Comparative analysis on building energy efficiency for the Balkan world: is it really developing?

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Abstract

On the whole over the world, it could not be possible to talk about a sustainable future without mentioning energy efficiency in buildings. Especially for developing countries, lack of diversified financial instruments, even without any awareness, is one of the main obstacles.

EUbuild Energy Efficiency (EE) Project was a sectoral collaboration project funded by the European Commission, designed to contribute to the development of financial instruments in order to build up the market for energy efficiency in buildings between 2010 and 2012. In this respect, this paper aims to present the current situation on financial support on energy efficiency in buildings, including a SWOT analysis and comparisons among Albania, Bosnia & Herzegovina, Macedonia, Montenegro, Serbia, Turkey, which are project partner countries. This is followed by conclusions and recommendations.

Under this framework, the following analyses were undertaken:

- SWOT analysis of partner countries.
- Comparisons of partner countries on: legal and institutional frameworks present in the country for EE; related EE measures/applications, possible/alternative financing mechanisms; future prospects for each country on EE; recommendations for realizing what is planned on EE in the future.

On top of these analyses, it can be stated that the crucial point, which should be kept in mind, is that we, the public, are the consumer; we are the producer, hence, we have the power to realize what is expected and what needs to be improved on energy efficiency and financing in the building sector for security of supply and demand, sustainability and competitiveness.

Introduction

Energy efficiency is a global and multi-faceted issue. The European Union (EU) is dependent on other countries for almost half of its energy and this need is increasing day by day. For Turkey, this need rises to ¾ of its energy and is nearly 100 % for the following Balkan countries: Albania, Bosnia & Herzegovina, Macedonia, Montenegro and Serbia. On the other hand, with buildings being at the centre of our lives, our need for better quality buildings is increasing. Now we are all aware of buildings that are environmental friendly, smart, zero-energy and zero-carbon. While new buildings are being constructed, the need for restoration and renovation of the existing buildings also gains much more importance. This issue is even more important for Turkey and the Balkan countries which are still developing countries where there exists a huge unregistered and unsecure existing building stock compared to EU members. Therefore a considerable part of this building stock has to be either demolished or renovated in the near future. When it is considered that approximately 40 % of all energy is consumed in buildings, their energy performance has a key role in decreasing the dependence on energy and on reaching the goal of zero carbon. EU's goal of decreasing the energy need by 20 % by 2020 has also been targeted by Turkey and Balkan countries. But how this target can be realized is the main question.

It seems there is an important task for the construction sector and this task can be carried out only by developing a variety of supporting financial instruments together with rationalist mechanisms and incentives.

EUbuild EE Project was a sectoral collaboration project funded by the European Commission (EC) between 2010 and 2012, designed to contribute to the development of financial instruments in order to build up the market for energy efficiency in buildings. Project partners are listed as follows:

- Albania European Union Energy Efficiency Centre (EEC)
- Association for Turkish Construction Material Producers (IMSAD)
- Belgrade Chamber of Commerce (BCC)
- Council of European Producers of Materials for Construction (CEPMC)
- Chamber of Economy of Sarajevo Canton (CESC)
- Macedonian Centre for Energy Efficiency (MACEF)
- Montenegrin Employers Federation (MEF) [1]

In this respect this paper aims to present the current poor situation on energy efficiency in buildings, a SWOT analysis and comparisons among Albania, Bosnia Herzegovina, Macedonia, Montenegro, Serbia, Turkey and EU for the first time as well as conclusion and recommendations.

Method

In order to analyse the current situation on energy efficiency in building sector for the countries in the scope, the following analyses were undertaken:

- SWOT analysis of partner countries.
- Comparisons of partner countries on: legal and institutional frameworks present in the country for EE; related EE measures/applications, possible/alternative financing mechanisms; future prospects of the country on EE; recommendations for realizing what is planned on EE in the future.

SWOT ANALYSIS

Strength-Weakness-Opportunity-Threat (SWOT) analysis can be regarded as a strategic planning method used to evaluate the strengths, weaknesses/limitations, opportunities, and threats involved in a project. It involves specifying the objective of the project and identifying the internal and external factors that are favourable and unfavourable to achieve that objective. By knowing this information it can be possible to develop a successful action plan that is ready to work around certain problems effectively and to avoid failure.

