

- Recording -Measuring and recording energy consumption
- Analysing -Correlating energy consumption to a measured output, such as production quantity
- Comparing -Comparing energy consumption to an appropriate standard or benchmark
- Setting Targets -Setting targets to reduce or control energy consumption
- Monitoring -Comparing energy consumption to the set target on a regular basis
- Reporting -Reporting the results including any variances from the targets which have been set
- Controlling -Implementing management measures to correct any variances, which may have occurred.

Particularly M&T system will involve the following:

- Checking the accuracy of energy invoices
- Allocating energy costs to specific departments (Energy Accounting Centres)
- Determining energy performance/efficiency
- Recording energy use, so that projects intended to improve energy efficiency can be checked
- Highlighting performance problems in equipment or systems.

The practices used in M&T can be used in verification of savings, in developing M&V plans.

4.3.3 Local legislation governing M&V

In all countries there exist certain legislation basis for energy efficiency in different sectors, but no local standards for M&V.

Bulgaria

Laws, ordinances and other documents (standards etc.) related to the evaluation and verification of the savings achieved as a result of implemented energy efficiency projects

1. ENERGY EFFICIENCY ACT
2. ORDINANCE CONCERNING THE METHODOLOGIES FOR DETERMINATION OF THE NATIONAL TARGETS, THE ORDER OF DISTRIBUTION OF THESE TARGETS AS INDIVIDUAL ENERGY SAVING TARGETS AMONG THE ENTITIES AS SPECIFIED IN ARTICLE 10, PARAGRAPH 1 OF THE ENERGY EFFICIENCY ACT, THE ELIGIBLE ENERGY EFFICIENCY MEASURES, THE METHODOLOGIES FOR EVALUATION AND METHODS FOR VERIFICATION OF ENERGY SAVINGS
3. ORDINANCE CONCERNING THE TERMS AND PROCEDURES FOR DETERMINATION OF THE AMOUNT AND PAYMENT OF THE PLANNED FUNDS UNDER PERFORMANCE CONTRACTS LEADING TO ENERGY SAVINGS IN BUILDINGS, WHICH ARE STATE AND/OR MUNICIPAL PROPERTY
4. Unified training programme for energy auditors, endorsed by the Executive Director of the Energy Efficiency Agency
5. Harmonized local with EU standards on M&V

Croatia

1. Ordinance on Certification of Energy Performance of Buildings (OG 113/08)
2. Ordinance on the Requirements and Criteria to be met by Energy Auditors and Energy Certifiers of Buildings (OG 113/08)

Czech Republic

Local legislation related to M&V

There is no legislation which requires measurement and verification of energy savings.

M&V plans are not part of energy audits and energy audits do not mention at all any improvements in measurement and metering energy consumption. Calculation of energy savings concentrate on thermal insulation qualities of the building and calculations is very detailed using standardised procedures by Czech standard ČSN 73 0540-2, harmonised with the EU standards updated for certification of energy performance in buildings.

Standards are also set for calculation of energy needs for ventilation, lighting, heating and hot water preparation. Less attention is paid to the way the building has been operated , the savings achieved by better operation of the building and not by technology exchange or improvement are not supposed to be “reliable” and are subject to improved energy management of the building.

Romania

Measurement and Verification Protocol in Romania could be applied to 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).
There is harmonized local approach with EU standards on M&V procedures.

5. TARGET AUDIENCE GROUPS FOR TRAINING

5.1 EE Stakeholder Identification

5.1.1 Bulgaria

- The Ministry of Economy, Energy and Tourism (MEET)
- The Energy Efficiency Agency (EEA)
- The State Energy and Water Regulatory Commission (SEWRC)
- Ministry of regional development and public works (MRDPW)
- Ministry of Finance
- The Agency for Economic Analysis and Forecasting (AEAF)
- The Bulgarian Small and Medium Enterprises Promotion Agency (BSMEPA)
- Bulgarian Development Bank
- Ministries involved in Cohesion and Structural Fund´s Operational programmes design and implementation
- Banks (many banks were involved in RBRD programmes for Bulgaria)
- ESCO companies (Enemona JSCo, CES AD, Elmib Bulgaria AD, Erato Holding AD, Energy Effect EAD
- Other Government Agencies and bodies:
  - The Bulgarian Energy Efficiency Fund (BEEF)
  - The Fund for local authorities and governments (FLAG)
  - The Kozloduy International Decommissioning Support Fund (KIDSF)
  - The Invest Bulgaria Agency (IBA)

