multEE
facilitating multi-level governance
for Energy Efficiency

Identifying areas of improvements of Monitoring and Verification schemes and Coordination Mechanisms

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List of abbreviations

AEA	Austrian Energy Agency
CM	Coordination Mechanism
CRES	Center for Renewable Energy Sources ad Savings
EE	Energy Efficiency
EEAP	Energy Efficiency Action Plan
EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
EPC	Energy Performance Certificate
ESCO	Energy Service Company
ESD	Energy Service Directive
ETS	Energy Trading System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
IPE	Institute of Physical Energetics
LEI	Lithuanian Energy Institute
M&V	Monitoring and Verification
MACEF	Macedonian Center for Energy Efficiency
NEEAP	National Energy Efficiency Action Plan
NGO	Non Governmental Organisation
R&D	Research and Development
RES	Renewable Energy Systems
RUC	University of Roskilde
SEAP	Sustainable Energy Action Plan
SIEA	Slovak Innovation and Energy Agency
SME	Small and Medium Enterprises
SMIV	System for Monitoring, Measurement, Verification of Energy Savings
SWOT	Strenghts, Weaknesses, Opportunities and Threats
TD	Top Down
VC	Vertical Coordination

I Executive Summary

This document is focusing on identifying areas of improvement of monitoring and verification schemes and coordination mechanism in the nine partner countries of the MultEE project. Supplementary an analysis has been carried out to conclude on these areas of improvements in respect of the different types of political governance in the partner countries.

The content is based on the country reports in D.1.3 and the Synthesis report on European best practices for M&V schemes and coordination mechanisms D1.3, and Energy efficiency policies in the countries based on national and country reports from Odyssee-Mure, and Energy Community (FYRFYR of Macedonia).

The partner countries are divided in the following 5 groups:

1. Lithuania
2. Slovakia, FYR of Macedonia, Croatia, Latvia and Slovakia
3. Greece
4. Austria and Germany
5. Denmark

I.I Areas of improvements – monitoring and verification schemes:

group 1

There is no formal M&V scheme. M&V schemes could be implemented with focus on verification, inspired by best case(s) from other countries.

Group 2

M&V schemes are already implemented/ under implementation, but further development of the M&V schemes are needed.

IT tools could be important elements in respect of this development. The countries have verification procedures, which could be improved based on specific measurements.

Group 3

No M&V schemes. But bottom up methodologies are used to measure achieved energy savings. The M&V schemes could be improved. A unified system with focus on verification should be implemented. ESCO arrangements could be used.

Group 4

M&V schemes have been implemented, but in Germany systematic monitoring at local level could be improved. In the SEAP projects only individual methods are used. In Austria the funding could be better integrated and the provinces should have better access to data.

Group 5

Costs should be reduced by change of rules, and the priority factor should be used to define and implement projects with a higher additionality, and a central reporting system should be implemented to reduce double counting.

It is suggested that the existing M&V schemes should be transformed into a template for local/regional action plan – if possible integrated into the SEAP (CoM).

I.II Areas of improvements – coordination mechanisms:

Group 1

No CM. But CM could be stablished with a focus of involving the local administrative level as a part of vertical coordination. These countries have horizontal coordination but only with ministries responsible for the energy policy.

Group 2

CM are rather undeveloped both in respect of coordination bodies and in the actual vertical coordination and horizontal coordination.

Group 3

No specified legal obligations for local authorities, and they have only little vertical and horizontal coordination.

Group 4

Vertical coordination is performed as a coordination between federal level and the federal states. In Austria only informal vertical coordination is taking place. In both Germany and Austria horizontal coordination is only taking place between relevant ministries.

Group 5

In Denmark (Group 5) there is no formal coordination mechanism, and the lack of delegation reduces the interest of stakeholders to carry out energy savings.

But the horizontal coordination takes place between the Ministry of Climate-, Energy and Buildings and many national institutions.

It is also concluded that all partner countries need capacity building in respect of education programs in EE at regional / local level, - national tailored local action plan template for energy efficiency and local horizontal integration through cross-organization (matrix organization on key issues).

Finally it is concluded that all countries need to include more relevant stakeholders both in the M&V schemes and in the CM schemes.

II Elements of improvements in Lithuania

II.I General framework

The Ministry of Energy of the Republic of Lithuania is responsible for the creation and administration of M&V schemes, but by decision of the Ministry of Energy, most of the administration and coordination tasks are delegated to the State Enterprise Energy Agency.

There are rules in place for calculating energy savings and monitoring of efficient energy and use of resources. These rules are applied to all efficiency measures implemented.

II.II Energy Policy

In the National Energy Independence Strategy (NEIS), approved by the Lithuanian Parliament in 2012, the government sets the objective to improve the efficiency of all types of energy including energy consumption in buildings, various installations and devices in households, technological processes in industry and transport systems moved towards those that are in economically developed EU countries. In the scope of energy efficiency, the NEIS sets a goal to increase energy consumption efficiency by 1.5% a year. Seeking to achieve this goal, cross-cutting and sectorial measures are being implemented.

The basic cross-cutting measures used to improve energy efficiency are the following: requirements of ecodesign for energy related products, labeling of energy consumption - related products, fiscal measures and support of renewable energy.

Industry investment subsidies for energy efficiency and renewable energy projects are provided through EU Structural Funds 2007-2013, Lithuanian Environment Investment Fund, Special Program for Climate Change. The financing is mainly oriented towards improvement of energy production efficiency by providing support for more efficient cogeneration and heat supply systems and for more efficient production and energy use for SMEs. The measures implemented in industrial enterprises by using their own financial resources are considered as relevant impact measure in the country too. EEE and Norvegian financial instruments (partnership project scheme and small grant scheme) are available too to develop and install new environmental technologies and to improve existing technological processes in order to increase the efficiency of the use of natural resources.

Programs and measures in households and tertiary sectors are focused on upgrading multifamily buildings and public buildings. For modernization of multifamily buildings soft loans are provided based on an updated financing model. Financial resources from state and municipal budgets, EU Structural Funds 2007-2013 are used to upgrade public buildings. The upgrading of multifamily buildings is expected to result in energy savings of 1000 GWh in 2020 and modernization of public buildings - in additional energy savings of 250 GWh in 2020.

II.III Monitoring

As a part of M&V schemes for energy efficiency measures, there is an overall monitoring but this monitoring is not specific for different measures and there is no verification of the results. The reason for this is the large amount of energy efficiency measures, which are aimed at different sectors. Besides these measures are implemented by different ministries, agencies, funds etc. – each with their own rules regarding M&V. There have been attempts to centralize data collection to allow for more efficient M&V schemes to be introduced, but the actual procedures have been too strong. A pilot project using improved M&V tools has been considered, but a lot of testing still have to be carried out.

Use of data collection methods could simplify and improve the data collection and analysis process in respect of M&V.

The monitoring is first of all related to energy efficiency measures and programs, where the monitoring process involves persons receiving financial support from programs, the public authorities or bodies administrating programs implemented by the public authorities and the Ministry of Energy of the Republic of Lithuania.

The monitoring covers the following: the type and number of measures implemented, energy properties and the amount and number of investment in specific measures.

II.IV Support

There is the following support for implementation of measures:

Support from EU Structural Funds for 2007-2013 (Operational Programme for Economic Growth).
Support from EU Structural Funds for 2007-2013 (Operational Programme for Promotion of Cohesion).
Support from the EU Structural Funds for 2014-2020.

Public consultations and relevant stakeholders are invited to participate in the drafting of regulations. Majority of energy efficiency measures have an inbuilt support mechanism (loans, subsidies, grants, etc.).

For motivation of participation in programs a good promotion scheme exists (presenting financial support possibilities – grants, support from different EC funds, local EE funds and others).

For implementation measures the local governments are motivated by financial support (State budget, ES Structural and Cohesion Funds, local EE Funds, other support).

Very strong rules exist for receiving financial support for EC funding programs or local funds.

In case of non-compliance of implemented measures – the owner of the project must return the received financial support.

II.V Areas of improvements

Based on best practices from other countries this could be improved by establishing such M&V schemes. The monitoring should be specific for different measures and the results should be verified.

The monitoring could be based on the experiences of the monitoring process already carried out in relation to the energy efficiency measures and programs

Use of data collection methods could simplify and improve the data collection and analysis process in respect of M&V.

II.VI Verification

The required verification is performed on random checks of the reports on the energy savings submitted by beneficiaries or administrators of the measures/programs. There are not specific targets being set for the implementation of the monitored and verified energy efficiency measures on annual basis.

II.VII Areas of improvements

Random checks could be improved by better investigations of the actual energy savings implemented, annual targets and better statistics.

II.VIII Coordination mechanisms

II.VIII.I Vertical coordination

Legal vertical coordination mechanism is not implemented in Lithuania yet. The responsibility for energy efficiency policy making lies on the national level. Agencies are helping with the implementation and coordination of energy efficiency policy between national and local levels. Local authorities demonstrate only limited interest in energy efficiency policy formulation.

Communication flow between governmental levels with regard to EE policy making and implementation can be characterized as not sufficient, but there are various mechanisms ensuring that communication and responsibilities between all parties involved.

II.VIII.II Areas of improvement

Improved vertical coordination mechanism and thereby better communication flow could be developed, when the limited interest on the local level has been increased.

II.VIII.III Horizontal coordination

Energy policy formulation between affected line ministries and other bodies is coordinated by legal acts and the energy policy is in line with EC policy.

II.VIII.IV Areas of improvement

But still it could be relevant to investigate useful possibilities of horizontal coordination between the different national bodies.

III Elements of improvements in Slovakia

III.I General framework

In Slovakia exists and is implemented M&V scheme for energy efficiency measures, called Monitoring system on energy efficiency, which is governed by the Act No. 321/2014 Coll. (New Energy Efficiency Act).

III.II Energy Policy

Energy efficiency policy is basically set by Energy Policy of the Slovak Republic, the latest from October 2014, covering the period until 2035. Energy Efficiency Strategy was adopted by the Government Resolution No. 576 of 04. 07. 2007, supported by the report in 2011, based on ESD, where three-years Energy Efficiency Action Plans have been used as implementing mechanisms for this strategy. Energy Efficiency Action Plans aim to propose energy efficiency measures to ensure the fulfilment of the policy and strategy objectives.

In the Energy Efficiency Strategy of 2007 was for the first time mentioned the necessity to create and realise monitoring system for energy efficiency. The Energy Efficiency Act No. 476/2008 Coll. had also set basic requirements for providing data to the monitoring system. Decrees have been issued on the data subject and form how to send those data to the monitoring system.

In 2009, the Energy Efficiency Programme was set to finance the creation of monitoring system. SIEA was set as the institution running the monitoring system according to previous Energy Efficiency Act. The second and third action plans have used the monitoring system for the assessment of energy efficiency measures set in both action plans, however there was still needed a manual verification of those savings.

New Energy Efficiency Act has introduced more detailed obligations for relevant subjects to submit data to the monitoring system, based on detailed requirements of the EED Directive. Also new decrees have been issued with detailed requirements of provided data to the monitoring system. More data are obliged to provide to the monitoring system.

III.III Monitoring

Responsible body for administration and coordination of the monitoring system of energy efficiency is Slovak Innovation and Energy Agency (SIEA).

Every measure is monitored via monitoring system as asked by the EED. Specific requirements are set for monitoring the energy savings related to Art.7 of EED, as well as cumulative calculation of savings. Each measure is described by the basic factors asked for in Art.7 as for policy measure. Only bottom-up methods of energy savings calculation are used, and they are were evaluated at the same level as the implemented projects.