The summary table, showing the crucial common points for the project partner countries in each title of the SWOT analysis was prepared. On the basis of this analysis presented in Table 1, the needs assessment of each country is derived as follows.

Table 1. Summary SWOT table for Albania, Bosnia & Herzegovina, Macedonia, Montenegro, Serbia and Turkey.

Strengths:	**Weakness:**
High energy saving potential in building stock, which will help to maintain economic growth and reduce trade deficit; Primary legislation in place in accordance with EU Directives; Developed concepts/application of energy manager and management application as well as energy performance certification of buildings; Increased interest by the national financing institutions offering different types of EE loans/credits.	Educating/training of government, universities, household owners, private and public building owners, engineers, construction companies and banks to think more energy supply projects rather than energy savings projects; Lack of building stock information; Incomplete secondary legislation on EE in building; Losing a lot of time to prepare projects on EE especially to be easy understandable from the banks; Less financing incentives from the governments; No Energy Efficiency Fund; Not developed/improved ESCO concept; Tariff system weakness to show the importance of EE.
Opportunities:	**Threats:**
New trends or emerging markets related with Building Stock of all categories mostly in the direction of high quality, meaning EE Qualitative materials for EE Buildings that can be easy to reach; Reachable energy saving targets by implementing the measures in building sector; Attraction of investors; Available international funds; Carrying out energy awareness campaign for showing in a simply way the advantages of new technologies to the general public and all stakeholders related with building stock.	Not fully placed legal basis for implementation of EE measures in Building Stock The Banks prefer big projects (less transaction cost and less requirements like in the industry) than buildings sector; Technical and especially energy audits and feasibility studies need to be prepared from consultant to be easily understandable by the Banks.

Albania

It is the task of the Albanian Government to show good will for improvement of EE by establishing a finance scheme, in particular the EE & RES Fund (requested from both draft laws) and for securing finance especially grants and soft loans for EE Program into Building Stock. New Draft Laws which will be approved soon is an encouraging sign in this direction. A lot of work should be done for preparation of Secondary Legislation for implementation of EE measures especially into Building Stock. Implementation of National EE Action Plan (NEEAP) means raising finance and if this does not happen then it will be very difficult for Albania to fulfil its EE targets. The Albanian Government should revise the Energy Building Code based on the EU Directive of "Energy Performance into Buildings" andimplement EE Measures first into Public Building Stock by showing in this way a leading role in this field [2].

Bosnia & Herzegovina

Operation of funds for EE in buildings should be available. Establishment of state agency shall be stated as crucial, which will be in charge for NEEAP implementation and EU aid. Faster implementation of existing legislation should be performed. Improvement of existing regulations should be done. Education/training of all stakeholders (authorities, enterprises, users etc.) should be handled carefully [3].

Macedonia

Building stock and reconstruction road map should be developed. Minimum saving regulations on a short and medium term basis should be adopted. Targeted and well-structured awareness campaigns for different stakeholders should be organized on the benefits of EE in the long term. Governmental lobbying activities at international donor community and financial institutions are crucial to offer support in the EE sector [4].

Montenegro

Strong incentive mechanisms should be introduced. New innovative and more affordable EE loans should be made available. EE Law should be implemented properly and on time. Buildings certification should be applied as an obligatory measure. ESCOs are crucial and should be developed. EE awareness raising campaigns with the participation of all stakeholders (local governments, public companies, financial institutions, etc.) should be organized to have more positive impact on EE applications [5].

Serbia

Renovation of the existing building stock is a large untapped potential for energy savings and implementation of measures to increase EE. Buildings and apartments built before 1970 have almost no thermal insulation. Buildings built before 1980 have an unsatisfactory thermal insulation. Over 75 % of the building stock was constructed before 1980. For these buildings the largest energy savings are possible, up to 80 %. Public sector has to take a leading role in the renovation of existing buildings starting from their own properties. National regulation should be periodically discussed and reinforced and all relevant stakeholders should be involved in this process. Government should continually improve instructions and awareness for citizens and other stakeholders according the latest regulations, how to apply energy efficiency measures in the households and invest in increasing energy efficiency, especially in the building sector [6].