5.1.2 Czech Republic

Following is a 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 Industry and Trade

b) Ministry of Environment

c) Ministry of Regional Development

d) Ministry of Finance

e) Local and Regional authorities

f) Energy Agencies (local and regional)

g) Commercial Banks – CSOB bank, Commercial Bank (KB), Reiffeisen bank, Ceska Sporitelna

h) ESCOs, mainly:
   - ENESA (former EPS)
   - Siemens
   - MVV Energie CZ
   - ENERG (AB Facility)
   - SUE (Centre for Energy Savings)
   - EVČ

ESCOs partially involved include Dalkia, Komterm, MARTIA, Honeywell.

i) Other important bodies include Association of Energy Auditors, consulting companies (SEVEn), Association of Energy Managers, Association of large energy consumers, electricity suppliers, gas distribution companies, heat producers and suppliers, Energy Information and Consulting Centres (EKIS).

5.1.3 Romania

- Ministry of Energy
- Government and EE Development Agencies (local and regional)
- Development Banks (local and regional)
- Government Structural Funds
- Commercial Banks
- ESCOs and other EE Developers
- Large EE Vendors and Contractors
- Other Government Agencies and bodies

5.1.4 Croatia

- Ministry of Economy
- Ministry of Finance
- Fond for environmental protection and Energy Efficiency
- UNDP Croatia
- HBOR (Croatian Development Bank)
- Local Energy and Development Agencies (AZRA, MENEA, REGEA, etc)
- HEP ESCO
- Large EE Vendors and Contractors
- Other Government Agencies and bodies

5.2 Target audience by type of training

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. defense, 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.

Detailed description of the target groups is provided in the individual country reports.

6. APPENDICES

6.1 Local Advisory Groups ("LAG")

6.1.1 Bulgaria

- Stefan Vassilev, United Bulgarian Bank, Manager SME and International Lending Programs
- Kristian Spassov, director, Ecotechproduct (energy/engineering consulting firm)
- Boriana Koeva - Uzunova, dipl.eng., Energy Efficiency Agency, Head of International Cooperation Department
- Krassimir Stanchev, executive director Erato Holding Plc (EE manifacturer)
- Pavel Manchev, deputy director , Center for energy efficiency EnEffect (NGO)

6.1.2 Czech Republic

- Ing. Ivo Slavotínek (ENESA, a.s.)
- Ing. Jaroslav Maroušek (SEVEn Energy, s.r.o.)
- Ing. Vladimír Sochor (SEVEn, o.p.s.)
- Ing. Bohuslav Kyjánek (/ENERG, a.s. - AB Facility)
- Ing. Povýšil (MVV Energie CZ)
- Ing. Kohoutek (Siemens, s.r.o.)

6.1.3 Romania

- Dr. Cristian Tantareanu – ENERO
- Mr. Florin Pop – EnergoBit
- Mr. Vasile Grasin – Eco Erg
- Ms. Geta Padurean - Eco Erg
- Mr. Cornel Corha – ARCE (National Agency for Energy Conservation)
- Dr. Corneliu Rotariu – ANRE (National Authority for Energy Regulations)
- Mr. Mihai Voronca – Executive Director Romanian Energy
- Efficiency Fund
- Dr. Stefan Gadola – Vice-president Romanian Energy Efficiency Fund

6.1.4 Croatia

- Željko Kučiš, Environmental protection and energy efficiency Fund
- Marina Malinovec Puček, Energy Institute Hrvoje Požar
- Vesna Bukarica, Zavod za visoki napon i energetiku
- Marino Grozdek, Faculty of Mechanical Engineering and Naval Architecture, Katedra za toplinsku i procesnu tehniku
- Goran Čačić, UNDP Croatia

6.1.5 Poland

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 specified listed stakeholders.

6.2 IEEFP Working Group

6.2.1 Bulgaria

Marko Markov (EEE)
Dimitar Doukov (EEE)
Vania Vassileva (Elana Finance Holding)
Ivan Peev (UniCredit Bulbank)
Daniel Entchev (UniCredit Bulbank)
Adrian Mitkov (UniCredit Bulbank)
Alexander Alexandrov (Tokuda Bank)
Emilia Stoyanova (Raiffeisenbank Bulgaria)
Vladimir Popov (Allianz Bank)

6.2.2 Czech Republic

LAG plus:
Ing. Miroslav Marada ((ENESA, a.s.)
Ing. Miroslava Novotná (ČSOB)

6.2.3 Romania

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

6.2.4 Croatia

LAG plus:
Igor Raguzin MINGO
Nada Marđetko Škoro – MZOPU
Željka Hrs Borković – Energy Institute ‘Hrvoje Požar’

6.2.5 Poland

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 mentioned stakeholders.

6.3 M&V Trainees

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.

The individuals and organisations to be invited to the training courses have been identified by country and are included in the relevant Country Report.