In programs, where the monitoring of energy savings was not required, the determination of savings was set as planned savings. Total investment costs were for the purpose of 3AP determined on the basis of the investment intensity (€/MWh) of projects that were solely aimed at improving energy efficiency in the sector.

III.IV Verification

Verification process in Slovakia is a part of monitoring system. Data are verified after being entered into the system, but before being used in the database as core data.

III.V Areas of improvements

The current database modules of MSEE will be updated and improved in order to simplify the access and data input. In preparation would be new interface to the database enabling the on-line addition and editing and verification of data.

Please see the weaknesses and the opportunities in the swot analysis.

- STRENGTHS:
  - The used data collection system (MSEE) is quite detailed regarding amount of data being collected.
  - MSEE includes a large sample of data already (since 2010), however, only for some sectors (especially residential buildings).
- WEAKNESSES:
  - Evaluation of energy efficiency measures from the NEEAP or Annual report is not yet possible.
  - MSEE cannot be used for the purposes of evaluation of progress towards the targets yet.

- Limitations of human resources on the side of the coordinator and data collection (only 4-5 people at SIEA (*Slovak Innovation and Energy Agency (SIEA)* working on MSEE, only 1 person at MoE SR (*Ministry of Economy in Slovak Republic*).
- So far very little automatisation, very time demanding both on the side of the different ministries, as well as on the side of the SIEA and MoE SR.
- Mistakes in terms of monitored energy savings, especially: errors in used units (kWh/GJ/TJ), time dimension of the energy savings (5-year savings or annual savings), missing information on energy savings, data on financing which include other costs than EE related.

- OPPORTUNITIES:
  - Extension of the monitoring system in order to cover all energy efficiency measures, extension into other systems and its linkage to the other information and monitoring system (such as ITMS, INFOREG, etc.) as well as setting up of the important procedures will allow to use the MSEE as a solid tool for monitoring and verification of EE measures for the needs of preparation of NEEAPs and Annual reports.
- THREATS:
  - Change of the main principles of M&V and reporting to the European Commission (by the EC) after the extension of the MSEE
  - The complexity of the MSEE could affect its flexibility and applicability

III.VI Coordination mechanisms

III.VI.I Vertical coordination

Responsibility for policy making lies mostly on national level. Conceptual policy and related legislation is made at the national level, some of the activities are made under the responsibility of regions (e. g. related schools) or at local level (e.g. concepts of community development in the field of heat energy).

The permanent inter-institutional group for preparation of NEEAPs which is set by the government includes all relevant ministries and representatives from regional administration and municipalities. Their role is to prepare, consult and coordinate the preparation of conceptual documents related to EE and NEEAPs. The group is therefore both relevant in respect of vertical and horizontal coordination.

III.VI.II Horizontal coordination

Relevant representatives of ministries are vital part of working groups under the lead of MoE, those are mostly responsible for conceptual work in the responsibility area of

each individual ministry. There is a long term cooperation with the relevant ministries and organisations who are responsible for running of the financial mechanisms with effect on energy savings. But else there is only little cooperation among the ministries.

III.VI.III Areas of improvements

Strengthening of the vertical and horizontal coordination is needed. The quality of the vertical and horizontal communication flow with regard to EE policy making and implementation at the national, regional and local level can be characterised as good, but it could be improved at all levels.

IV Elements of improvements in Germany

IV.I General framework

All laws and regulations are passed in a co-decision policy process which safeguards that during the law-making regional and local concerns can be voiced and adequate funding and staffing agreed. Whereas federal laws and initiatives only designate minimum regulations, federal state and local entities are able to step up on these regulations so as to safeguard that energy efficiency policies are most effective in their regional or local circumstances.

Unlike in centralized countries, the federal structures of Germany imply that all levels of government (federal government, regional federal states and local level) have competencies in the various fields of energy policy. Partly these are shared competencies and partly they are exclusive competencies. In the case of energy efficiency policies, the federal government and regional states act as co-legislators.

The logic applied in Germany is closely related to the principle of subsidiarity. According to this logic, it is the task of the Federal Government to define a (minimum) set of policies in the energy efficiency field. Regional governments can then decide whether they agree with the level of ambition or whether further action is needed to satisfy the regional policy stance on energy and climate change policies. Finally, it will be up to local level governments to (a) implement these frameworks but also (b) to decide if this framework fits to the local needs or whether additional action is necessary.

The responsibilities of each level are clearly defined and attributed to dedicated actors. At national level, the Federal Ministry of Economic Affairs and Energy (BMWi) defines energy efficiency policies. It is supported by the Federal Centre for Energy Efficiency (BfEE) and the national energy agency (dena).

At regional level, the attribution of the energy efficiency file varies from federal state to federal state. In many cases, the dossier is attributed to the economic ministries or the environment ministries.

Depending on the policy measure, different actors are involved in implementing energy efficiency policies (e.g. federal ministries, the Federal Centre for Energy Efficiency, federal state ministries, municipalities, and promotional banks such as KfW). Energy agencies in general terms tend to have a promotional or support function but not a formal role of implementation in the legal sense.

IV.II Energy policy

With its Energy Concept from September 2010 and the decisions from summer 2011, Germany initiated a farreaching transformation of its energy system.

Alongside intensifying the use of renewable energies, reducing energy consumption by increasing energy efficiency is a key pillar.The Energy Concept also includes ambitious energy efficiency targets for Germany.

The overall energy efficiency target demands a reduction of primary energy consumption by 20% until 2020 (and by 50% until 2050). However, a remaining shortfall to meeting the primary energy target in 2020 was estimated to be around 10 to 13% based on current forecasts.

In order to fill this gap, the German Federal Ministry for Economic Affairs and Energy (BMWi) presented the "National Action Plan on Energy Efficiency" (NAPE) in early December 2014 (BMWi 2014). The NAPE includes new and further developed policy measures to increase energy efficiency in buildings, industry and the tertiary sector. The highest contributions to energy and CO2 savings are expected from a newly introduced competitive tendering scheme for energy efficiency and the establishment of up to 500 energy efficiency networks in industry.

IV.III Monitoring and Verification

In the respective laws and ordinances, a clear policy implementation will be established and codified. Usually the implementation is passed from federal to federal state and thereon to local level in a clear cascading manner.

In principal, all governmental actors and bodies which participated during the process of law-making will be responsible for the implementation. This guarantees that the policy-formulation directly consider matters of implementation and potential implementation problems from the very start.

Authorities interact to safeguard access to data and information. This usually is done informally and on ad hoc basis. As local, federal state and federal statistics are interlinked the overall energy aggregates can be tracked at any point in time for an evaluation.

At local level, a systematic tracking of energy efficiency is not comprehensively implemented. Whereas all major local entities like bigger cities or agglomerations

collect and monitor energy data, the review of energy saving programs is not systematically installed.

Energy efficiency monitoring is implemented mainly in the local entities participating in the European Energy Award and having taken up a dedicated reporting obligation in this framework.

In relation to evaluation of SEAP projects energy monitoring is performed systematically only in 22 cities. All of these actors rely on individual methods (bottom up or top down, depending on the case) for tracking energy efficiency progress.

In general terms, all major energy efficiency instruments are assessed in regular intervals usually through evaluation by independent research institutes in order to allow for redesigning them. The German authorities, both on federal and on state level, place high emphasis on the fact that their monitoring should be cost-effective. Implementing a continuous and comprehensive monitoring and verification of energy savings on all levels and for all measures including the introduction of a common IT tools is generally not considered of meeting the criterium of cost-efficiency. Hence, most important programmes are stringently monitored and evaluated, but less money is spent to trace the saving impact of an energy saving campaign or secondary energy audits.

IV.IV Areas of improvement

Monitoring and verification of energy savings could be done in a more systematic and comprehensive manner especially at local level. The actors involved in SEAP projects rely mostly on individual methods (bottom up or top down, depending on the case) for monitoring of energy efficiency progress.

IV.V Coordination mechanisms

IV.V.I Vertical coordination

Unlike in centralized countries, the federal structures of Germany imply that all levels of government (federal government, regional federal states and local level) have competencies in the various fields of energy policy. Formal vertical coordination is performed largely in the legal context set up by the shared competences of the federal level and the federal states for energy efficiency.

In case local governments are impacted by this legislation, the federal state ministries will ensure coordination with the respective associations of local level representatives.

The German formal coordination mechanisms are designed to guarantee smooth law-making which is closely oriented at the subsidiarity principle. Whereas this general

framework was sufficient for the last decades, the increasing need for a constant exchange on energy efficiency policy making as well as on monitoring and implementation has led to the emergence of supplementary informal coordination mechanisms at all levels of government. Owing to the informal and non-binding character of these mechanisms, the group of involved actors has in many cases been enlarged to include researchers, industry associations, consumer associations and NGO representatives.

To underpin the formal law-making, the Federal Ministry of Economic Affairs and Energy hosts an annual working group of the responsible government officials of federal and federal state level (Bund-Länder-Arbeitskreis Energieeffizienz). Key aims of this working group are facilitating the policy process, informing about intended policy changes or amendments and exchanging best practices on a regular basis.

To guarantee a successful implementation and monitoring of the energy system transformation, the Federal Ministry for Economic Affairs and Energy has established a number of informal "coordination platforms" (Energiewende-Plattformen), among those the coordination platforms for energy efficiency and energy efficiency in buildings. Key tasks of these platforms are to develop and discuss joint solutions together with the relevant stakeholders from business, civil society, science, the affected government departments and the federal states.

With the implementation of the energy transition and climate change policies, new forms of informal coordination have appeared both on federal and federal state level. As these mechanisms include a broad range of stakeholders – in some cases even civil society at large – in the policy formulation and implementation process, they might be an interesting mechanism for testing in other countries as well.

IV.V.II Horizontal coordination

Adding to this formal vertical coordination, a horizontal coordination between the federal ministries and between the federal state actors on energy efficiency is taking place in formal and informal settings. This allows for the exchange of best practices and a concertation which supports the law-making and policy implementation process.

IV.V.III Areas of improvements

Please see the weaknesses mentioned in the swot analysis:

In terms of policy coordination, the traditional formal vertical and horizontal coordination of government layers used for law-making in Germany also strongly defines energy efficiency policies.

In terms of ***strengths***, the German policy coordination mechanisms are based on a clear formal structure. As these structures are used for overall policy formulation and coordination, they are well established and accepted at every level of government. A clear attribution of tasks is a further strength of the German coordination system. Each government entity which is involved in the policy implementation is also included in the policy formulation which allows taking into account potential implementation problems and safeguards the adequate attribution of funding and staffing.

With the implementation of the energy transition and climate change policies, new forms of informal coordination have appeared both on federal and federal state level. As these mechanisms include a broad range of stakeholders – in some cases even civil society at large – in the policy formulation and implementation process, they might prove an interesting mechanism for testing in other countries as well.

Whereas the policy coordination mechanisms allow for a thorough and comprehensive inclusion of all relevant actors at all government levels, their main ***weakness*** can be seen in the duration the process of policy formulation takes, compared to a centralised "command and control" approach. This weakness is acknowledged for overall law-making but generally accepted as an inconvenient side-effect of implementing the subsidiarity principle.