Turkey

There is a need for collaborative studies of related governmental institutions and for better/widespread implementation national agency(ies) formation. What is targeted in terms of EE buildings should be defined clearly in order to see the differences with what is realized in the application. Secondary legislation should be strengthened i.e. recasting of Energy Performance Certification considering the existing buildings, as well. Mandatory surveying and energy efficiency auditing together with bonus-malus for the database formation and good monitoring i.e. known saving potentials, reference values are very important. Governmental incentives should be defined and applied for the building sector i.e starting from the commercial ones. Public-private partnership, energy performance contracting, third party financing applications should be considered for demonstration and formation of best practices. EE and RE technology database for more implementation practices should be developed. Low interest rate loans/credits, tax exemptions for EE materials, equipment, systems should be provided. Overcoming the information gap has great importance to secure more involvement in the private sector as well as the public [7].

COMPARISON OF PARTNER COUNTRIES

SWOT analysis is a simple and easy tool to come up with a list of factors but it cannot be expected to identify all important external factors. For this reason, after summarizing the current SWOT analyses and needs of the partner countries in terms of EE in buildings;, comparison of their respective situation was undertaken according to the following topics:

- legal and institutional frameworks present in the country for EE,
- related EE measures/applications,
- possible/alternative financing mechanisms,
- future prospects of the country on EE,
- recommendations for realizing what is planned on EE in the future [2–7].

Legislative framework

Regarding EE studies and implementation, the first thing that should be taken into account is the related applicable legislative framework, consisting of mandatory EE implementations as well as incentives/penalties. Table 2 represents the comparison of the partner countries on the basis of presence of EE law, building energy performance (BEP) regulation, EE strategy and national EE action plan (NEEAP).

As can be seen from Table 2, only Turkey and Montenegro currently have an EE law, whereas Albania, Bosnia and Serbia have the draft (not adopted yet). In Macedonia, the Energy Law deals with EE issues and there is no separate EE law.

BEP regulation is very fundamental legislation for the energy certification of the buildings; auditing, determination of EE saving potentials and energy codes and the EE implementation for getting at least the required class, which is set in this

Table 2. Comparison of EE legislative framework [1].

Legislation	Albania	Bosnia	Macedonia	Montenegro	Serbia	Turkey
EE law	Draft EE law	Draft EE law	Energy Law	EE Law	Draft EE law	EE Law
BEP regulation	Not yet developed	Present	Present	No separate regulation	Present	BEP TR
EE strategy	Albanian National Strategy of Energy June 2003/2008-2010	Present in both FBH (2009) and RS (2012)	EE Strategy of the Republic of Macedonia until 2020	Present	Present	EE strategy of Turkey 2012–2023
National EE Action Plan	National Action Plan 2009–2018	National EE Action Plan 2009–2018	First National Energy Efficiency Action Plan 2010–2018	Present	National Action Plan for Energy Efficiency 2010–2012	Target policy in 10th Development Plan

regulation. Albania and Montenegro have not developed this regulation up to now.

The other step for the countries to have proficient legislation is to develop national EE strategies (or building renovation strategies) and their actions plans. Although all partner countries have developed EE strategy, only Turkey has no national action plan[1] (in preparation) but it was stated as a target policy in the 10th Development Plan. Other critical point is that these strategies and plans should be re-evaluated in some periods of time after taking the results of implementations in terms of what is targeted and what is realized.

Institutional framework

Other than applicable legislation, the responsible institutions should be defined in various structures; such as, central/local governments, agencies and private sectors. As can be seen from Table 3, in all partner countries, central government has defined EE related studies under related ministry(ies). In terms of local governments, apart from Montenegro and Turkey, they are active in EE studies. In Turkey, for example, there is no provision with regard to mandatory applications in local governments and there are very few examples of self-financing EE projects. It should be stressed that local governments are one of the key actors for proper on-site EE implementation as demonstration projects starting from their own buildings with the application of different financing mechanisms. Therefore, they should be actively involved in EE activities.