6.4 IEEFP Introduction Participants

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.

The individuals and organisations to be invited to the training courses have been identified by country and are included in the relevant Country Report.

6.5 Recommended IPMVP Amendments

6.5.1 BULGARIA

Position paper prepared by Dimitar Baev, Senior Fellow, Ph. D (Eng.)
(Without any claim for completeness of the analysis)

CONCLUSIONS (1):

Some of the IPMVP principles and approaches are laid down in the Bulgarian regulatory documents. There are, however, open questions and differences, which might lead to incompatibility of certain procedures with the practices in other EU Member States, as well as to inaccuracies in the evaluation of the savings from measures implemented in Bulgarian sites, therefore the methodology of IPMVP might be applied as a standardized and quality procedure - *in case the IPMVP is recommended or imposed by EU and adopted by the Government.*

Laws, ordinances and other documents related to the evaluation and verification of the savings achieved as a result of implemented energy efficiency projects

1. ENERGY EFFICIENCY ACT, in force as of 14 November 2008
2. ORDINANCE CONCERNING THE METHODOLOGIES FOR DETERMINATION OF THE NATIONAL TARGETS, THE ORDER OF DISTRIBUTION OF THESE TARGETS AS INDIVIDUAL ENERGY SAVING TARGETS AMONG THE ENTITIES AS SPECIFIED IN ARTICLE 10, PARAGRAPH 1 OF THE ENERGY EFFICIENCY ACT, THE ELIGIBLE ENERGY EFFICIENCY MEASURES, THE METHODOLOGIES FOR EVALUATION AND METHODS FOR VERIFICATION OF ENERGY SAVINGS, in force as of 10 April 2009.
3. Unified training programme for energy auditors, endorsed by the Executive Director of the Energy Efficiency Agency

Necessity of application of procedures for evaluation of savings ensuing from:

- The requirement for description of the methods and procedures for evaluation of the savings from the possible measures for energy efficiency improvement recommended by the energy audits
- The need to prove the achieved individual targets through certificates for realized energy savings for industrial consumers having annual consumption above 3000 MWh and for buildings (state or municipal property) with a floor area above 1000 m^2, as well as for energy suppliers..
- The requirement to report to the Energy Efficiency Agency the savings achieved during the preceding year by 31 March of the next year.
- The voluntary agreements between the state and energy end-users
- Implementation of energy performance contracts (ESCO schemes)
- The need to prove the achieved savings to financing institutions and organizations.

Provisions in the legislative and regulatory documents in accord with the requirements of IPMVP

1. ENERGY EFFICIENCY ACT:

Art. 14. Measures for energy efficiency improvement shall be the actions, which lead to energy efficiency improvement that can be verified, measured and evaluated.
Art. 36. (1) (Addendum – SG, Vol. 6/2009, in force as of 1 May 2009) Owners of buildings as specified in Art. 19, Paragraph 2 and of industrial systems as specified in Art. 33, Paragraph 2 are obliged to apply energy efficiency management.

(2) Energy efficiency management shall be performed through:
1. Working out of annual plans and programmes for energy efficiency improvement in compliance with the reports as specified in Art. 35;
2. Implementation of the measures envisaged in the plans and programmes as specified in Item 1 above;
3. Submission to the Agency of information concerning the effect of the implemented measures and the expected effect from the implementation of the measures envisaged in the plans and programmes as specified in Item 1 above.
4. Nomination of at least one employee, whose job description comprises implementation of the responsibilities as specified in Items 1-3 above;

(3) (Addendum – SG, Vol. 6/2009, in force as of 1 May 2009). Owners of buildings as specified in Art. 19, Paragraph 2, shall keep a logbook for the monthly consumption by types of energy, including delivery dates, prices and quantities, as well as the identification numbers of the documents evidencing the quantity of the delivered fuels.
(4) Owners of industrial systems as specified in Art. 33, Paragraph 2, shall prepare periodically, at least once a year, analyses of the total and specific energy consumption.
(5) The entities as specified in Paragraphs 3 and 4 shall submit to the Agency annual reports on the energy efficiency management.
(6) The reports under Paragraph 5 shall contain description of the activities and measures, indicate the amount of the achieved energy savings and shall be submitted together with a copy of the plans and programmes as specified in Paragraph 2, Item 1, not later than 31 March of the year following the year of implementation of the respective activities and measures.