The multi-layered approaches towards coordination (federal level with federal states, federal states with local level) bear the ***threats*** that local experiences are only indirectly passed on to the federal authorities and that the feedback loops for policy formulation are only indirectly taking place. Usually this threat is anticipated through the fact that the local authorities are represented in Berlin through the means of their associations (e.g. by Deutscher Städtetag – German Association of Towns and Cities etc.). These associations will safeguard that the local voice is heard in federal policy making.

Especially with the energy transition, the additional informal coordination mechanisms both on vertical and horizontal levels can be seen as ***opportunities*** for enhancing and complementing the formal coordination. As these informal mechanisms define coordination in a very broad sense, including civil society at large, they might prove an interesting and effective instrument.

Acknowledging the fact that the success of energy efficiency policies eventually depends on the acceptance of energy consumers and energy users who are actively participating in policy design and formulation through the informal coordination mechanisms, this element of German policy coordination might prove interesting for other countries as well.

V Elements of improvements in Austria

V.I General framework

A M&V scheme for energy efficiency policy implementation exists in Austria for the monitoring of the target achievement of the federal law on energy efficiency and of the Directive 2012/27/EU on energy efficiency (short: Energy Efficiency Directive (EED)), Article 3 and Article 7. The Federal law on energy efficiency implements the EED in Austria and was passed in mid-2014.

V.II Energy policy

Austria's energy policy is simultaneously conducted at two levels, the federal level and level of Austria's nine federal provinces. The federal constitution allocates responsibilities either to the federal level (e.g. taxation, metering and emergency supply) or to the joint federal and province level (e.g. energy supply, energy conservation and subsidies). Energy policy is formulated and implemented in close co-operation with the social partner organisations, which represent important groups of society (employers, employees, agriculture).

The main energy policy making is taking place at the federal level in a number of government ministries and institutions. The Federal Ministry of Economy, Family and Youth is the main government institution responsible for energy matters at the federal level. The Federal Ministry of Agriculture, Forestry, Environment and Water Management is responsible for environmental protection, including climate change and emissions from combustion. The Federal Ministry of Transport, Innovation and Technology is responsible for transport policy and energy R&D. The Federal Ministry of Finance is responsible for setting energy taxes.

At the regional level, the governments of the nine federal provinces have responsibility for policy making, setting subsidy levels, and implementing regulatory control of energy companies.

The E-Control Commission is the federal regulator for electricity and gas in Austria. The E-Control GmbH is a government-owned company providing advice on regulation to the commission. The energy institute for Austrian businesses was initiated by the Austrian chamber of commerce and established in 2008. The Austrian Energy Agency was established by the federal government and states to promote clean energy use in Austria. Besides the Austrian Energy Agency, which acts as a national energy agency, regional institutions performing the tasks of an energy agency exist in all Austrian federal provinces. This corresponds to the important role the federal provinces play in

energy policy. In some federal provinces these institutions are incorporated into the administration, in others energy agencies have been formed as legal bodies.

More than 40 Austrian organisations offer energy efficiency information services for consumers. The most prominent of these is the Austrian Energy Agency. Many organisations are active only at the state or municipal levels. Austrian utilities also run information campaigns to encourage responsible energy use.

V.III Monitoring

In Austria, a national monitoring and verification scheme (M&V) for energy efficiency measures was first set up during the implementation of Directive 2006/32/EU on energy end-use efficiency and energy services.

The M&V scheme consisted of an online database which was used by all parties affected by the ESD to report energy efficiency measures they had initiated (mostly through subsidy schemes) in the energy end-use sectors. For the implementation of the EED a similar database was set up.

Austria chose to follow a bottom-up approach by calculating energy savings from energy efficiency measures mostly with nationally approved default values per individual measure through means of the online database.

The regional and national administrative levels participate actively in the Austrian M&V scheme for energy efficiency by reporting energy efficiency measures they have subsidized to the national monitoring body on a yearly basis.

Local authorities and companies are not required to report energy efficiency measures. However, if local authorities and companies have received subsidies for implementing energy efficiency measures in their sphere of action, the effects of these measures are generally reflected in the savings reported to the national monitoring body by the respective national agency funding.

A great portion of the savings reported resulted from measures subsidized by the provinces in the area of buildings and heating.

V.IV Verification

The energy savings reported are verified by means of plausibility checks and in depth sample checks of statistically significant proportions of projects. In addition, selected projects are verified through on site visits.

The reporting of energy efficiency measures and savings is made on an annual basis.

V.V Areas of improvement

Please see the weaknesses and opportunities mentioned in the swot analysis:

Strengths: one national monitoring body ensures a coherent monitoring of energy efficiency measures in Austria; nationally agreed bottom-up methods allow for coherent energy savings calculations.

Weaknesses: the allocation of energy savings when measures are funded by two different institutions (especially between energy suppliers subject to the energy efficiency obligation system and other funding agencies).

Only energy providers and federal bodies are obliged to use the database. Federal provinces and other actors can but do not have to use the database for reporting their energy savings.

Opportunities: the online database collects information now on energy efficiency measures from the federal state and the energy suppliers subject to the energy efficiency obligation scheme. This database could additionally collect information on energy efficiency measures from the provincial level and other funding agencies in Austria and would allow having a comprehensive data collection tool for energy efficiency measures in Austria.

V.VI Coordination mechanisms

Formal coordination mechanisms neither exist on vertical nor on horizontal level. Involvement of another governance level (e.g. the federal level involving the regional level or the regional level involving the local level) in energy policy formulation mostly happens on an informal basis, usually with no obligation of mutual coordination.

However, involving the regional level in national energy policy formulation and implementation, especially related to national energy strategies or similar, is standard practice. Subsidy schemes for energy efficient construction and refurbishment exist in each province; energy savings achieved through these schemes contribute largely to the Austrian energy savings target. The local level only plays a minor role in regional and national energy policy formulation, but initiatives such as the European Energy Award®, targeting the local level, are well received in Austria with more than 160 local authorities participating and showing commitment to reduce CO_2 emissions by improving energy efficiency and boosting the use of renewable energy sources in their sphere of competence.

V.VI.I General Framework

Being a federal state, the regional levels in Austria (composed of 9 federal provinces) have a variety of competences that allow them to pass laws and decrees and to define policies in certain areas with energy being one of them. Therefore, energy policy making is not only within the legal responsibility of the national state, but also within the regional provinces. On the other hand, local authorities are free to develop their own energy policies suitable for their sphere of action; however, they have no legal competence and responsibility respectively to pass laws and decrees.

V.VI.II Vertical coordination

In Austria, no vertical coordination bodies or fora exist per se between national and regional level for energy policy. However, the provincial states are usually represented in task forces, strategic coordination groups and similar settings when important strategies such as the Austrian Energy Strategy are developed. In such cases, representatives from the provinces are involved in the development and/or adaption of energy efficiency measures through participation in different working groups, each working group being in charge of a different energy topic.

On the other hand, regional energy strategies are usually formulated without involving representatives from the national level.

Worth mentioning in this context is, however, the so-called 15a agreement: it is an agreement between the federal government and the provincial governments about matters falling within their sphere of competence. A 15a agreement is binding for the federal government as well as for the provincial governments. An example is the 15a agreement to implement the ESD in Austria. The agreement between the federal government and the provincial governments stipulates common quality standards for the promotion of the construction and refurbishment of residential buildings in order to reduce greenhouse gas emissions.

Local authorities are not involved in national energy policy formulation. On the other hand, the provincial states may involve local authorities in regional policy formulation, e.g. when pursuing a bottom-up approach in energy policy making.

V.VI.III Horizontal coordination

The relevant ministries in respect of energy and environment are The Federal Ministry of Science, Research and Economy, The Federal Ministry of Agriculture, Forestry, Environment and Water Management and The Federal Ministry of Transport, Innovation and Technology.

These ministries cooperate on a regular basis, for example when launching research and funding programmes or developing strategies covering their different thematic focuses altogether.

On regional level there exists a nationwide cooperation forum on climate and energy between the provinces and the Austrian Energy Agency. The forum meets three times a year and aims at improving collaboration and communication between the institutions involved. However, it needs to be noted that this forum has no duties or responsibilities related to horizontal EE policy formulation and only meets informally. It cannot be classified as a horizontal coordination body by definition.

For the local level, no coordination bodies or fora are known that particularly deal with energy issues.

Austria's political culture is characterized of being highly cooperative. The term "Social Partnership", the institutionalized co-operation between the representatives of employers and labour in Austria, is used to describe the cooperative political culture in Austria. The Austrian Social Partnership aims at solving diverging interests through achieving consensus via negotiations between the different parties and to minimize open conflicts.

Energy strategy/energy concepts: when the Austrian energy strategy was developed, about 150 stakeholders were involved in this process, each bringing in specific know-how and interests.

Regular evaluations of policies are determined by the budget available and the importance of the energy policy for the country, region or municipality. Evaluations may take place internally or through external institutions such as consultants or similar companies evaluating objectively to what extent the policy has been implemented.

Attempts to redesign the mechanisms of policy implementation to increase their effectiveness may take place when updating policies after a certain time.

In Austria, energy policy making is not regulated through an established and institutionalized coordination mechanism. However, when important energy and/or climate relevant strategies and policies are developed at national level, representatives from the federal governments usually participate in such processes.

Energy, though, is a matter which is not only the legal responsibility of the national administration but also of the federal provinces. They may pass their own energy-specific laws and decrees and develop energy policies independent from those at national level – theoretically, in practice their strategic approach and measures are similar to the national ones, and often even more ambitious. In addition, the 2,100

local authorities in Austria may also develop their own local energy policies and have to respect regional laws and decrees if they become relevant for the implementation of their policies.

The implementation of energy efficiency measures at regional and local level is incentivized through subsidies schemes targeting, among others, local authorities, and the energy efficiency obligation scheme obliging energy suppliers to implement energy efficiency measures in the end-use sector including local authorities.

V.VII Areas of improvements

Please see the weaknesses and opportunities mentioned in the swot analysis:

Strengths: (1) Competences in energy policy formulation are clearly defined; (2) Provinces and local authorities have full autonomy in energy policy formulation; (3) They are free to develop more ambitious energy policies than the federal state; (4) Coordination between the national and regional level with regard to national policy implementation is usually well functioning without an official coordination being in place.

Weaknesses: (1) Due to the federal structure of the country and the competence provincial states have in energy policy making on regional level, coherence in energy policy formulation between the national and regional (and local) level is not ensured (e.g. provincial states adhering to national targets)[1], (2) Also horizontally (regional and local level), there is no coherence with regard to energy policy formulation; (3) The local level is not involved in processes on national strategic energy policy making, nor in energy efficiency monitoring. (4) Legal energy matters (may) differ from one provincial state to another and may therefore complicate to harmonize nationally important proceedings.

Opportunities: involve the local level more in regional and national energy policy formulation and energy strategy development e.g. through bringing the issue of sustainable energy and the role of local authorities in contributing to energy and climate targets to the attention of existing associations such as the Austrian Association of Towns and the Austrian Association of Municipalities.

Threats: for policies obliging only the national level and not the regional level, support from the regional level to fulfil national targets is only voluntary.

[1] However, it needs to be noted that provincial states are often more ambitious in energy target setting as the federal state.

VI Elements of improvements in FYR of Macedonia

VI.I Energy Policy

The energy policy of the FYR of Macedonia is based on the Energy Law, that is a framework of all secondary legislation, including strategic documents and action plans on local and national level. The Energy Law defines the rulebooks, the obligations and the monitoring and verification procedures.

