

ROLE OF EXECUTIVE AGENCIES FOR ENERGY EFFICIENCY WITH A VIEW ON ACTIVITIES OF SERBIAN ENERGY EFFICIENCY AGENCY

by

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Many countries, particularly in Europe, have executive energy efficiency agencies at national, regional and local levels that are organized in different ways. For all of them, it is common that there are existing strategic needs in their countries for enhancement of conditions and measures for rational use of energy and fuels. Serbian Energy Efficiency Agency was established in 2002 within the reform of the energy sector in Serbia and its current status was defined in 2004 by the Energy Law. It contributes to the improvement of social responsibility towards energy in all structures of the state and society, by proposing energy efficiency incentives, promoting importance of energy efficiency, as well as by managing energy efficiency and renewable energy programs and projects.

Key words: *energy efficiency, energy efficiency agencies, Serbian energy efficiency agency*

Introduction

In the Energy Sector Development Strategy of the Republic of Serbia until 2015, the energy efficiency is underlined as one of priorities [1]. In recent years, similar to the majority of Central and South East European countries, Serbia has made (and proceeds further on) the first steps in establishing an organized system of energy efficiency on the consumption side. This complex process faces numerous objective and subjective obstacles, but only a systematic and synergetic approach to problems can bring a significant step toward energy efficiency indicator improvement. In this respect, it is necessary to fulfill certain preconditions in order to ensure sustainability and greater efficiency of the overall process.

European good practice has shown that not only national but regional and local (*e. g.* city) energy efficiency agencies should also be developed. In this respect, it would be advantageous to have geographically close regions (cities and municipalities) band together and join efforts in implementing diverse programs and projects. In Europe, according to the official web portal of the Directorate-General for Energy of the European Commission, by January 2011, 421 energy efficiency agencies were registered with varying structures and scope of activities

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[2]. Of those, 32 are national (central) energy efficiency agencies, including the Energy Efficiency Agency of the Republic of Serbia (SEEA). It should also be stressed that this register does not include agencies from Russia, Ukraine, Kazakhstan, Turkey, Georgia, Armenia and several other countries. The following chapters shall include an overview of the assumed main role of energy efficiency agencies.

One of the main preconditions, especially for countries at this stage of development in which Serbia is today, is defining the place and role of a national agency which focuses on energy efficiency tasks. It should offer diffusive support to all relevant factors in the country and encourage their activities in order to promote energy efficiency. When compared to other Western Balkans countries, over the last few years, the Republic of Serbia was efficient in defining the Energy Efficiency Agency (that is Serbian Energy Efficiency Agency – SEEA) as the executive agency of national importance [3], but its activities in the upcoming period require structural upgrading and support, mainly due to the implementation of the above mentioned role. First of all, it refers to strengthening of capacities in the number of staff and available budget in accordance with European good practice. This is evident in many relevant reports from international institutions (EAR – European Union, United Nations Economic Commission for Europe, World Bank, *etc.*), as well as examples of developed countries in the field of energy efficiency. One example is the Netherlands, which has twice more citizens than Serbia, and has the state agency Senter Novem (recently renamed NL Agency) with over 1,400 employees in the field of environmental protection, energy efficiency and health. This is 100 times more than our Agency. The budget comparison gives similar results.

Role of the energy efficiency agencies with special focus on the SEEA's activities

Work on drafting laws

The initial step for the improvement of energy efficiency is defining and adopting and then implementing adequate legal and subordinate regulation framework for this field. The existing legal framework in Serbia is not sufficiently binding for sectors that consume energy regarding increasing energy efficiency. That is why the state intends to introduce a law which regulates rational use of energy in order to enable realization of identified preferred technical measures [4]. The Draft of the Law on the rational use of energy has been prepared and it is the responsibility of the competent ministry for the energy sector. The law shall more precisely define obligations of all energy subjects in different sectors regarding energy efficiency and shall contain qualitatively new solutions, *e. g.*, the obligation of determining current energy consumption of a company at the annual level, as well as obligations in case of exceeding the set maximum consumption level.

The energy efficiency agencies should initiate drawing up and assist competent state authorities in drafting legal and subordinate regulations. The Energy Efficiency Agency of the Republic of Serbia has actively participated in many activities so far and we would especially like to mention the following:

- Providing expertise and professional assistance to the ministry in charge of energy issues in defining procedures and regulations in the field of energy efficiency and renewable energy sources (SEEA has participated in the preparation of the Draft Law on Rational Use of Energy, as well as the package of bylaws on renewable energy sources; SEEA has provided to the Ministry the Draft Rules on Energy Labeling of Electrical Households Appliances and the proposal of mandatory introduction of energy managers in municipalities, *etc.*).