Art. 46. (1) The voluntary agreements as specified in Art. 45 shall contain:

1. The specific responsibilities of the entities as specified in Art. 45 for achievement of the targets as specified in Art. 44;
2. The specific responsibilities of the Agency;
3. The mechanisms for supervision and control on implementation; ***the methodology for evaluation of the achieved energy savings;***
5. The procedures for amendment and/or supplementing of the envisaged measures in the event of failure to achieve the targets or of existence of barriers to their achievement;
6. Other clauses

(2) The drafts of voluntary agreements shall be published in an appropriate manner, ensuring their review by the stakeholders..

Art. 49. (1) The services under performance contracts shall be provided at guaranteed energy savings for the building or industrial system, for which the service is provided. .

(2) The services under performance contracts shall be provided on the basis of written contracts, which shall contain:

1. Normalized energy consumption;
2. The amount of guaranteed energy savings and the conditions under which they were established;
3. The method of financing;
4. The manner of payment of remuneration;
5. Other clauses

Art. 50. **The energy savings certificates** are aimed to prove their owner's contribution to the implementation of measures for energy efficiency improvement.

Art. 51. (1) The certificates for achieved energy savings as per Art. 50 shall be issued by the Executive Director of the Agency to the entities specified in Art. 39, Paragraph 2, to owners of buildings as specified in Art. 19 and owners of industrial systems as specified in Art. 33, Paragraph 2, against payment of a charge defined according to a tariff approved by the Council of Ministers.

Art. 52. (1) Provision of evidence about the achieved energy savings shall be the responsibility of the entities as specified in Art. 23, Paragraph 1 and Art. 34, Paragraph 1.

(2) Inspection of the methodologies used for evaluation of the different types of

implemented measures for energy efficiency improvement shall be performed by the Agency..

(3) The actions under Paragraph 1 and 2 above, as well as the format, conditions and procedure for issue of the certificates as specified in Art. 50 shall be defined by the Ordinance specified in Art. 9, Paragraph 2.

2. Ordinance concerning the methodologies for determination of the national targets, the order of distribution of these targets as individual energy saving targets among the entities as specified in article 10, paragraph 1 of the energy efficiency act, the eligible energy efficiency measures, the methodologies for evaluation and methods for verification of energy savings

Art. 19. As evidence for the implementation of the individual energy saving targets shall be recognized all the measures for energy efficiency improvement, whose energy saving effect can be verified, measured or evaluated. .

Art. 20. The eligible measures for energy efficiency improvement should meet the following requirements:
1. To have payback periods not longer than the service life of the respective measures;
2. To lead to saving of primary energy resources;
3. To lead to reduction of GHG emissions;
4. Not to lead to deterioration of the quality of the environment;
5. Not to lead to deterioration of the sanitary and hygienic norms.

Art. 22. (1) Energy savings shall be determined through estimation and/or measurement of the energy consumption of the respective sites.
(2) The estimation and/or measurement of energy consumption shall be performed after the implementation of the energy efficiency measures
(3) The energy savings shall be presented as saved quantities of primary energy consumption, final energy consumption and CO_2 emissions in compliance with the requirements of:

Art. 23. The specialized methodologies shall be worked out by the Energy Efficiency Agency on the basis of:

1. Standardized methodologies recommended by EU acts
2. Methodologies worked out and proposed by the persons specified in Art. 23 and 34 of the Energy Efficiency Act

Art. 24. The following principles shall be followed in the design of the specialized methodologies:
1. The principle of universality, which permits development of a unified basis for comparison of the expected energy saving by different energy efficiency measures
2. The principle of compatibility, which permits application of the worked out methodology to all the sites of the same type
3. The principle of functionality, which permits the worked out methodology to cover all the required information for proving the resultant energy savings through measurement, evaluation and verification

Art. 25. (1) The specialized methodologies shall be used for evaluation of the quantity of energy saved as a result of the implementation of individual eligible measures for energy efficiency improvement

(2) The specialized methodologies should contain a mechanism for distribution of the energy savings by years for the entire service life of the respective implemented energy efficiency measure

Art. 26. The specialized methodologies shall comprise the following indicators:
1. Energy performance indicators:
a) Total and specific energy consumption prior to and after implementation of the measure
b) Achieved energy savings by types of energy as compared to the normalized level of energy consumption for the entire service life of the measures;
c) Deviations for the values defined under items (a) and (b) above;
2. Environmental indicators:
a) Achieved saving of CO_2 emissions by types of energy;
b) Deviation from the values defined under Item (a) above;
3. Financial indicators:
a) Monetary equivalent of the achieved energy savings by types of energy for the entire service life of the measure;
b) Payback period;
4. Functional indicators:
a) Technology conditions, under which the measure was implemented;
b) Climatic conditions, under which the measure was implemented;
c) Organizational conditions, under which the measure was implemented;

Art. 27. The specialized methodologies are based on:
1. Measurements, which involve determination of the:
a) measurement points and periods, the types of metering devices, protocols/records of the performed measurements;
b) measurement methods, the techniques used and any additional equipment;
c) accuracy and measurement procedures, ensuring the required quality of the measurements;
d) forms of reporting and documentation of the results;
2. Engineering calculations and estimates, which involve determination of the:
a) preliminary conditions and assumption;
b) characteristics of the site and the type of energy efficiency measures, which will be evaluated;
c) climatic data, other internal or external factors, which will be used in the engineering analyses;

Art. 28. In the evaluation of the implementation of the national energy saving targets the potential energy savings that may be achieved after the deadline for meeting the targets shall not be taken into account..