The National Action Plan for Energy Efficiency states the goals of the country, which is then transposed in the local strategic documents through Municipal Plan for Energy Efficiency. These two types of action plans are setting the foundation for vertical coordination, since the Municipal Action Plans for Energy Efficiency must state their share towards the National Plan.

The Energy Agency of the Republic of the FYR of Macedonia has the main role in the coordination mechanisms.

This public body gathers information on planned and implemented measures on vertical and horisontal aspect. These information, later, transfer to the Ministry of Economy.

The horizontal coordination is not included in the energy policies.

VI.II Energy Efficiency Priorities 2015 – 2016

Former Yugoslav Republic, the FYR of Macedonia has progressed in the implementation of the energy efficiency acquis in the reporting period, including the update of primary and secondary legislation. However, the recent decision to postpone the implementation of the certification scheme shows a lack of political will to implement in full the requirements of Directive 2010/31/EU, but also to enable investments in building renovation.

The first priority for former Yugoslav Republic, the FYR of Macedonia remains in the following period to adopt the second EEAP and to implement its measures. The Ministry of Economy should take the initiative to promptly unblock the Government's approval of the second EEAP, as a key policy document enabling investments in energy efficiency, especially since the planned timeframe for the third national EEAP is closing.

Further implementation of Directive 2010/31/EU remains a priority, in particular, with the development of calculation software and the cost-optimal level of minimum requirements of energy performance of buildings and building components. Further transposition of the Labelling Delegated Regulations started in 2015, in accordance with the Ministerial Council Decision of September 2014.

Finally, strengthening the institutional capacity in both the Ministry of Economy (the Energy Efficiency department) and in the Energy Agency is extremely important, as the existing human resources proved to be insufficient during the realization of the first EEAP. The draft second EEAP proposed also the establishment of the Energy Efficiency Fund, which is expected to strongly support the implementation of energy efficiency measures.

VI.III Monitoring

The administrative authority for the M&V scheme in the Former Yugoslav Republic, the FYR of Macedonia is the Energy Agency.

Also, available are two voluntary (not defined in the legislation) software solution for M&V. ExCITE is a software solution that is used by the local authority for monitoring the energy consumption. The software also provides several types of reports, that are helpful in mandatory reporting regulated in the legislation.

The Rulebook on energy audit prescribes MVE methodologies: top-down and bottom-up. Both are developed according to the EU methodologies.

The M&V schemes in the Former Yugoslav Republic, the FYR of Macedonia are in line with the National Energy Efficiency Action Plan.

VI.IV Verification

The verification of energy savings is through officialisation of results of measurements, through preparation of annual report for achieved energy savings by the Energy Agency of the Republic of the FYR of Macedonia. Also, as verification could be treated adoption of each Energy Efficiency Action Plan in which consisting part is information for achieved energy savings for the previous period of 3 years.

There is only national indicative energy saving target of 9% until 2018 and intermediate national energy saving target for 2012. For 2015 is defined new intermediate national energy saving target in the draft second Energy Efficiency Action Plan which is not yet adopted.

The steering structure for implementation of EE measures is the national Energy Agency. The Energy Agency controls the implementation of the EE measures by the local authorities.

There are no rules established for the decision-making process for policy implementation among the involved authorities.

There are no procedures established in order to facilitate the access to data and information from the different authorities involved.

VI.V Areas of improvements

There are M&V scheme defined in the legislation in Republic of the FYR of Macedonia. The obligations of different responsible bodies are defined. The secondary legislation is in place.

There are several different aspects that can be improved. One example is universal IT tool for measuring the savings and in addition for reporting.

Also, in practise, the M&V scheme is still not functioning on full scale.

VI.VI Coordination mechanisms

VI.VI.I General framework

Apart from the Ministry of Economy, the Energy Agency is included in the process of policy formulation.

The private sector and the academia, research organisations and educational organizations are helping the policy formulation process participating actively during preparation, or are included in the process of finalisation of the policy formulation during public discussions.

The steering structure for implementation of EE measures is the national Energy Agency. The Energy Agency controls the implementation of the EE measures by the local authorities.

There are some EE measures and regulation foreseen in Energy Efficiency Action Plans which are intended to motivate participation of different authorities and which have been implemented.

The local and regional governments have legal obligation for fulfilling and implementing EE measures. In some cases, technical and financial support for implementation of EE measures from international financing institutions and donors is

available, relevant national authorities give possibilities to all local self-governments to use it, in the frame of the possibilities of this mechanism.

VI.VI.II Vertical coordination

There are neither formal nor informational vertical coordination bodies nor fora between national and regional level for energy policy.

The Former Yugoslav Republic, the FYR of Macedonia follows the guidelines of the Energy Community. Also, the Energy Community is supervising body for the implementation of the EE measures and policies in the country.

The National Action Plan for Energy Efficiency states the goals of the country, which is then transposed in the local strategic documents through Municipal Plan for Energy Efficiency. These two types of action plans are setting the foundation for vertical coordination, since the Energy Agency of the FYR of Macedonia Municipal Action Plans for Energy Efficiency must state their share towards the National Plan.

The Energy Agency of the FYR of Macedonia has the main role in the coordination mechanisms. This public body gathers information on planned and implemented measures on vertical and horizontal aspects.

VI.VI.III Horizontal coordination

The horizontal coordination is not included in the energy policies. The situation is similar as the vertical coordination. The Energy Agency is responsible for gathering information from the Ministries (central government) about the planned and implemented measures, and to share this information with the Ministry of Economy.

VI.VII Areas of improvement

The biggest operational issue is the lack of capacity, both financial and human. Several measures are in place to address this problem in several national strategies, like the National Energy Efficiency Action Plan, inducing municipalities for using the web-based software tool for monitoring and management of the energy consumption (i.e. the information system). The Ministry of Economy in 2015 is implementing EE Campaign, which, in addition to other, includes such type of trainings. Also, in the Energy Efficiency Action Plan (first and draft second) trainings for relevant authorities are proposed for using the software tool for monitoring and verification of energy savings from implemented EE measures.

VII Elements of improvements in Croatia

VII.I Energy Policy

By becoming a full member of the EU, the Republic of Croatia has, together with other Member States and pursuant to Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, assumed the obligation of increasing energy efficiency in the EU in order to achieve the objective of saving 20 per cent of primary energy consumption at EU level by 2020.

With the Energy Strategy, the National Energy Efficiency Program, and the First National Energy Efficiency Action Plan, the Republic of Croatia set the target of reducing final energy consumption in 2016 by 19.77 PJ, in accordance with the requirements of Directive 2006/32/EC on energy end-use efficiency and energy services (ESD). The sectoral distribution of the target was revised in the 3rd NEEAP in accordance with the amended projections for final energy consumption and the saving potentials per sector.

The Environmental Protection and Energy Efficiency Fund was established in 2003 as a non-budgetary fund with the status of a legal person with public authority, with the objective of raising earmarked funds for financing the preparation, implementation and development of programs, projects and similar activities in the field of environmental preservation, sustainable use of the environment, environmental protection and amelioration; the participation in financing national energy programs aimed at improving energy efficiency, the use of renewable energy sources, as well as organizing and implementing a management system for special categories of waste. EPEEF is a national Fund, and it is competent for financing the implementation of the energy policy of the Government of the Republic of Croatia in regard to energy efficiency improvements and increasing the use of renewable energy sources. The Fund co-finances energy efficiency programs and projects in accordance with the Energy Strategy of the Republic of Croatia, the National Energy Efficiency Program for the 2008–2016 period, national energy efficiency action plans, as well as other programs derived from the aforementioned strategy documents adopted by the ministries competent for energy, construction, environmental protection and transport.

Apart from the co-financing of home energy retrofit, energy efficient construction, use of renewable energy sources, more energy efficient public lighting, fostering green

transportation and energy efficiency in industry, the Environmental Protection and Energy Efficiency Fund implements and co-finances a number of other programs and projects related to energy efficiency and use of renewable energy sources.

Various educational, research and development activities are being co-financed, as well as the projects that were granted co-financing from EU funding and, additionally, the funding is also available to civil society organizations.

Furthermore, various education and information campaigns for different groups of beneficiaries – citizens are being implemented, representatives of the business and public sectors.

VII.II Monitoring and Verification

The Republic of Croatia has an M&V scheme in the form of an IT-tool called SMIV (System for Monitoring, Measurement and Verification of Energy Savings) that is currently in its implementation phase.

The M&V then started as a project developed in cooperation with GIZ, and SMIV has become an official Croatian M&V tool through the new EE Act.

SMIV serves as a tool for monitoring savings for Article 7, but also for entire monitoring of energy efficiency. This integral monitoring through SMIV involves the following:

- Collecting all public EE plans and uploading them to the system. All measures mentioned in the plan are linked to the provided algorithms in SMIV.
- Bottom-up monitoring of EE targets under Article 3 EED
- Bottom-up monitoring of EE targets under Article 7 EED – since all measures are in the same system, there is a diminished possibility of double counting.
- Monitoring of EE targets under Article 5.

All parties participate in the Croatian M&V scheme at all levels (local, regional, national) – the public sector, the households sector, the industry sector and the transport sector. In the 3rd NEEAP the target of 19,77 PJ for 2016 was planned to be achieved in following fractions; Households 6,700.00 TJ, Transport 6,030.00 TJ, Service sector 3.600,00 TJ and Industry (non-ETS) 3.400,00 TJ.

Implementation of planned measures is obligatory only for about 200 parties mentioned in the NEEAP through concrete measures. This means that measures and

targets emanating from the NEEAP are compulsory, while on the local level, there are no mandatory targets, only obligation of planning, while the implementation on the local level is encouraged through state incentives.

However, even if the measure is not mentioned in NEEAP, but concerns energy efficiency and is implemented either by public sector, by companies offering energy service contracts, or by institutions offering subsidies/loans for EE measures, it is mandatory to enter this EE measure into SMIV.

With this, Croatia has included every sector, and almost every measure will be counted. The only type of EE measures not counted towards the national target through SMIV are those when a person/company decides to invest their own money in some EE measures, without state incentives. CEI believes such acts are not state-induced at all, and thus should not be counted towards the EE target.

In this phase, once SMIV end users enter the data into system, it will be possible to monitor all planned savings through entered local and regional EE plans, as well as to exactly count implemented measures by type of measure or by sector.

Data for monitoring and implemented energy efficiency measures in different sectors comes from paid subsidies – meaning that whichever institution gives out incentives, is obligated to enter savings into SMIV.

All data from actual project plans is entered into SMIV - it is real, bottom-up collected data.

VII.III Verification

The measured energy savings are being verified through algorithms in SMIV – the M&V system. Targets for each measure in SMIV are related to those same measures planned through Croatian NEEAP. Targets at the local level (municipalities, cities and counties) are monitored through EE plans, but they are not mandatory.

VII.IV Areas of improvement

Croatia has implemented an integrated IT-tool for the homogenous monitoring and reporting of the M&V schemes, which will be entered and verified until the end of 2016. Croatia is currently in the process of educating the end-users in using the tool. The opportunities are vast and, once implemented, this tool is a way to consistently and economically monitor all bottom-up savings on the national level. However, the

threat lies in the support the tool gets – it needs to be rooted in the national Acts, it needs to be obligatory, and the finances for its further development and administration need to be planned. Without political and legal support from the responsible authorities (e.g. ministries, the government) such system would not function.

VII.V Coordination mechanisms

The legal responsibility for energy policy making lies on the national and local level. Ministry of Economy is responsible for national EE targets, but all counties, as well as all cities larger than 30.000 citizens are obliged to make yearly EE plans. Although there is no set goals for them to achieve in terms of savings, the EE Plan is obligatory and there are incentives in form of the ECO fund large subventions for various EE measures.