- SEEA is committed to start the implementation of the Directive on Energy Performance of Buildings and has participated in the preparation of draft bylaws within the Law on Planning and Construction, regarding energy efficiency of buildings.
- SEEA participates in the work of the National Commission for KSA 242 standards – Energy Management, as well as in the implementation of EU Directive on Small and Medium Size Enterprises.
- SEEA has taken part in the preparation of the National Action Plan for the use of biomass in energy and in the legal framework for renewable energy sources coordinated by Ministry of Infrastructure and Energy, *etc.*

Education and raising awareness

As stated above, the rational use of energy is not just the responsibility of the state but also of every individual, so a broader social action is needed, as well as raising awareness of all social target groups regarding this issue. The energy efficiency agencies must influence the change of beliefs, attitudes, habits and behavior of energy consumers, create new forms and routines, especially where there is socially irresponsible practice of wasting energy, support the concept of socially responsible behavior and rational view of energy and energy sources, as well as natural resources as a whole.

Special attention should be focused on the youngest generation, the generations that are to come, who are also the easiest to educate during the process of their maturing and schooling. The Serbian Energy Efficiency Agency participates in promoting the education process in Serbia. Concretely, SEEA has contributed to the introduction of the subject of Renewable Energy in vocational electrical engineering secondary schools. Also, SEEA has participated in the preparation of lectures in energy efficiency and renewable energy for 6th, 7th and 8th grade of elementary school as part of physics. SEEA received special award of the Internet portal of the European Commission – Directorate General for Energy and Transport “ManagEnergy” for outstanding results in education on energy efficiency in the region in 2007. SEEA was the only official partner from Serbia in the Campaign “Sustainable Energy in Europe 2005-2008” initiated by the European Commission with its own project. SEEA reaffirmed its commitment to this goal in 2011 by applying with the second project for the new campaign.

Related with this issue, we can add the following activities of SEEA:

- Organization of the public celebration of March 5th, the World Energy Efficiency Day for the first time in Serbia in 2008 and on the same date, we took part in thematic events in later years.
- Support the campaign “I do rationally use energy” dedicated to the European Energy Saving Day for which we received the acknowledgement of the Radio Belgrade – Program 202.
- Support and participation in the global campaign “Earth Hour” in 2009 (the first year in which Serbia took part) and in later years.
- Support and participation in the event “European Solar Days” held in towns across Serbia
- Participation in the Festival of Energy Efficiency in the City of Kragujevac and “Sustainable Energy Day in Serbia”.
- Thanks to SEEA, young people in Serbia had the opportunity to participate at the European competition for the best photograph organized by the Assembly of European Regions (one of the topics-categories was sustainable development).
- SEEA was the partner in the project “Energy is all around us” in which pupils of primary and secondary schools participated, as well as children from kindergartens.

- SEEA is one of initiators for 2011 to be declared as the Energy Efficiency Year in Serbia. The signatories are relevant ministries, nongovernmental organizations, business sector, UNDP, University of Belgrade, Serbian Chamber of Commerce, *etc.*
- Participation with Research Campus Petnica in the project on education in the field of energy efficiency.
- SEEA is partner in the project – public competition for the best journalist report on energy efficiency and special thematic reports, *etc.*

Implementation of demonstration, innovation and science and research projects

The final result of demonstration projects is the assessment of effects of measures implemented in order to increase energy efficiency. In our country, demonstration projects are important because acquired experience can be used for applying for funding for other projects, especially from European funds. SEEA has realized twenty nine demonstration projects co-financed by the EU CARDS program in the following areas: buildings, public street lighting, district heating, public water supply and renewable energy sources.