Art. 29. (1) Collection and processing of the data for implementation of the energy saving targets shall be performed in Compliance with Annex No. 6.
(2) For the purposes of comparison of the energy savings and their transformation into comparable units the transformation coefficients according to Annex No. 7 shall be applied.

Annex No. 6
Methods for collection and processing of data for evaluation of energy savings

A. Methods for collection and processing of data based on available documents and/or observations

1. On the basis of invoices issued by energy suppliers:
1.1. The invoices for measured and paid for energy for a representative period shall be used as a basis for evaluation of the energy consumption prior to the implementation of the energy efficiency measure.
1.2. The invoices under Item 1.1 shall be compared with invoices for measured and paid for energy for a specified representative period after the implementation of the energy efficiency measure.
1.3. The results from the comparison under Item 1.2 above shall be compared with a reference group of energy end-users, which has not participated in the implementation of the energy efficiency measure..
1.4. If the comparison under Item 1.3 cannot be ensured, the results under Item 1.2 should be normalized according to the rules set forth in Annex No. 3.

2. On the basis of data about energy sales:
2.1. Energy savings for the different types of energy (for instance electricity, natural gas, fuel for space heating) shall be measured through comparison of the data about the energy sold by the energy suppliers prior to the implementation of the energy efficiency measure with the data about the sales after implementation of the measure.
2.2. With a view to normalizing of the results from Item 2.1 and elimination of any external factors affecting energy consumption they should be compared with a reference group of energy end-users.
.
3. On the basis of data about the sales of equipment and devices:
3.1. The efficiency of the equipment and devices is calculated on the basis of information provided by the manufacturer.
3.2. The data about the sold equipment and devices shall be obtained from the respective tradesmen, who offer them on the market. This data may be adjusted through additional specialized studies and/or measurements.
3.3. The total amount of the energy savings is determined on the basis of the information from Item 3.2 about the realized sales
3.4. Under this method adjustments are made according to the changes in the regime and/or manner of use of the respective equipment or device.

4. On the basis of data about the loads at energy end-use:
4.1. The energy consumption of a building or an individual piece of equipment is tracked for the purpose of establishing its values prior to and after the implementation of the energy efficiency measure;
4.2. Detailed measurements are conducted of the factors, which have significant impact on energy consumption (production process, specialized equipment, space heating systems). .

Stipulations in the legislative and regulatory documents in disaccord with the requirements of IPMVP

- Valuation of a group of interrelated measures (Option C, for instance) is not allowed by Bulgarian Energy Efficiency Act and "Ordinance concerning the methodologies for determination of the national targets…"
- The methodologies allow for collection and processing of data based on engineering estimate – which is considered as violation of the IPMVP requirements concerning mandatory measurement

Ordinance concerning the methodologies he methodologies for determination of the national targets, the order of distribution of these targets as individual energy saving targets among the entities as specified in Article 10, paragraph 1 of the energy efficiency act, the eligible energy efficiency measures, the methodologies for evaluation and methods for verification of energy savings.

Art. 21. Eligible measures for energy efficiency improvement and their service life
Art. 23. Specialized methodologies are designed by the Energy Efficiency Agency on the basis of:
1. Standardized methodologies recommended by EU acts;
2. Methodologies designed and proposed by the persons specified in Art. 23 and 34 of the Energy Efficiency Act
Art. 31. (1) The quantitative and qualitative characteristics of the energy savings achieved as a result of the implementation of energy efficiency measures shall be corroborated through certificates for energy savings.
(2) Every implemented energy efficiency measure shall be valuated separately and reflected in the energy savings certificate –

B. Methods for collection and processing of data based on engineering estimate
1. Under this type of evaluation no site visit is realized.
2. It is used as a method for evaluation of presumed energy savings
3. The calculations are based on engineering principles without direct measurement of the characteristics of the site..
4. The method uses assumptions based on the specifications of the equipment, the operation characteristics, the schedule of change of the state in the process of operation with implemented measures, statistical data etc.
5. Additional information for performance of engineering evaluation may be obtained also from an external expert through study of the respective site. On the basis of this approach more complicated simulation algorithms/models may be worked out, which might be applied to a larger number of sites (for instance buildings, equipment, vehicles). In this way the data, obtained only through engineering estimate, might be supplemented or adjusted.