It can be clearly stated that from the examples of developed countries, like EU member states, energy agencies have an essential role in the field of EE and RE having more power to do more. If all these activities are centralized, it could be very difficult to spread, control and monitor, appropriately. With the exception of Bosnia-Herzegovina and Turkey, participating countries have different structured agencies. These are also important for market formation together with the private sectors, comprising NGOs, and also controlling the related market. As stated, private sector interest should be stimulated to have a sustainable market with utilization of existing or creating new financial mechanisms while saving energy.

EE applications/measures targeting the building sector

As a following step after having legal and institutional bases, in the market, defining and implementing either mandatory or voluntary EE applications/measures to save energy, support the economy and improve the environment are compulsory.

One of the basic differences between countries is the definition of energy auditors and managers. Apart from Turkey, the others have both energy managers and energy auditors. In Turkey, on the other hand, energy manager is defined as responsible for both management and auditing. In addition, in Turkey, mandatory applications are specified for large scale (on the basis of either the energy consumption or the construction area) industry and buildings. As this can be regarded as very basic for the determination of the current situation, energy saving potentials, possible/applicable EE saving measures, etc., mandatory applications shall be worthwhile.

In the world, there are two standards (very close to each other in terms of the contents) for energy management: EN 16001 and ISO 50001, both entitled "Energy Management Systems"[2], published in 2009 and 2012 respectively. After a transition period, ISO 50001 shall be the only standard to be applied. Hence, the countries should start to adopt this standard, because, this helps continuous and stable EE applications and also good monitoring and verification systems.

When the building energy performance evaluation and certification is analysed, in Bosnia&Herzegovina, Serbia and Turkey, there are mandatory applications (while taking operation/construction) for the new buildings (for the existing buildings apart from Turkey, the application was started, as well) with the

1. Strategy defines what are the basic objectives, targets and actions to reach them, whereas action plans comprise the applicable real actions to give directions to energy consuming sectors.

2. EN is the standard for "European Committee for Standardization (CEN)" and ISO stands for International Organization for Standardization.

Table 3. Comparison of institutional framework [1].

Institution	Albania	Bosnia	Macedonia	Montenegro	Serbia	Turkey
Government responsible ministry(ies)	Ministry of Economy Trade and Energy	Ministry of Foreign Trade and Economic Relations of BH	Ministry of Economy, Ministry of Transport and Communication, Ministry of Local Self Government	Ministry of Economy	Ministry of Infrastructure and Energy Ministry of Environment, Mining and Spatial Planning	Ministry of Energy and Natural Resources Ministry of Environment and Urban Planning
Local government	Infrastructure office which deal also with energy issues	Cantonal ministries for responsible for energy issues in FBH, municipalities in RS	All units of the local self-governments (84 municipalities plus Skopje)	Not active but articles in EE law to be more strong	Established five Regional energy efficiency centers REECs	Self-Financing Covenant of Mayors
Agency	State institutions	no	Energy Agency of the Republic of Macedonia; Energy Regulatory Commission	Energy Regulatory Agency not on energy efficiency	Serbian Energy Efficiency Agency (SEEA) -Governmental Serbian Energy Agency (SEA) – independent	None
Private sector	Not enough interest,	Not enough interest Things getting to be improved	The private sector is involved but not to a desired level because of lack of legal framework.	Not enough interest Especially if we are talking about the banks	Private sector, SME-s is interested in EE issues but could be more.	Involved but not sufficiently

defined energy classes, while in Albania, Macedonia and Montenegro, there exist provisions in the legislation but the applications is not getting started, yet. For the determination of energy classes, building stock information is very crucial together with EE audit results. In addition, the energy performance evaluation methodology/program should be up to date, easy to use, has flexibilities, to be monitored and evaluated for the standardization. After that certificate shall have a meaning to show the real energy class of buildings to evaluate EE improvements opportunities, implicitly.

Energy Service Companies (ESCOs), which are dealing with EE auditing, energy saving potential/possible EE measures evaluation and implementations of EE measures, are other important actors to be able to have an active EE market, i.e. widespread application in the country. Only Turkey has a developed ESCO market activity, whereas in Serbia, Montenegro and Albania, related legislation is present but not the activity. In Macedonia, in the past there were attempts to establish public and private ESCOs but they failed. At present there are few companies that try to work on project based financing and enter into direct agreement with the municipalities but most of them report problems in the money pay back due to the low municipality financial viability. Therefore, in all partner countries, in order to act as an ESCO, requirements should be set clearly for guaranteeing the project development with reasonable financing methods to implement EE measures and also with good monitoring, inspection and verification systems to have sustainability.