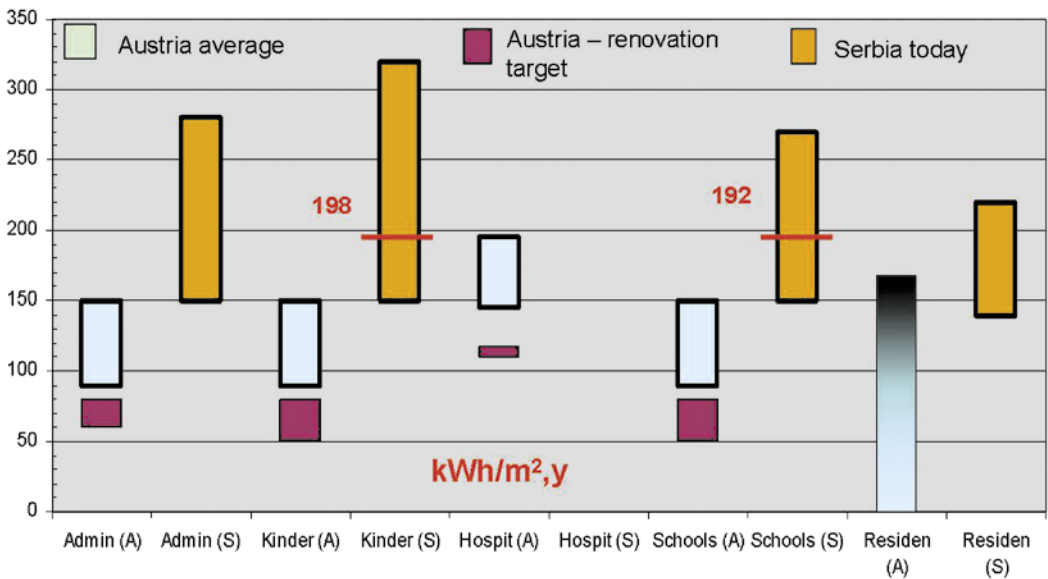


Figure 1. The energy efficiency indicator pyramid

Figure 1 shows the state of public buildings sector in Serbia based on SEEA experiences from numerous energy audits it has done. The most important is the way of heating in these buildings. Fifty eight towns in Serbia have district heating system but not many of them have consumption based billing. In the context of long term strategic program “Energy Efficiency in Public Utility Energy Management”, which will contribute to the increase of energy efficiency and reduce consumption of energy in buildings and systems for which the local self management is in charge, in 2005 and 2006, the Agency for Energy Efficiency of the Republic of Serbia implemented the project “ENERGY EFFICIENCY IN THE PUBLIC UTILITY EN-

ERGY MANAGEMENT – DEMONSTRATION PROJECTS”. As an example, we are going to mention the project in Subotica for which three comparable residential buildings with similar characteristics are chosen. The buildings are of the same size and construction quality, at the same location and with residents with similar habits. They were constructed and connected to the district heating system in Subotica in the middle of 1970-ies. Every building has 12 floors with 76 flats and the total area of 4,500 m².

The project program comprised following works:

- Reconstruction of heating substation with the installation of heat energy consumption meters in the building at 34, Bajnatska 34 (for project purposes, this building is designated as Facility A).
- Replacement of the existing heating substation with a new one, package type with regulation of heating substation operations according to outside temperature in the building at 156, Brace Radic Street (Facility B).
- Replacement of existing heating substation with a new one, package type with regulation of the heating substation operations according to outside temperature and with frequency regulation of pump operations and installation of thermostatic valves and allocators of the heat energy consumption at radiators in the flats of the building at 158, Brace Radica Street (Facility C).

Table 1 shows indicators of heating energy efficiency in all 3 facilities. The heating area totals to 3,481 m². Comparing annual indicators of heat energy consumption for various heating standards in Germany [5] according to which specific heating energy consumption in line with standard regulation totals to 100 kWh/m² and energy efficient facilities are those with specific heating energy consumption of 55 kWh/m², it is possible to make the cross section of the situation in these particular facilities in Subotica. However, it is important to consider the fact that these buildings were constructed in the middle of 1970-ies.

Significant savings of heating energy were realized in the Facility C (local plus individual regulation) in which old valves were replaced by thermostatic valves and heating energy settlement was performed by allocation in comparison to actually consumed energy by heat allocators. The savings in the consumption of electricity in the substation of the Facility C in comparison to the Facility A where the new inverter substation was installed with the frequency regulated circulation pump, was totally as much as 44.43%. The reduction of total CO₂ emissions was achieved by applying energy efficiency measures for Facilities B and C in comparison to the referent Facility A.

Experiences acquired in this demonstration project stimulated the management of the Public Utility Company “Subotica Heating Plant” to continue with the improvement of measurement and regulation system, so that in the following years, the concept of payment for heating energy according to consumption was introduced in Subotica.

Also, SEEA is the technical implementation body for the “Serbian Energy Efficiency Project – SEEP” (energy efficiency in public buildings) with financial support of the World Bank that can be classified as demonstration project. This project won international “Green Award 2007”, and since January 2011 it has been the official partner of the European Commission campaign “Sustainable Energy Europe”.