6.5.2 Czech Republic

In the Czech Republic following region specific characteristics are taken into account when reading and using IPMVP:

General:

In the document proper reference to financing the translation from IEE programme has to be included as well as to training slides, etc.

Chapter 9:

Definitions of Degree-day: Czech definition will be used.

Chapter 8.7

In case verification of CO_2 under the EU ETS (EU Emission Trading Scheme) relevant binding procedures as set by the EU and national authorities (Act No 695/2004 Coll., as updated) will be used.

All chapters:

All references and recommendation of standards, procedures and guidelines will be in practical use of IPMVP be replaced by Czech and European standards wherever necessary, legally required or practical. This also partially relates to references to ASHRAE Guideline 14, in many of the calculations can be also replaced by several Czech standards. ASHRAE Guideline 14 is nevertheless recommended to learn and follow.

List of Czech standards follows:

Most important technical standards related to energy:

ČSN 01 1300	Legal units of measurement
ČSN 01 3613	Graphical symbols for energetic diagrams
ČSN 06 0210	Calculation of heat losses in buildings with central space heating
ČSN 06 0215	Heating with infrared radiators
ČSN 06 0310	Central space heating - projection and installation
ČSN 06 0312	Central radiant heating with concreted tubes
ČSN 06 0320	Heating of domestic hot water – designing and installation
ČSN 06 0830	Safety device for central space heating and for domestic hot water heating
ČSN 06 1101	Heaters for central space heating
ČSN 06 1102	Heaters for central space heating - calculation of dimension
ČSN 06 1201	Local solid fuel appliances
ČSN 07 0021	Hot water boilers
ČSN 07 0240	Hot water and low-pressure steam boilers
ČSN 07 0305	Evaluation of boiler losses
ČSN 07 0610	Heat exchangers water-water, steam-water
ČSN 07 0620	Steam boiler construction and accessories
ČSN 07 0621	Location of boiler equipments and design of boiler houses
ČSN 07 0623	Technical documentation and steam boiler testing
ČSN 07 0703	Gas boiler houses
ČSN 07 0710	Operation, attendance and maintenance of steam and hot water boilers
ČSN 07 5853	Liquid fuel burners
ČSN 07 7401	Water and steam for thermal power generating equipment (with pressure up to 8 MPa)
ČSN 07 7403	Water and steam for thermal power generating equipment (with pressure 8 MPa and higher)
ČSN 08 0010	Steam turbines for driving turbo-generators
ČSN 08 3500	Combustion turbines
ČSN 08 5000	Nomenclature of water turbines, storage pumps, pump turbines and water turbine governors
ČSN 09 0011	Combustion engines
ČSN 10 5004	Compressors
ČSN 11 0010	Pumps
ČSN 12 0000	HVAC systems

ČSN 33 2000	Electrical regulations
ČSN 33 3100	Classification of power plants and heating plants
ČSN 35 1100	Power transformers
ČSN 35 0220	Hydro-alternators
ČSN 35 0225	Synchronous compensators
ČSN 38 0526	Heat supply - principles
ČSN 38 5502	Gas fuels
ČSN 44 1315	Solid fuels storage
ČSN 44 1440	Solid fuels – brown coal of North-Bohemian coalfield
ČSN 44 1450	Brown coal of Sokolov coalfield
ČSN 44 1411	Bituminous coal of Ostrava-Karviná coalfield for energetic purposes
ČSN 44 1482	Coke for heating purposes
ČSN 65 7991	Oil products, fuel oils
ČSN 73 0540	Thermal protection of buildings - parts 1, 2, 3, 4
ČSN 73 0550	Thermal properties of building structures and buildings – calculation methods
ČSN 73 0560	Thermal properties of building structures and buildings – industrial buildings
ČSN 83 0616	Quality of domestic hot water
ČSN EN 835	Heat cost allocators for the determination of the consumption of room heating radiators - appliances without an electrical energy supply, based on the liquid evaporation principle
ČSN EN 834	Heat cost allocators for the determination of the consumption of room heating radiators. Appliances with electrical energy supply
ČSN EN 60034	Rotating electrical machines
ČSN EN 61400	Wind power plants
ČSN ISO 8528	Reciprocating internal combustion engine driven alternating current generating sets

MOST IMPORTANT TECHNICAL STANDARDS in the field of measuring and control tools and instruments