VII.V.I Vertical coordination

There are existing coordination bodies between national and regional levels for energy policy. There are many now successful regional energy and development agencies that help the local community implement EE measures. But the only official body for EE is the National EE Authority.

Local authorities are involved in national energy policy formulation, since they are obliged by law to make yearly and three-year EE plans. All EE plans need to be approved by the National EE Authority on yearly basis.

The priorities and needs of the different involved authorities have been taken into consideration during the design of the energy efficiency measures.

Vertical coordination is both formal and informal; formally, all local and regional authorities that plan EE measures, need to report those plans to the National EE Authority. In this, the main informal role is carried out by the regional energy agencies, and in great extent regional development agencies, which are most of the times the ones drafting and implementing EE measures on the local level. The local and regional governments have been incentivized by financial support schemes.

VII.V.II Horizontal coordination

The main weak link is the horizontal communication. Independent ministries decide on the specific issues they are responsible for, but the collaboration is not always well-timed and the more ministries are involved, the more time the official procedures take up.

EE policy is coordinated only nationally. There is no official regional coordination – all local and regional policy is sent to the national bodies and ministries.

VII.VI Areas of improvements

There is a developed coordination between the different bodies in Croatia, although the only official body is nationally defined – the National Energy Efficiency Authority. Local authorities are involved by making three-year and annual energy efficiency plans which are legally required and evaluated by the National EE Authority, but they are not obligated to implement the EE measures as defined by NEEAP. There is also a significant problem with human resources on a local level. There is a large amount of EE measure co-funding available. The problem is alleviated by the regional development agencies subcontracted to do EE plans.

The coordination will have further improvements on the local and regional level in order for the SMIV to have access to fully fledged and complete data for the evaluation, monitoring, measurement and verification of the EE measures developed and implemented within Croatia's energy policy.

Main problem is lack of funding on national level, inability of local authorities to incur debt, and overall lack of official penalty for not implementing the planned EE measures.

VIII Elements of improvements in Denmark

VIII.I General framework

The content of the following part is based on the Agreement 13 November 2012 about energy savings by the energy companies in Denmark. The agreement is concluded between the Ministry of Climate-, Energy and Buildings and the grid- and distribution companies with electricity natural gas, district heating and oil. The responsible monitoring body is the Danish Energy Agency.

VIII.II Energy Policy

Reducing energy consumption through increased energy efficiency and energy savings has traditionally been a priority for Denmark and is still an important part of Danish energy policy. The Danish Government has a long-term objective of being free of fossil fuels by 2050, and an important element in this objective is improving energy efficiency. In March 2012, the Danish Government's objective was followed up by an energy agreement for the period up to 2020 in which energy efficiency and savings are a crucial element in the transition towards a society based on 100 % renewable energy sources. Initiatives in the energy agreement entail a fall in energy end use by almost 7 % in 2020 compared with 2006. This means that gross energy consumption in 2020 will be reduced by 12 % compared with 2006. In the energy agreement, emphasis is put on, among other things, energy renovation of existing buildings and energy saving by energy companies as two of the primary national instruments to drive energy efficiency forward in Denmark.

A crucial element in the transition to 100% renewable energy will be that Denmark uses less energy by switching to more energy efficient technologies. Otherwise, economic growth will push up energy consumption and make it disproportionally expensive to expand the share of renewables in the energy supply. Moreover, investment in more energy efficient technology will often quickly pay itself back.

VIII.III Monitoring and verification

The savings are calculated either by use of standard values, by a specific inventory of the saving following the activity or by the effect of a specific market impact. All energy savings in respect of this arrangement must be reported to The Danish Energy Agency.

The effect of the energy savings are based on the energy saving after the first year. The energy saving after the first year is weighted with a simple priority factor, which reflects the lifetime of the energy saving, the gross energy consumption and the expected CO2-effect of the energy saving.

Two different methods are used for the monitoring of the energy savings:

1. Monitoring based on standard values.
2. Monitoring based on a specific inventory

The monitoring based on standard values is especially used for smaller standardized activities (Savings in private homes and other small buildings). Here the standard values in the standard value catalogue for energy savings are used. Monitoring is carried out by a simple multiplication of the standard value with the amount of units relevant for the concrete project. If there in the standard value is given a priority factor, then this factor must be used on the calculated saving.

Specific monitoring is based on specific projects or integrated solutions, where no standard values are given – typically larger and/or integrated projects in industries or public institutions. A specific monitoring includes:

- A monitoring of the energy consumption before the implementation of the energy saving project – the reference.
- A monitoring of the energy consumption after the implementation of the energy saving project.
- A monitoring of the effect calculated by the total energy saving in the first year of operation with correction of changes in time operations, amount of production and production compositions.

The methodologies and indicators are updated by a technical working group, where all the parties are represented.

VIII.IV Verification

The grid- and distribution companies have the responsibility of securing that their documentation is fulfilling the demands in the agreement. Once every year The Danish Energy Agency is carrying out an independent sample of the involved grid- and distribution companies. The sample focuses on controlling whether the activities of the companies are fulfilling the demands and the obligations in respect of the agreement. Besides, extensive evaluations are carried out by consultants. The last evaluation was

published in March 2015.The grid- and distribution companies fulfilling of the targets will be measured on specific targets for 2015.

VIII.V Areas of improvements

Please see the weakness and opportunities mentioned in the swot analysis:

Strengths:

- The arrangement is working well. The parties in the agreement use the experiences to improve rules, organizing, and other framework conditions for the energy savings.
- The energy companies have every year fulfilled their targets for energy savings.
- The energy companies have succeeded in implementing the energy savings with the lowest costs.
- The arrangement gives an important input to reach the national targets of energy savings in Denmark.
- The arrangement has a net effect of 74%, meaning that 74% of the reported energy savings would not have been implemented without this arrangement.
- For industries there is a social economic benefit of 8.9 Euro per MWh.
- The stakeholders are mostly satisfied with the arrangement.

Weaknesses:

- The arrangement is still too expensive for households. For households there is a social economic cost of 8.1 Euro per MWh.
- There is too little knowledge of the arrangement by the final energy consumers, and the information about the arrangement has not been sufficient, and therefore are these consumers not always selecting the optimal energy saving projects.
- The costs of the energy savings is increasing due to the situation that many of the energy savings with lower costs already have been implemented.
- The rules do not encourage to cost efficiency, because the grid companies can transfer the costs to the final consumers.

Consultancy gives better solutions and much more additionality, but it is cheaper for the grid companies to give subsidies to standard solutions.

Opportunities:

- The web information site: Energispareindsatsen.dk could be improved to give better information to the final energy consumers.
- Also the Danish Energy Agency could give better information.
- A market place for not reported energy savings could be established to secure that the companies better could reach their individual targets of energy saving.
- The priority factor could be increased for projects with higher additionality e.g. projects including consultancy.
- A central reporting system for energy savings could be established to reduce double counting of the energy savings.

Threats:

- The most important threat is the rising costs of the energy savings, which can reduce the interest of the involved stakeholders in implementation of further energy savings.

VIII.VI Coordination mechanisms

VIII.VI.I Vertical coordination

Only little vertical coordination due to the fact that nearly all decisions of energy policy are taken at the national level. But there are fora and organizations at the regional level, which first of all is giving knowledge and subsidies to the local energy planning activities at the municipal level.

VIII.VI.II Horizontal coordination

The Ministry of Climate-, Energy and Buildings are working together with the Ministry of Environment and Food – especially in respect of waste handling and climate policy. Several formal bodies, research institutions, energy companies and NGO´s at the national level are delivering input to the energy policy formulation.

VIII.VII Areas of improvements

The top down procedure with only few responsible actors is giving an effective coordination mechanism, but the lack of delegation reduces the interest of the stakeholders to carry out energy savings.

IX Elements of improvements in Latvia

IX.I General Framework

The current M&V scheme was set up for transposing the Directive 2006/32/EU on energy end-use efficiency and energy services. The legal framework for the M&V scheme had been established in 2010. In 29 March 2016 new Energy Efficiency Law, transposing the Directive 2012/27/EU had come into force. According the provisions of the new Law, the Cabinet of Ministers shall adopt up to 1st October 2016 at the latest also new Governmental Regulations regarding Procedures by which state energy end-use savings shall be measured and the operation of the energy efficiency monitoring system shall be ensured, these new Regulations shall replace previous ones.

Latvia has a M&V system in place since 2010, based on the evaluation of implemented energy efficiency projects' savings. However, the scope of covered measures includes currently energy efficiency improvements in buildings only. Positive aspect, during 5 years of evaluation for energy efficiency measures in buildings the most problems related to the M&V systems operation have been solved.

The existing system covers only those energy efficiency measures and projects, which are co-financed by the EU Funds or by national public budget support.

The parties that are participating in the M&V scheme are the Public sector, the Household the sector and the Industry sector. The largest energy savings, which had been reported by the M&V scheme, were obtained within the energy efficient renovation of public and multi-apartment buildings.

The Cabinet of Ministers Regulations (CMR) No923 (30 September 2010) on M&V states that only documentable and verifiable information (heating and electricity accounts, project reports, notifications, energy audit reports, other documents) shall be used for reporting energy savings.

There is only one annual target set – annual renovation of 3% of the total floor area of heated buildings owned and occupied by central government.

Currently metered savings methods are used. Regarding deemed savings method, the Ministry of Economics currently has elaborated and published the Latvian Energy Efficiency Catalogue for Deemed Savings. The application of two other methods – Scaled Savings and Surveyed Savings - is not considered for the near time.

The calculated energy savings shall be verifiable, assessable and realistically achievable. The energy end-use savings shall be calculated according to the top-down and bottom-up calculation methods in accordance with the principles in the Law.

The Ministry of Economics has the right to random check the information received from the competent institution although the institution has confirmed the data quality. The Ministry usually hires energy consultants to assess achieved energy savings and to make final calculations. The Ministry is responsible for the accurate calculation of energy savings and is obliged to collect annually information on the energy savings achieved in the previous year. The annual report has to be sent to the European Commission.

IX.II Monitoring

IX.II.I The methodology for bottom-up monitoring

It is concluded that the deemed-savings method and the metered savings method are the most suitable for Latvia.

Metered savings method is already being used. Several financing programs have been implemented in Latvia in which energy savings have been assessed. However, the Buildings Energy Efficiency Calculation Method is the only methodology approved for the moment in Latvia.

It should be stressed, that the application of noted above Buildings Energy Efficiency Calculation Method is still limited due to this method is based on the heat balance process of the building, but the method cannot be applied to evaluate the energy savings arising from the replacement of out-of-dated technologies and installation of new energy efficient ones.

Ministry of Economics has published Latvia deemed energy savings catalogue. This Catalogue has been developed using as the example the Danish Catalogue "Standardværdikatalog for energibesparelser" (version 3.1 of August 2014) and by involving branch associations, energy auditors and other partners. Currently the Catalogue includes the parts of heating, hot water, ventilation, lightning and technologies and will be added during time course.

IX.II.II The methodology for top-down monitoring

By applying TD method, the total energy savings are calculated based on statistical indicators and their variation over time.

IX.III Verification

Until now, no sampling procedures are foreseen, but after the adoption of the "Law on Energy Efficiency" such procedure will be foreseen in the new regulation on energy efficiency monitoring.