Not only in the field of EE but also in all other vital activities, the consciousness level and the involvement of all public groups as a consumer, representatives of financial sector specialists, NGOs, public sector, academicians, private sector (producers, contractors) and energy managers, etc. should be improved for the sake of successful implementation. And in the building sector, especially, EE awareness campaigns, good demonstration projects and examples should be supported by the central and local governments with an effective roadmap.

While mentioning the alternative strategies for security of energy supply and demand, EE and RE strategies are considered together, since their combined effects are higher than individually. This is mainly due to economical saving through EE and using this for investing in RE. For this reason, domestic RE usage for diversification of the energy resources alternative to fossil fuels, mostly as an import, increases the efficiency in production, reducing expenditure on importing conventional energy sources and decreasing GHG emissions. One of the ways to support RE utilization is to have feed-in tariffs as a guarantee for purchasing the produced electricity. To have effective RE utilization as well as to be certain about what is realized after EE applications as a saving to be comparable with what is targeted as the potential saving, standardization, labelling and eco-design applications to all materials, systems and technologies should be stated in related legislation and turned to applications in the market.

Current financing mechanisms for EE in the building sector

Table 4 represents basic financing mechanisms, currently applied/evaluated by the partner countries in order to foster EE in the building sector.

Table 4. Comparison of current financing mechanisms for EE in the building sector [1].

Financial mech.	Albania	Bosnia	Macedonia	Montenegro	Serbia	Turkey
Tax reduction, exemption	Poor in application	There is no such mechanism, recently. NEEAP has proposed tax rebates, provided by state /entities/cantons (13 % in total financial instruments)	Fiscal mechanism in the country represents a 5 % VAT (normally 18 %) for import of systems for exploitation of renewable energy.	For solar collectors and in EE law defined for entrepreneurs and legal entities, using and implementing technologies, produce and trade in products that promote EE	Present but none for buildings	None for buildings
Feed-in tariffs	YES since 1999	Feed in tariffs in place since 2004	Feed-in tariffs just for electricity production from RES, and highly efficient cogeneration power plants.	Regulation on simulative feed in tariffs for solar generators, wind, wood waste, biogas	Regulation of tariff for electricity generation using renewable energy and combined heat and power (valid until December 31, 2012). Feed-in tariff system	Present for solar, wind, biomass, hydroelectric, geothermal energies for producing electricity
Credits	Yes, Pro Credit with soft loan programme since 1999	EU IPA fund, UNDP, USAID, EBRD, UNEP, GEF Few commercial banks have offered by purpose loans for EE	Donor schemes: WeBSEFF (EBRD/EU), Green for Growth Fund (KfW), Macedonian Bank for Development promotion (The World Bank), trough set of local banks.	World Bank and KfW Funds for EE in public buildings.	International Development Association, EBRD, World bank, KfW, UNDP, local banks in Serbia	TURSEFF (EBRD, World Bank), KfW, GEF, UNDP, France Development Agency, either separate or together with the local banks
Grants	KfW has supported three demonstration project and a fund of 5.5 Million Euro will be for 25 other buildings	UNDP, USAID, GIZ for demonstration projects Some local government (cantonal) 100 % of the project	WB – Sustainable Energy Project, EBRD/EU WeBSEFF, USAID Habitat for Humanity, UNDP, GIZ for demo projects.	GIZ, Kingdom of Norway.	EBRD, Fund for Energy Efficiency, Government of Spain for solar energy, Kingdom of Norway for financial engineering and EMS	None
Public-private partnership	Yes – legal base already exists since 2008	Legal framework has established	New law on public private partnership, but only in the sector of public lighting.	Low level within the scope of EE	Law on Public-Private Partnerships and Concessions in 2011	Not yet developed
Third party financing	This will be part of secondary legislation under ESCO	Not yet developed	In emerging stage, but only in the private sector	Not yet developed	Law on Public-Private Partnerships and Concessions in 2011	Not yet developed
R and D budgets for efficient technologies	Present through Ministry of Education and Science	Very small amount from ministries responsible for education	The National program for R&D of the Republic of Macedonia 2012 – 2016 anticipates a track on low carbon societies including RES, EE, clean transportation and other clean technologies on both the production and consumption side.	Renewable Energies and Energy Efficiency in Montenegro 2006-2009 Fund for energy efficiency is recognized by EE Law but not implemented	Promotion of the usage of energy efficient equipment	Present by mainly TUBITAK
White certificate	Not yet and it is part of secondary legislation of Draft EE Law	Not yet developed	Not yet developed	Not yet developed	Not yet developed	Not yet developed
Emission trading	Not applicable	No	No, the country building sector is too small and bundle type of projects is the only possible method for ET projects. But bundle projects are too difficult to arrange and prepare.	No	Voluntary emission trading market but not registered projects yet	Present voluntarily mostly for RE projects