ČSN 2500	In general
ČSN 2501	Verification of measuring instruments and measuring devices in general
ČSN 2502	Verification of concrete measuring instruments and measuring devices
ČSN 2509	Measuring instrument accessories and record papers
ČSN 251010	Length gauges
ČSN 2512	Callipers, slide gauges etc.
ČSN 2514	Micrometers
ČSN 2516	Protractors, thickness gauges, feeler gauges and wire gauges
ČSN 2518	Dial gauges and accessories
ČSN 2519	Gauges for measuring the accuracy of machine tools
ČSN 2520	Coordinate measuring machines (CMM)
ČSN 2523	Instruments for measuring surface geometric properties
ČSN 2531	Limit gauges for diameters and length dimensions
ČSN 2532	Limit and standard gauges
ČSN 2533	Gauge blocks and accessories, taper gauges and check plugs
ČSN 2535	Splined shaft and hub gauges and shape gauges
ČSN 2537	Sine bars, knife edges, knife edge square
ČSN 2538	Radius gauges, profile gauges etc.
ČSN 2540	Thread gauges for ISO metric threads fit
ČSN 2541	Limit gauges for screw threads
ČSN 2546	Other screw thread gauges

ČSN 2547	Instruments and gauges for measuring gearing
ČSN 2551	Drawing and control sets
ČSN 2557	Levels, plumb lines, optical squares
ČSN 2561	Area and length measuring machines and gauges
ČSN 2570	Pressure gauges in general and accessories
ČSN 2572	Pressure gauges
ČSN 2574	Analyzing equipments
ČSN 2575	Volume measuring
ČSN 2576	Volumetric weight and density measuring
ČSN 2577	Liquid and gas flows in hollow sections measuring
ČSN 2578	Instruments for liquid and gas flows and quantities measuring
ČSN 2579	Viscosimeters
ČSN 2580	Thermometers in general, components
ČSN 2581	Glass liquid thermometers
ČSN 2582	Pressure-type thermometers, with contacts and for transformers
ČSN 2583	Thermocouple and resistance thermometers
ČSN 2585	Calorimeter and indicators for heating cost distribution
ČSN 2591	Flaw detectors
ČSN 2593	Liquid flow measuring in open channels
ČSN 2596	Control sieves etc.

MOST IMPORTANT TECHNICAL STANDARDS in the field of metrology

ČSN 9900	General provisions, nomenclature, symbols and units of measurement of geometric magnitudes
ČSN 9901	General provisions, nomenclature, symbols and units of measurement of geometric magnitudes
ČSN 9903	Length gauges for yard goods measuring
ČSN 9905	Accuracy of coordinate measuring machines (CMM)
ČSN 9906	Length gauges, micrometers and slide gauges, deviation meters and precision dial gauges
ČSN 9910	Length measuring instruments – rolling and folding gauges
ČSN 9921	Testing of ammeters, voltmeters, wattmeters
ČSN 9931	Glass thermometers
ČSN 9941	Weighing instruments
ČSN 9944	Measuring instruments of mechanical tests of material – hardness meters
ČSN 9947	Mean absolute pressure measuring instruments
ČSN 9954	Electronic filter testing
ČSN 9963	Metal volume measures
ČSN 9964	Large volume measures
ČSN 9968	Gas flow-meters and gas volume-meters
ČSN 9971	Photometric measuring instruments
ČSN 9973	Optical properties of materials measuring instruments
ČSN 9980	General provisions, nomenclature, symbols and units of measurement of physical-chemical properties of materials

Units:

As the Czech Republic uses System of SI Units (Le Système International d'Unités), additions to IPMVP, Volume I and III, will be made, indicating the conversion of the measurements from Anglo-Saxon Units System to units of measurement of the SI System:

- 1 US gallon = 3,785412 l
- to convert the temperature from Fahrenheit degrees to Celsius degrees, the following formula will be used: (F°-32)*5/2
- mcf (million cubic feet,Mft3)=106ft3=106* 0.02832 m3 (1 ft3=0.02832 m3)
- 1 pound= 0,4536 kg

6.5.3 Romania

Addition to Chapter 1.3, "IPMVP's Relationship To Other *M&V* Guidelines", page 2 in IPMVP, Volume I, September 2009, EVO 10000-1:2009

Another useful document for the reader of IPMVP is National Energy Balance Elaboration Guide. The national guide describes the way to perform en energy balance, energy audit and how to accomplish the measurement.

Addition to Chapter 4.8.3.2, "Calibration", page 29 in IPMVP, Volume I, September 2009, EVO 10000-1:2009

In Romania the devices are calibrated according to the recognized authority, National Institute of Metrology, that has as main mission the provision of scientific basis for uniformity and accuracy of measurement in Romania, and therefore calibration action must comply with its assessed laws.