IX.III.I Reporting

The reporting is made on an annual basis. The Ministry of Economics shall by 1 May each year compile information regarding the energy savings achieved in the State in each of the end-use sectors (Article 11 of the CMR No923).

IX.IV Areas of improvement

Please see the weaknesses and opportunities mentioned in the swot analysis:

Strengths

- There is defined responsible body for energy efficiency monitoring – Ministry of Economics.
- Lead staff of energy efficiency policy within Ministry of Economic explicitly recognises the high necessity for M&V of energy savings.
- There is adopted (in 2010) legislative framework for M&V scheme which transposes the Directive 2006/32/EU and monitors energy savings within NEEAP thus controlling the process of achieving the general national indicative target (the section of the Energy End-Use Efficiency Law and Cabinet of Ministers Regulation issued pursuant to it).
- The development of M&V scheme had been done simultaneously with the NEEP1 implementation.
- The adoption of new Energy Efficiency Law (March 2016, transposing the Directive 2012/27/EU) defines framework for future improvements in M&V scheme which will be introduced by new governmental regulations this autumn 2016.
- The existing M&V scheme compiles information regarding implemented State supported energy efficiency measures (corresponding to the category Data from paid subsidies).

- The Public sector, Household sector and Industry sector currently are covered by the M&V scheme – these sectors in which energy efficiency measures had been/are co-financed by the EU Funds or national Green investment scheme.
- There is established clear procedure regarding information flow on energy savings between final beneficiaries, competent responsible authority (project administration institution at national level) and Ministry of Economics.
- Also voluntary submitting of information is foreseen by energy efficiency improvement measures' implementers.
- The Cabinet of Ministers Regulations (adopted 2010) on M&V scheme states the unified reporting template: (i) unified form which shall be completed by national Responsible Institutions on implementing state supported energy efficiency programs, and (ii) unified forms in 4 sectors (households, services, industry, transport) for voluntary providers of information.
- The information submitter – beneficiary – shall utilize documented information only to prove energy savings.
- Latvia has good experience in monitoring energy savings in buildings, both multi-apartment and public ones, by metered savings method. Buildings Energy Efficiency Calculation Method is approved by the Cabinet of Ministers Regulations (the first version in 2009). During 5 years this method has been improved several times by eliminating imperfections.
- The improvement of the M&V methodology was done in co-operation between Ministry of Economics, Ministry of Environmental Protection and Regional Development, research institutions, Latvia energy efficiency association.
- Hiring qualified experts-consultants by Ministry of Economics to provide support for operation of the M&V scheme.
- Starting from 2009, the system for certification of independent experts in buildings energy efficiency is in force (~ 100 experts currently).
- The M&V scheme allows getting information on energy efficiency improvement measures' total costs and analyzing them.
- Applying of TD method is based on EC's Preferable and Mandatory indicators, applied formulas corresponding to EC approved methodology.
- Particular project's beneficiary responsibilities are stated for meeting contracted CO2 savings within national Green Investment Scheme.
- 19 Latvia municipalities have elaborated SEAP-plans within the Covenant of Mayors.

Weaknesses

- At the moment the existing M&V scheme does not cover the full scope of programs in which energy efficiency improvement activities might take place by

using the state aid (co-financing). Namely, at the moment the existing M&V scheme include only the EU Funds programs, which are supervised by the Ministry of Economics or Ministry of Environmental Protection and Regional Development (MEPRD) and which have defined the energy efficiency improvements as the primary target, as well as the programs of national Green Investment Scheme. Other programs, in which the projects might have energy efficiency improvement measures as well, are not covered. However, the covering of these other programs is foreseen for the 2014-2020 EU Funds programming period[2].

- The local level administrations (local self-governments) are not involved in the M&V scheme. Thus the current M&V scheme does not cover the energy efficiency improvement projects implemented by local authorities by their own sources only (without EU Funds or State support).
- Buildings Energy Efficiency Calculation Method is the only bottom-up methodology approved for the moment in Latvia.
- The application of this noted above method is limited due to the method is based on the heat balance of building. The method cannot be applied to evaluate the energy savings arising from the replacement/installation new technologies.
- No sampling procedures are used for the verification at the moment.
- No set of annual targets are developed (until now only 3% of the central government buildings must be renovated).
- Until now there are no penalties for the not attaining specified energy efficiency targets.
- There is no integrated IT-tool for M&V.

Opportunities

- The adoption of legislative framework (new governmental regulation) for M&V scheme for transposing Energy Efficiency Directive 2012/27/EU – is expected to

[2] For instance, there are adopted two Cabinet of Ministers Regulations regarding implementation of EU Funds 2014-2020 co-financed programs of the national Operational Program: (i) CMR No 645 (10.11.2015, with amendments) regarding the "Revitalization of territories through regeneration of degraded territories according to municipal integrated development programs", and (ii) CMR No593 (13.10.2015. with amendments) regarding the "Increase the amount of private investment in the regions, by making investment for entrepreneurship development according to the economic specialization of territories set in the municipal development programs, as well as based on the local entrepreneurs' needs". It is stated accounting of energy saving indicator in both programs, by evaluating energy consumption in buildings before and after projects' implementation (if applicable according the projects content).

be issued autumn 2016, after adoption of new Energy Efficiency Law in March 2016.

- The government should use all possibilities for improving energy efficiency across all areas of intervention.
- Including energy efficiency criteria into State aid programs should widen the scope of the national alternative measures to be implemented in combination with the energy efficiency obligation scheme, and consequently this will widen the sectoral coverage of M&V scheme. This approach is already planned by the Ministry of Economics.
- Finalization of Latvia deemed savings catalogue = planned in 2016.
- Introduction of sampling procedures after the adoption of new Energy Efficiency Law.
- Ensuring regular CO2 emissions/energy saving monitoring within local governments SEAPs/energy programs, linking this monitoring with the national M&V scheme.

Threats

- Limited financing limits enlarging the capacity of personnel resources to be involved in the methodological developments, thus the methodological developments are slowed down.
- The availability of financial resources limits the development of effective institutional framework for energy efficiency policy implementation, therefore the national Energy Agency might not be established.
- Again, limited financial resources might not allow involving the necessary experts' capacity to determine the energy efficiency criteria and M&V methodology within the programs of other sectors before the start-up of these programs.
- Negative attitude (both from the sectoral ministries and sectoral stakeholders) regarding establishment of additional energy efficiency criteria within the programs of other sector.

IX.V Coordination mechanisms

IX.V.I General framework

Since 1 July 2009 Latvia has changed its administrative division from two-level municipalities to one-level municipalities. The local municipalities were merged into 110 municipalities and there are 9 republican cities with their own city council and administration. Thus, currently there are 119 local level governments in Latvia. The districts since 1 July 2009 were liquidated, thus there is no other level of territorial

administration but the national one and the 119 self-governments. Latvia has no administrative regional level.

IX.V.II Energy policy

The legal responsibility for energy policy making lies on the national level. The Ministry of Economics is responsible for energy policy, including energy efficiency policy, both development and implementation. Latvia currently has no separate institutions for energy policy development and energy policy implementation. There is no specific energy efficiency policy implementation institution.

Local level - municipalities - have the right to elaborate the local energy plans but up to now it is not a mandatory duty. According the "Energy Law" municipalities has a mandatory function to organize heat supply in their territories. Important, in the 2014-2020 programming period the linkage between integrated local development planning and energy efficiency planning will be promoted.

Latvia has no wide historical experience for energy development planning and/or energy efficiency planning at municipal level. Historically the municipalities are self-focused on district heating planning mostly. On-going National Development Program 2014-2020 states the development of local government energy plans providing for complex measures to promote energy efficiency and transition to RES as the prioritized element in energy sector. 19 Latvia municipalities (~ 16% of the total number, covering slightly more than half of Latvia population) have developed their Sustainable Energy Efficiency Plans within the Covenant of Mayors. However, there is no centralized state-(co)financed body promoting participation and providing methodological help for local self-governments participation in the Covenant of Mayors on regular basis.

The Latvian Association of Local and Regional Governments as well as the Association of (district) Heat Producers are active partners contributing by their opinions and comments in the development of legislative documents and policies of energy sector, including energy efficiency policy.

Latvia has no wide experience of the work of regional energy agencies.

The priority sectors for energy efficiency improvements are defined by the National Development Plan (NAP) 2014-2020:

Development of local government energy plans providing for complex measures to promote energy efficiency and transition to RES.

Energy efficiency programs in the sector of state and local government public buildings.

Comprehensive energy efficiency has become the cornerstone of the country's energy independence. Improving the energy efficiency of the manufacturing and service sectors is a matter of both competitiveness and the quality of the working and living environments. The energy efficiency of homes and public buildings is systematically being improved.

Latvia has a favourable environment for investments in green energy.

IX.V.III Vertical coordination

There are several formal or informal coordination bodies between national and local self-governments.

The Latvian Association of Local and Regional Governments (LALRG) is the main actor to promote inclusion of self-government interests in national policies, including energy policy. The LALRG, founded in December 1991, is a public organisation associating local governments of the Republic of Latvia on voluntary basis. The LALRG has authority to represent municipalities in the negotiations with the government. The LALRG is the only municipal organisation in Latvia, and 118 municipalities out of 119 are members of LALRG. The main objectives of the LALRG are: development of self-government politics in Latvia, solving of self-government problems, protection of self-government interests.

The Association of Heat Producers (AHP), is a society uniting district heating utilities.

IX.V.IV Horizontal coordination

The Ministry of Economics is responsible for state energy policy (including energy efficiency policy) elaboration and implementation. Energy policy documents are usually elaborated with the involvement of the Ministry of Environmental Protection and Regional Development as this ministry has responsibility for environmental policy and regional policy which are closely connected to energy policy. Other ministries are step-by-step involved as well in 2014-2020 Programming period.

IX.VI Areas of improvement

Please see the weaknesses and opportunities mentioned in the swot analysis:

STRENGTHS

It may be concluded that there exist important elements and factors to provide multi-level co-ordination of energy efficiency policy. The issue is to maximise both the consentual aspects and application of them.

- There is clearly defined responsible national authority for energy policy making – Ministry of Economics.
- The positive trend of the last few years is increasing involvement of civil society stakeholders in development and implementation of energy policy including energy efficiency policy.
- The defined procedure of passing the legislative documents through the Meeting of the State Secretaries as well as Meeting of the Committee of the Cabinet of Ministers (before the adoption in the Cabinet of Ministers) requires presenting the opinions of other ministries as well as other relevant stakeholders.
- The procedure of preparation of the detailed annotation for the draft legislative documents in principle require wide involvement of different types of stakeholders and assesses social, economic, financial, institutional and administrative impact of new legislative document.
- National Development Plan 2014-2020 and related Operational Program "Growth and Employment" clearly define priority sectors for energy efficiency improvement.
- National Development Plan 2014-2020 states the development of local government energy plans providing for complex measures to promote energy efficiency and transition to RES as the prioritized element in energy sector. The Ministry of Economics has elaborated "Recommendations for energy sector planning in municipalities".
- Local governments are incentivized for energy efficiency measures by co-financing them from EU Funds and national Green Investment Scheme. Latvia applies "standard" system for implementation of EU Funds programs, including energy efficiency and RES programs. There is established for the EU Funds period 2014-2020 only one centralized co-operation institution - Central Finance and Contracting Agency (CFCA) of the Republic of Latvia. In principle this approach shall decrease the administrative burdens. However it is not yet approved in real practice.
- For the implementation of EU ERDF programme 2014-2020 on energy efficiency improvement in multi-apartment buildings the new actor will be involved, compared with the previous period 2007-2013. The stock company "Attīstības

finanšu institūcija ALTUM" (*Development financing institution ALTUM*) will be overall implementer of this programme based on single contract with the CFCA, will provide all types of financial instruments (grants, low interest loans, loans guarantees) for the final beneficiaries, will make agreements with commercial banks, will provide wide consultancy work for the potential beneficiaries, will supervise the quality of technical documentation, etc. This approach should decrease the administrative burdens, opens space for more applicants, increase the quality of energy efficiency improvement measures.