For the promotion of EE and RE activities, from the government side, among the important mechanisms, tax reduction/exemption, feed-in-tariffs and grants can be listed. In almost all partner countries, tax reduction/exemption are not favoured for EE and the building sector. In case of feed-in tariffs, apart from Montenegro and Serbia, others have this financial mechanism for the electricity production from different RE sources. And as not stated in this table, grants from the government side are not considered for the building sector in all countries. It should be stated that government should be a sample financier for EE and RE in the building sector for good demonstration projects to attract the public interest starting from their building and giving tax reduction/exemption for EE and RE products and technologies as well as some grants through either mandatory or voluntary energy saving targets, expected from EE/RE implementation projects.

On the other hand, from different international organizations/financial institutions (the World Bank, EBRD – European Bank for Reconstruction, EIB – European Investment Bank, GEF – Global Environmental Facility, KfW – Reconstruction Credit Institute of Germany, AFD – French Development Agency, etc.), there exist various credit lines and grants (no grant in Turkey). This is a good base for financing EE and RE activities in the building sector to be able to take the national financial institutions' attention. Some of these credits are from WEBSEFF or TURSEFF – Western Balkans (Bosnia, Macedonia, Serbia) or Turkish Energy Financing Facility like structures as umbrella institutions acting between international donors and national banks. The second way, they can give directly to the consumers or separate cooperation with one or more national banks.

ESCOs are essential for widespread realization of EE and RE projects. ESCOs use different contract for their projects, namely "energy performance contract – EPC". The base of EPC is to guarantee how much energy can be saved after project implementation. Financing can be from either internal sources of ESCOs, from customers or from third parties, such as financial institutions and banks. As listed in Table 5, public-private partnership (PPP) and third party financing (TPF) can be regarded as related financing mechanisms for ESCOs. PPP is denoted for central or local government involved project, implying that a private ESCO can work with the government by using either its financing sources or TPF within the framework of EE and RE implementation project. This requires some revisions on the public procurement legislation in order to allow ESCOs to enter these procurements offered by the governments, especially for their building auditing and renovation. Other than Montenegro and Turkey, the other countries already have relevant legislation. On the other hand, for Turkey, the revision in the Law is going to be performed as declared by the 10th Development Plan concerning ESCO activities in public buildings. It should be kept in mind that with successful implementation projects are required based on applicable legislation to apply more TPF in other projects like between ESCO and the customer, directly.

In the more developed world, energy-economy-environment goes hand-in-hand with the concept of "low carbon society or economy", which can be defined as reducing GHG emissions of a country as much as possible by efficient and feasible measures, i.e. EE and RE. To be able to take part in such a kind of activity, the first thing is to have an EE and RE technology database and development according to national requirements, and opportunities. Then, involvements of environmental or green funding mechanisms, like white certificate, emission trading, etc. in EE and RE applications are needed.

Future prospects on other possible financing mechanisms for EE in the building sector

When partner country representatives were asked about future prospects of other financing mechanisms for EE in the building sector , the following opinions were provided (Table 5). As can be seen, the following common themes emerge:

- For all countries, government support with national EE fund formulation, different project support mechanisms and arranging taxes (for EE/RE equipment, technologies and systems support) /tariffs (electricity tariffs for the building and electricity form RE sources) in favour of EE are emphasized.
- In addition, for the credit lines, decreasing the interest rates with long payback period is needed, especially for low-income households. Moreover, more involvement of national banks is crucial for these targets.
- The other common point is to develop/increase the ESCO activities with PPP and EPC/TPF arrangements and applications.