Addition to Chapter 8.11, "Measurement Issues", page 52 in IPMVP, Volume I, September 2009, EVO 10000-1:2009

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) and using the Code for Electric Energy Measurement elaborated also by ANRE.

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 current 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

Addition to Chapter 8.7, "Data for Emission Trading", page 50 in IPMVP, Volume I, September 2009, EVO 10000-1:2009

In Romania the CO_2 emissions are measured, monitored and traded according to National Allocation Plan Regarding Greenhouse Gas Emission Certificates, that can be found on the following link: http://www.anpm.ro/Files/TEXT%20Anexe%20HG_NAP_ro-%20FINAL_20098183817246.pdf

The certificates trading its made according to EU legislation.

Because Romania uses European metric, an addition to IPMVP, Volume I and III, will be made, indicating the conversion of the measurements from Anglo-Saxon Units System to units of measurement of the International System:

- 1 US gallon = 3,785412 l
- to convert the temperature from Fahrenheit degrees to Celsius degrees, the following formula will be used: (F°-32)*5/2
- mcf (million cubic feet,Mft^3)=$10^6 ft^3$=10^6* 0.02832 m^3 (1 ft^3=0.02832 m^3)
- 1 pound= 0,4536 kg

6.5.4 Croatia

1. Chapter 4.8.3.2. Calibration, 1st sentence should be replaced with following:

   'Meters should be calibrated as recommended by the equipment manufacturer, in laboratory approved by Croatian agency for metering (Hrvatski zavod za mjeriteljstvo) and with valid certificate.'
2. Chapter 9 Definitions, definition of Adjusted-baseline energy, add at the end of definition:

   '*Baseline energy consumption* according to Croatian Law on efficient energy end-use'
   '*Osnovna potrošnja energije* prema Zakonu o učinkovitom korištenju energije u neposrednoj potrošnji'
3. Chapter 9 Definitions, definition of Energy, add at the end of definition:

   'see definition in Croatian Law on efficient energy end-use'
   'vidi definiciju u Zakonu o učinkovitom korištenju energije u neposrednoj potrošnji'

6.6 Recommended IEEFP Amendments

6.6.1 Czech Republic

Comments to IEEFP:

1) Page 10 (Word document), Chapter 15: … *In assessing the proposed technologies for a given project, LFIs need to be able to assess the quality of an investment grade audit (IGA)….*

Comment
There are not many „just" ESPs financed by LFIs credits in our countries. Most often these are projects financed with state (EU) subsidy. That is why the banks use consultants – authorised energy auditors – or recommended companies - to have them evaluate the technical qualities of the ESP audit and project documentation – and its economic results.
Which does not mean banks are not interested in any training.

2. IFC/GEF guarantee – we had this programme in the Czech Republic several years ago, we need to check, if it is still available here…

3. Chapter 1, Page 1 (Word document): Even energy efficiency projects with very high 25 to 50 percent IRR's are unable to compete with one-year internal hurdle rate of returns "projected" for core business investments of many large industrial Hosts.

Comment
Energy Efficiency projects with IRR from 25-50% do not need to look after external financing at least in Czech companies

4. Appendix A of the IEEFP: Table M&V Summary: suggestion to add one column:

Original M&V table

Savings Measure	Item Measured	Level Measured	Item(s) Stipulated (based on post actual)

Water	Gallons	Sample	Toilets = # Flushes
			Showers = # & Time

Lighting	kW	Sample	Hours of Use (based on actual logged use)
Steam Traps	Steam Loss	Sample	Extrapolated Actual
Power Factor	Utility Bill	100%	Annual Savings
Sterilizer	Steam Loss	100%	Annual Savings
Chiller Plant	kW/Ton	100%	Ton Hours

Proposed M&V table (distinguishing medium and units)

Savings Measure	Item measured	Units of measurement	Level measured	Items stipulated (based on post actual)

Water	Hot and cold water	Litres	Sample	Toilets = # Flushes
				Showers = # & Time

Lighting	Electricity	kW	Sample	Hours of Use (based

				on actual logged use)
Steam Praps	Steam loss		Sample	Extrapolated actual
Power factor	Utility bill		100%	Annual savings
Sterilizer	Steam loss		100%	Annual savings
Chiller Plant	Elektricity savings	kW/t	100%	Tonhours

5. Tables: All US$ will be translated into EURO, technical units will be translated into SI units system.

6. The last page or any other place should state that the Czech version (and also Romanian, Bulgarian…) was developed within the Intelligent Energy Europe Programme and Logo of IEE should be placed there.