- The existence of the Ministry of Environmental Protection and Regional Development, supervising both program on energy efficiency improvements in municipal buildings and national green investment scheme, in principle might provide high quality of energy efficiency investments in municipal level.
- It is planned to focus currently on existing revenues of national green investment schemes (EU ETS quotas auctioning) mostly to low energy consumption in buildings in culture and education sectors, thus this approach will have certain demonstration value.
- Final beneficiaries are stated to be responsible for meeting contracted GHG emissions reduction targets of the projects within national green investment scheme.
- On-going national Operational Program "Growths and Employment 2014-2020" facilitates that co-financing of energy efficiency improvements in municipal buildings should be in accordance with the integrated development program of the municipality).
- There is the influential organization – Latvian Association of Local and Regional Governments (LALRG), which might highly play for energy efficiency policy vertical coordination between national and local levels as well as for horizontal coordination among local self-governments. LALRG is defined as one of the official partners for negotiations procedures with the Government. There are legally binding requirements to involve LALRG in the development of energy policy documents.
- There is the organization of Latvia district heating utilities (Latvia Association of Heat Producers, AHP).
- LALRG and AHP regularly submit their comments and opinions on new legislative documents and policies in energy sector.
- Latvia local self-governments have established smaller scale associations uniting similar municipalities – this might make more easy coordination mechanisms.
- There are 19 Latvia local municipalities participating in the Covenant of Mayors (covering slightly more than a half of Latvia population) and having elaborated their Sustainable Energy Action Plans.

- Certain number of municipalities are providing as its voluntary function the financial assistance for preparation of energy audits and other technical documentation for multi-apartment buildings renovation.
- Latvia has 5 planning regions defined by the Regional Development Law. Having statutory function to prepare opinions on the correspondence of national level planning documents with the interests of planning region, the Planning region might be active actor in regional sustainable energy planning being mediator between national and local level and being mediator of horizontal local self-governments co-operation within the region.
- Advisory Boards of Ministries are the important actors in the policy formulation process. The work of Economic Advisory Board of the Ministry of Economics, participated by the senior representatives of the wide range of stakeholders, might be considered as the best practice of Latvia.
- Besides the Advisory Boards, Ministry of Economics practices the co-operation with the wide range of different organizations by applying other methods.

WEAKNESSES

- There is no regional administrative level in Latvia, the regional level has only planning functions (so called Planning Regions).
- Latvia, being a rather small country, still has a relatively high number of local self-governments (119 municipalities), which are very diverse in number of population and territory, which give difficulties for coordination mechanisms.
- There is no specific energy efficiency policy implementation institution (like the national Energy Agency).
- Elaboration of comprehensive (energy efficiency + RES) local energy plans is not defined as the mandatory function of the local level; this is still a voluntary function.
- There is no centralized body promoting participation and providing methodological support for local self-governments participation in the Covenant of Mayors. Thus local SEAPs have never been consensually evaluated in the common manner.
- Not all of Latvia regions have established actively working regional scale energy agencies.
- Planning regions activities in coordination of energy sector developments are different in different regions.
- As there is not yet established Energy Efficiency Obligation Scheme, the role and place of Latvia Association of Local and Regional Governments and Association of Heat Producers in implementation and coordination of EEOS are not yet discussed.

- The inter-ministerial co-operation on energy efficiency issues is not always enough effective.
- National Energy Efficiency Fund currently does not exist in Latvia.
- Still burdens exist for the work of ESCO companies.
- Local self-governments act in most of cases as the final beneficiaries of the energy efficiency improvement project of the particular program, and at the same time the role of local self-governments as mediators among national energy efficiency program operators and other final beneficiaries might be considered as rather weak.
- To this moment there are no penalties for the not attaining specified energy efficiency targets.

OPPORTUNITIES

- The institutional framework should be improved to ensure the quality of policies. Next step should be the audit of functions to harmonize them and set clearly defined functions, procedures and responsible institutions.
- Responsibility of energy policy development institutions should be promoted to organize transparent communication with the public and ensure the effectiveness of public participation.
- It is worth to re-identify/re-consider the role of local self-governments in facilitating projects for multi-apartment buildings energy efficient renovation in EU Funds 2014-2020 period.
- Establishment of national Energy Efficiency Fund, the research on its institutional structure and operational model.
- Establishment the penalties system for not attaining specified energy efficiency targets after the adoption of the new Law on Energy Efficiency.
- Establishment of effectively working EEOS.

THREATS

- The finances of only EU Structural Funds and national Green Investment Scheme are not enough to reach national energy efficiency targets.
- Currently there is negative attitude regarding EEOS establishment from the number of potential obligated parties, including district heating companies.

X Elements of improvements in Greece

X.I General framework

The Ministry of Environment and Energy is responsible for the implementation of the ESD and EED at national level for the design, facilitation and monitoring of the implemented energy efficiency measures and for the establishment, administration and coordination of the required M&V schemes.

X.II Energy Policy

The EED has been transposed into the national legislation through the adoption of the Law 4342/2015. The Law 4342/2015 foresees the introduction of energy efficiency obligation scheme in combination with the already adopted alternatives measures in order to fulfil the targets of Article 7 of the EED. The establishment of the energy efficiency obligation scheme is expected to enable the development of a central M&V scheme integrating of the implemented energy efficiency measures.

X.III Monitoring

The implementation of the M&V schemes for energy efficiency measures depends on the implemented programs. Specifically, several M&V schemes have been designed and established within the framework of the implemented energy efficiency measures according to their discrete requirements and characteristics. The main categories of energy efficiency measures, which are already on progress, consist of the provision of financial incentives mainly from the Operational Programs within the framework of National Strategic Framework and the exploitation of the available Structural Funds and the imposition of legislative and regulatory measures.

The monitoring of the energy efficiency measures is performed through the establishment of specialized bottom-up procedures. These procedures were developed from the Ministry of Environment and Energy. The foreseen approaches were improved according to the requirements of the Article 7 of the EED. An innovative point is the bottom-up approach for the case of "Energy Savings at Home" program, which is based on the analysis and the evaluation of the EPC data for these buildings financed by each Operational Program. Specifically, for each building it is estimated the savings in final energy consumption by the provided savings in primary energy consumption through a specialized calculation procedure utilizing specific reference values. The specific approach is intended to be utilized for all the energy efficiency measures that are related with interventions in buildings.

X.IV Areas of improvements

The development and utilization of common bottom-up equation for all the implemented energy efficiency measures according to the requirements of the EED adopting national reference values, which will be utilized by all the involved parties.

Please see the weaknesses and opportunities mentioned in the swot analysis.

X.V Verification

The measured energy savings are verified within the framework of the M&V schemes through the conduction of random inspections to a representative sample of the participating either building or vehicles. In any case the details about the verification procedure are specified by each energy efficiency program separately complying with the requirements of each Operational Program and the National Strategic Framework (both for the programming periods of 2007-2013 and 2014-2020). To this purpose each Operational Program has established a corresponding unit, which is responsible for the verification of the implemented actions and interventions.

X.VI Areas of improvements

The development and utilization of common verification procedures for all the implemented energy efficiency measures is vital according to the requirements of the EED.

Please see the weaknesses and opportunities mentioned in the swot analysis.

Strengths:

The fact that the majority of the energy efficiency measures are financed by the Operational Programs and the National Strategic Framework (both for the programming periods of 2007-2013 and 2014-2020) constitutes easier implementation of the necessary measurement, monitoring, verification and reporting procedures regarding the achieved energy savings.

The Registry of Energy Performance Certificates is utilized as the main source for the acquisition of necessary data regarding the implementation of energy efficiency interventions in buildings. The utilization of the registry in conjunction with the corresponding bottom-up methodologies constitutes a robust approach for the measurement of the achieved energy savings. Moreover, a specialised verification procedure is foreseen by the Ministry for issuing the Energy Performance Certificates.

Weaknesses:

- Absence of a central M&V scheme for all the implemented energy efficiency measures.
- Lack of the appropriate evaluation procedures in order to assess the effectiveness of the implemented bottom-up methodologies.
- The current ESCOs market is immature confronting the potential establishment of a M&V scheme according to the implemented techniques (such as IPMVP etc).
- No significant experience regarding the development and administration of M&V scheme from the involved ministries.

No satisfactory communication among the involved ministries.

Threats:

The economic recession has led to the reduction of the administrative costs regarding the development and administration of the M&V scheme.

Opportunities:

The introduction of the Energy Efficiency Obligation Scheme will facilitate the establishment of robust measurement, monitoring, verification and reporting procedures regarding the achieved energy savings from the obligated parties.

X.VII Coordination mechanisms

X.VII.I General framework

The Ministry of Environment and Energy has the legal competence for the energy efficiency policy formulation. Specifically, the Ministry is responsible for the transposition of the relevant directives and their implementation including the design, implementation, monitoring and verification of the foreseen energy efficiency measures. As a result the legal responsibility for energy policy making is concentrated on national level. Moreover, other Ministries are involved into the formulation of energy efficiency policies in their corresponding fields in collaboration with the Ministry of Environment and Energy.

Nevertheless, various energy efficiency measures are performed at regional level through the financing from the regional Operational Programs, which have the flexibility and duties to implement their regional energy efficiency strategy according to their needs and priorities. The formulation of energy efficiency policies at local level is limited through the conduction of Sustainable Energy Actions Plans, while the

financing of the proposed measures is implemented mainly by the National Strategic Framework and the corresponding regional Operational Programs.

X.VII.II Vertical coordination

The current level of the vertical coordination can be assessed as very low.

X.VII.III Areas of improvement

The establishment of vertical coordination mechanism and the achievement of a better communication flow among the different administrative levels.

Please see the weaknesses and opportunities mentioned in the swot analysis.

X.VII.IV Horizontal coordination

The current degree of the horizontal coordination cannot be considered as satisfactory.

X.VII.V Areas of improvement

The improvement of the horizontal coordination mechanism and the achievement of a better communication flow among the different involved national bodies.

Please see the weaknesses and opportunities mentioned in the swot analysis.

Strengths:

The fact that the majority of the energy efficiency measures is financed by the Operational Program and the National Strategic Framework (both for the programming periods of 2007-2013 and 2014-2020) provides the opportunity to coordinate more effectively the implemented energy efficiency measures.

The role of the regional Operational Programs can be vital for the establishment of a coordination mechanism facilitating the communication among the involved administrative levels during the formulation and implementation of the energy efficiency measures.

Weaknesses:

The centralized structure of the country does not facilitate the involvement of the regional and local authorities to the formulation and implementation of the energy efficiency measures.

No imposition of energy efficiency targets at regional and local level.

No transparent framework for the specification of the priorities and needs of the different involved authorities has been identified. This must be taken into consideration during the design of the energy efficiency measures.

No direct linkage of the conducted Sustainable Energy Actions Plans with the initiated energy efficiency measures from the Operational Programs.