Recommendations for further improvements on EE and financing in the building sector

When partner country representatives were asked about future prospects for other financing mechanisms for EE in the building sector the following key recommendations were identified (see Table 6 for details by country):

- Mandatory energy management/manager/auditor applications
- Development of reference buildings andenergy classes through reliable building stock information
- Mandatory application of energy certification of buildings (for new and existing)
- Determination of energy saving potentials of the buildings by mandatory EE auditing
- Development of EPC schemes and more demonstration of ESCOs
- International technical assistance for ESCO market and EE/RE technology improvements
- Accredited laboratories for the verification/testing of EE equipment and systems efficiencies
- Awareness campaigns for all stakeholders
- Environmental/green financing opportunities

For sustainability of EE and RE activities together with the governments, properly developed and acting "agency" like institutions are crucial for implementing EE in by providing a focal point and also through their role in monitoring and verification.

Table 5. Future prospects of partner countries on financing mechanisms for EE in the building sector [1].

Country	Future prospects
Albania	Soft Loans; Energy Efficiency Fund; Tax Reduction.
Bosnia	Soft loans, budget grants, international technical assistance.
Macedonia	Direct Subsidies with controlling mechanism. Taxation policy (Amortization, Energy consumption tax, Tax benefits (for investors and fund users), Green mortgage – lower tax or no tax on energy efficient equipment and household appliances, White certificates or similar. Favorable customs duties for energy efficient equipment. Mobilizing capital for creation of investment funds (National Fund for Energy Efficiency). Guarantees for commercial banks. Low-income family energy efficiency financing programs given the rate of people with low income in the country. Development of secondary legislation for ESCO's, and promotion of ESCO's.
Montenegro	Enhanced and greater involvement of relevant addresses – stakeholders, (local governments, public companies, financial organizations – banks, energy supplying company, public sector, private sector NGO's …) towards establishing new and innovative mechanisms for supporting EE, eg tax relief, low interest loans, easier fund access.
Serbia	Third-party financing, energy performance contracting, guarantee of energy savings contracts. Preferential loans and credits with low interest rate. Minor part of the population and consumers of energy has own economic potential to self -invest in Energy efficiency and they are preferably interested for tax and duties reduction/exemption on the constructing material, equipment, etc. Government should continually improving instructions and awareness for citizens and other stakeholders according the latest regulations, how to apply energy efficiency measures in the households and invest in increasing energy efficiency, especially in the building sector.
Turkey	Governmental financing mechanisms (EE projects and Voluntary Agreements types of incentives) for building sector. Public-private partnership, energy performance contracting with third party financing. Prefential loans and credits with low interest rate together with the involvement of more national financing institutions. Taxation and tariff policy arrangements in favor of EE in buildings.

Conclusion

The building sector will be one of the key enablers of 20/20/20 targets for 2020 and also the 2050 decarbonisation goal for the European economy. These goals link two European policies:

- The energy policy: long term scenarios by 2050 show that a 40 % to 50 % reduction of the building sector energy consumption is mandatory by 2050 to decrease the amount of fossil fuels used.
- The climate policy: long term scenarios by 2050 show that the building sector must target a reduction of about 90 % of its CO_2 emissions, since accounting for about 1,4 giga tons of CO_2 per year.

In line with the ambitious 2050 targets, the long-term strategic objectives comprise:

- Most buildings and districts will become energy neutral, and have a zero CO_2 emissions. A significant number of buildings would then be energy positive, by integrating renewable energy sources, clean distributed generation technologies and smart grids at district/national level.
- Public Private Partnerships will indeed cover the entire innovation chain; fostering performance based contracting and innovation friendly procurement practices. This will be achieved with sustainable financial incentives schemes on the demand side. On the supply side, systemic technical solutions will be integrated locally.
- Urban planning and smart cities implementations will leverage on these novel solutions at building and district scale, creating the basis for intelligent connections between buildings and districts and all urban resources.