Threats:

The economic recession has led to the reduction of the administrative costs regarding the establishment of a coordination mechanism.

Preference of the local and regional authorities towards the further penetration of RES instead of energy efficiency measures due to their simplicity and more secure payback prospects.

The involved authorities have not had the sufficient financial and human resources to plan and implement the measures as defined in the national plans, while additional obstacles constitute the limited number of personnel and the lack of specialization on energy efficiency issues.

Opportunities:

The already conducted Sustainable Energy Actions Plans can provide an indication of the needs and priorities of the local level.

XI Areas of improvements related to the different types of countries

XI.I Division of the countries in 5 groups

Based on the political systems in the countries, they are divided in five different groups. The idea to direct the areas of improvement to the specific type of countries both in respect M&V schemes and the Coordination Mechanisms.

The former east european countries have centralized political systems. They are divided in two groups depending on whether they have M&V schemes or not.

Also Greece is a country with a centralized political system. Austria and Germany are federal political systems, and the scandinavian countries like Denmark are centralized countries with delegated tasks to the regional and local authorities.

1. Lithuania
2. Slovakia, FYR of Macedonia, Croatia and Latvia
3. Greece
4. Austria and Germany
5. Denmark

Table 1: Country overview I

M&V	Lithuania Grp. 1	Slovakia Grp. 2	FYR of Macedonia Grp. 2	Croatia Grp. 2	Latvia Grp. 2	Greece Grp. 3	Germany Grp. 4	Austria Grp. 4	Denmark Grp. 5
Actual status	Overall monitoring, which is not specific for different measures.	A M&V scheme is imple-mented. Every measure is monito-red via a monito-ring system. A verifica-tion process is a part of the monito-ring system.	The M&V schemes are in line with the national Energy efficiently Action Plan. The verification of energy savings is implemented by results of measure-ments.	A M&V scheme as an IT Tool, which is currently in its im-plementation phase. The measured energy savings are being verified through the IT tool in the M&V system.	A M&V system based on evaluation of projects but only for national green investment scheme and EU Funds. Actually no sampling procedures are foreseen, but after the "Law on Energy Efficiency" such procedures will be created.	No central M&V scheme. Bottom up methodologies are used to measure achieved energy savings. A verification procedure is foreseen.	M&V schemes have been implemente d.	M&V schemes have been implemented. The energy savings reported are verified by means of plausibility checks. Selected projects are verified through on site visits.	M&V schemes have been implemented.

M&V	Lithuania Grp. 1	Slovakia Grp. 2	FYR of Macedonia Grp. 2	Croatia Grp. 2	Latvia Grp. 2	Greece Grp. 3	Germany Grp. 4	Austria Grp. 4	Denmark Grp. 5
Improve-ments	M&V could be implemented Inspired by best cases from other countries. Use of data collection methods could simplify and improve M&V process. Random checks could be improved by better investigations of the actual energy savings implemented, annual targets and better statistics.	The monito-ring system (MSEE) should include all energy efficiency measures organi-sing both monito-ring and verifica tion.	A central reporting system for energy savings could be established to reduce double counting of the energy savings. Use an IT-tool for data.	An IT system is imple-mented. It needs to be rooted in the national Acts, It needs to be obligatory, and political supported.	1. Local Authorities should be involved. 2. Other sectors than buildings should be integrated 3. Sampling procedures should be used. 4. IT tool should be used.	Improve ESCO market to improve M&V procedure.	Introduction of a systematic monitoring also on local and regional level. M&V must be secured in such a way that the costs are reduced as much as possible. Systematic verification at local level could be improved. SEAPs are only using individual methods.	1.Funding should be integrated 2.More provinces should have data access.	Costs should be reduced by change of rules. More knowledge. Increased priority factor for projects with high additio-nality. A central reporting system for energy savings could be established to reduce double counting of the energy savings.

CM Criteria Actual status	Lithuania Grp. 1	Slovakia Grp. 2	FYR of Macedonia Grp. 2	Croatia Grp. 2	Latvia Grp. 2	Greece Grp. 3	Germany Grp. 4	Austria Grp. 4	Denmark Grp. 5
Administrative Procedures	Responsibility of energy efficiency policy lies on the national level.	A permanent inter-Institutional group includes mnistries, regions and municipalities.	The administrative Authority is the Energy Agency. Not many formal or informal coordination bodies.	The legal responsibility of energy policy lies on the national level. Local authorities are involved but without obligations.	Besides the national level there are 119 local self-governments, (municipali-ties), but no regional level. No Energy agency, but there are several formal or informal coordination bodies.	Top down procedures are used. No specified obligations for regional and local authorities.	All levels of government are involved. It is performed as a coordination between federal level and the federal states for energy efficiency. Takes a long time – due to the type of country.	No formal coordination exist. But informal coordination takes place.	There is an agreement between the Ministry of Climate, Energy and Buildings and the large energy companies. No formal coordina-tion exist.

CM Criteria Areas of improve-ments	Lithuania Grp. 1	Slovakia Grp. 2	FYR of Macedonia Grp. 2	Croatia Grp. 2	Latvia Grp. 2	Greece Grp. 3	Germany Grp. 4	Austria Grp. 4	Denmark Grp. 5
Vertical co-ordination	Could be improved in coordina-tion with an increase of the interest at the local level.	The vertical coordination should be improved incl. the communica-tion flow.	More formal and informal coordination bodies should be established.	Local Authorites should have obligations.	Institution al frame-work should be improved.	SEAP plans could help involving lower local authorities.	The efficiency of the vertical coordination should be improved.	Integrate local level in ener-gy policy for-mulation.	The lack of delegation reduces interest of stakehol-ders to carry out energy savings.

CM Criteria Areas of improve-ments	Lithuani a Grp. 1	Slovakia Grp. 2	FYR of Macedonia Grp. 2	Croatia Grp. 2	Latvia Grp. 2	Greece Grp. 3	Germany Grp. 4	Austria Grp. 4	Denmark Grp. 5
Horizontal coordination	Further Horizontal Coordina-tion (HC) should be investi-gated.	The hori-zontal co-ordination should be improved incl. com-munication flow.	Very little coordina-tion. Should be im-proved.	The collabo-ration be-tween minis-tries is weak and takes time. Should be im-proved.	Only two ministries are coordi-nating.	Very little coordination. Should be improved.	There is horizon-tal coordination between federal Ministries and federal state ac-tors.	No formal coor-dination exists. But relevant Ministries are cooperating.	There is coordina-tion between The Ministry and many national Institutions.

XII Conclusion

XII.I Monitoring and Verification: actual status:

Lithuania does not have any formal M&V scheme. The rest of the countries have implemented M&V schemes except Greece. But some countries like Latvia have a system based on the evaluation of projects for EU-programmes only.

XII.II Monitoring and Verification: areas of improvements:

In Lithuania (Group 1) M&V schemes could be implemented inspired by best case(s) from other countries. The use of data collection methods could simplify and improve the M&V process. Especially the verification process needs improvements to secure that the energy saving projects also are being implemented.

In Fyr of Macedonia, Croatia and Latvia (Group 2) M&V schemes are already implemented or are under implementation, which means that further development of the M&V schemes are needed. IT tools like MVP/SMIV could be important elements in respect of this development. These countries have verification procedures but these could be improved based on specific measurements.

Also Greece (Group 3) could improve its M&V scheme. Even if Greece doesn't have any M&V scheme or verification procedures, bottom up methodologies are used to measure achieved energy savings, and ESCO arrangements could be used to involve private companies in defining and implementing energy saving projects to secure the verification of the implementation.

In Germany and Austria (Group 4) M&V schemes have been implemented, but in Germany systematic verification at local level could be improved. In the SEAP projects only individual methods are used. In Austria the funding could be better integrated and the provinces should have better access to data.

In Denmark (group 5) costs should be reduced by change of rules, and the priority factor should be used to define and implement projects with a higher additionality, and a central reporting system should be implemented to reduce double counting.

XII.III Coordination Mechanisms: actual status and areas of improvements:

Lithuania (Group 1) doesn't have a coordination mechanisms, but it could be established with a focus of involving the local administrative level as a part of vertical coordination. Luthiania has horizontal coordination but only with ministries responsible for the energy policy.

In FYR of Macedonia, (Group 2) the coordination mechanisms are rather undeveloped both in respect of coordination bodies and in the actual vertical and horizontal coordination. In Croatia the local authorities are involved, but they have no obligations. Latvia has no regional authorities and no state Energy Agency, but hey have several formal or informal coordination bodies. FYR of Macedonia has very little horizontal coordination. In Croatia the collaboration is taking place between ministries, but the collaboration is weak and takes time, and in Latvia only two ministries are collaborating.
Greece (group 3) has no specified obligations for legal and local authorities, and there is only little vertical and horizontal coordination.

In Germany (group 4) is the vertical coordination performed as a coordination between federal level and the federal states. And the horizontal coordination is happening between two ministries, which are responsible of the energy policy. In Austria no formal coordination is taking place, but a lot of informal coordination is going on, and horizontal coordination is taking place between relevant ministries.

In Denmark (Group 5) there is no formal coordination mechanism, and the lack of delegation reduces the interest of stakeholders to carry out energy savings. But the horizontal coordination takes place between the Ministry of Climate-, Energy and Buildings and many national institutions.

Table 2: Country overview II

Type of improvements	Country Group 1	Country Group 2	Country Group 3	Country Group 4	Country Group 5
Countries	Lithuania	Slovakia FYR of Macedonia Croatia Latvia	Greece	Germany Austria	Denmark
M&V schemes	No formal scheme. M&V schemes could be implemented with focus on verification, inspired by best case(s) from other countries.	M&V schemes are already implemented/ under implementation. Further development of the M&V schemes are needed. IT tools like MVP could be important elements in respect of this development. These countries have verification procedu-res. These could be improved based on specific measurements.	No M&V schemes in Greece. But bottom up methodologies is used to measure achieved energy savings. The M&V schemes could be improved. A unified system with focus on verification. ESCO arrangements could be used.	M&V schemes have been implemented, but in Germany systematic monitoring at local level could be improved. In the SEAP projects only individual methods are used. In Austria the funding could be better integrated and the provinces should have better access to data.	Costs should be reduced by change of rules, and the priority factor should be used to define and implement projects with a higher additionality, and a central reporting system should be implemented to reduce double counting.
		The existing M&V schemes should be transformed into a template for local/regional action plan – if possible integrated into the SEAP (CoM).			

Type of improvements	Country Group 1	Country Group 2	Country Group 3	Country Group 4	Country Group 5
Policy (CM)	No CM. But CM could be established with a focus of involving the local administrative level as a part of vertical coordination. These countries have horizontal coordination but only with ministries responsible for the energy policy.	CM are rather undeveloped both in respect of coordination bodies and in the actual Vertical Coordination (VC) and HC coordination.	No specified obligations for legal and local authorities, and they have only little vertical and horizontal coordination.	VC is performed as a coordination between federal level and the federal states. In Austria only informal VC is taking place. In both countries HC is only taking place between relevant ministries.	No formal coordination exist. The lack of delegation reduces interest of stakeholders to carry out energy savings. HC exists between many relevant institutions.
Capacity	All countries need capacity building: • Education program in EE at regional /local level • National tailored local action plan template for energy efficiency • Ensure local horizontal integration through cross-organization (matrix organization on key issues)				
Stakeholder	All countries need to include more relevant stakeholders both in the M&V schemes and in the CM schemes.				

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