The implementation of the 2050-decarbonisation goals raises new grand challenges for the building sector and the entire value chain (technology manufacturers, construction companies, energy service companies, etc.):

Table 6. Future prospects of partner countries on financing mechanisms for EE in the building sector [1].

Country	Recommendation
Albania	Awareness Energy Efficiency Campaign; Technical Assistance for preparation of Energy Performance into buildings considering cost benefit analysis under Albanian/country conditions.
Bosnia	Soft loans from domestic development banks, tax discount rate for EE equipment, implementation of public private partnership regulation.
Macedonia	Building certification. Energy Performance Contracting. Requirements to purchase equipment based on lists of energy-efficient product specifications of different categories of equipment, as well as establishing of accredited laboratories for certification of EE equipment. Introduction of mandatory certificates for sites, public or municipal property in operation, with a total useful area of over 1000 sq. m., preceded by energy audits prescribing energy savings measures. Higher involvement of energy engineers in the financing institutions (banks). Implementation of wide awareness campaigns. Future incentives for the banks (guarantee funds) to develop financial products for EE.
Montenegro	ESCO might be able to deliver in short time; introduction of targeted EE credit lines with lower interest rates and grace period; reduced taxes on EE equipment and services; It should be noted that EE equipment/materials prices are still too high (most of it, if not all, come from the import and there is limited impact Regional governments can do, except to find common approach.
Serbia	Energy efficiency is one of the most cost effective ways to enhance security of energy supply, and to reduce emissions of greenhouse gases and other pollutants and thus contribute to sustainable development. Building sector is the most energy-demanding sector in Serbia and energy efficiency can be seen as biggest energy resource especially as potential opportunities in renovation of the existing building stock. Cost-effective energy saving activities in buildings sector have a great potential for stimulating direct and indirect employment in the construction and related industries from the materials supply chain.
Turkey	More R&D studies for the technological improvements in EE and RE concerning climate change i.e. reduction of GHG and related financing mechanisms application like white certification. Datacenter formation for the determination of reference values and the maximum saving potentials for the energy performance certification. More demonstration projects especially by public-private partnerships for the standardization. Eco-design concerns for energy consuming equipment and systems.

- How to make the routes to reach the 2050 goals realistic when complying with intermediate targets by 2020 (20/20/20)?
- How to reduce the risk of potential market failures ahead?

It can be stated that the above policy strategies are implemented with very little public funds. They are first supposed to drive the behaviour of market players in the expected directions. Yet, there is evidence that market players do not implement the expected behavioural changes. Energy or greenhouse gas emission savings are rarely the main drivers. Typical drivers may include the improvement of the living quality and comfort of the building, or even the improvement of the building appearance and economic value.

The probability of a market failure is therefore rising under these conditions. Mandatory applications by related legislation recasting will be the case whereas the building sector will be unable to transform them into opportunities, either because the supply is not adequate (too expensive) or the demand is not ready (too high upfront investment costs). Reducing the probability of a major market failure requires that all the stakeholders of the building sector (manufacturers, constructors, energy service companies, etc.) accelerate and deepen refurbishment, while keeping investment costs under control. Increased technological, social and business innovation is therefore needed now and in parallel to address several issues:

- Most technology solutions are too expensive.
- Construction processes lack productivity and quality (i.e. existing gaps between performance by design and performance at commissioning).
- Renewable energy sources have not yet reached mature integration into existing or new buildings (to provide users

with heat and/or electricity that are independent from fossil fuel uses, innovation is still needed to optimize renewable energy impacts and uses at building and district level).

Managing the above stated issues requires meeting three constraints, like in any technology development:

- The time required to deliver innovative technologies and/or construction processes (fast),
- The quality of the technologies and/or construction processes (durable energy efficiency),
- The total costs required for developing and implementing the product or construction process (cheap-affordable) [8].

Affordability means the arrival of a demand-driven market whereas durable quality and fast delivery of innovative technologies guarantee that energy savings will last long after new or refurbished buildings have been commissioned. Thus, the 2050 deadline to reach full decarbonisation remains under question.

Finally, the crucial point which should be kept in mind is that we, public, are the consumer; we are the producer, hence, we have the power to realize what is expected and what needs to be improved on energy efficiency and financing in the building sector for security of supply and demand, sustainability and competitiveness.

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