Table 1: indicators of heating energy efficiency in 3 observed facilities

Specific heating energy consumption [kWhm ⁻² annually]	Heating season 2006/2007	Heating season 2007/2008
Facility A	133.69	140.88
Facility B	121.37	124.55
Facility C	101.74	116.29

As a demonstration project, we can also classify the installation of solar photovoltaic panels in three vocational secondary schools of electrical engineering (Belgrade, Varvarin and Kula) and the system of solar collectors for heating purposes at specialized psychiatric hospital "Gornja Toponica" (near the City of Niš), as part of the project for strengthening the Centre for Renewable Sources of the SEEA, financed by the Spanish Government Grants. In March 2011, the first photovoltaic power plant was plugged in the electricity energy power system of Serbia (in the school in Varvarin) and soon we completed the same in Kula and Belgrade.

Science and research projects in the field of energy efficiency are the contribution of scientific and research community (universities, institutes) which should be used in the best possible way, above all in practical application of results of these projects. This is why it is necessary for businesses to join the information exchange through their representatives (chambers of commerce, associations, *etc.*). SEEA has supported and got involved as a partner in ten science and research projects from the National Energy Efficiency Program and Technology Development Program of the Ministry of Science (cogeneration; buildings – thermal protection and standards; electrical appliances; quality of interior; electrical appliances (follow-up); sustainable development of spas in Serbia; measuring of wind potential in Serbia; solar heat collectors; electric motors; housing development and climate change; buildings – thermal conductivity of building materials).

SEEA was the first to support and financially help the realization of the project "Public Solar Charger" by the students of the University of Belgrade. The first public solar charger in Serbia (and in the world) was positioned at the Central Square in Obrenovac on October 14th 2010. The project won the prestigious prize in its category at the "European Sustainable Energy Week" held in Brussels in 2011. Also, SEEA supported the innovative project "Solar House", which entered in the final selection for the European contest award.

Promotion and information

By implementing their mission, energy efficiency agencies must support the improvement of conditions for investing in energy efficiency, contribute to the transfer of knowledge and current "best practice" and continuously work on raising awareness of all energy consumers through better flow of information.

Until now, SEEA has organized and participated at numerous public meetings in Serbia and abroad. We will mention only some of them:

- Contribution in the organization of Energy Fairs – two national conferences on energy efficiency and renewable energy, exhibitions and accompanying programs.
- Co-organization of special accompanying program "Energy Efficiency and Sustainable Construction in Serbia – Current State and Perspectives" at the Belgrade Construction Fair.
- Participation in the First Fair on Environmental Protection, Energy Efficiency and Renewable Energy, held in Niš.
- Support and co-organization of the First International Exhibition and Conference about Electrical Cars in South-East Europe.
- SEEA took part in following events: Fourth International Conference "Environment for Europe", International Conference "CSR and Energy Efficiency", Annual International Conference "Energy Future in the Balkan Region", "Energy Days" – Forum and Fair, Annual Conference "Days of Serbian Engineers 2009", organized by the Serbian Chamber of Engineers, Round Table "Energy Sector in Serbia – where are we now and where are we heading?", the First International Forum on Energy Management at Local Level for Central

and South East Europe, International Conference “Industrial Energy and Environment in the Countries of South East Europe”, the First Regional Conference “Energy Efficiency of Railways in Terms of Sustainable Development”, *etc.*

Due to the importance and role they pay, the representatives of the SEEA have worked many times with media, national and local, electronic and print, very popular and specialized, in order to inform and raise awareness of the public.

Cooperation at different levels of the society

Some of instruments available to the state in order to create favorable environment for the enhancement of energy efficiency are subsidies and new forms of financing, *e. g.*, partnership projects between public and private sector or the introduction of financing models based on energy savings (ESCO) model. In our opinion, experts in the field should provide legal framework in the area of energy efficiency, clear division of responsibilities of legal authorities at different levels, targets in the field of energy efficiency, as well as action plans with concrete steps for their implementation. All of this has to be supported by appropriate instruments (resources, effective and unambiguous responsibilities, political support, *etc.*).

Serbian Energy Efficiency Agency has cooperated with many different structures of the Serbian society:

- In co-operation with the Ministry of Energy and Mining, SEEA has provided assistance to regional centers for energy efficiency through the project “Norwegian Help for Serbia” and realized part of the project for the foundation and organization of the Serbian Industry Energy Efficiency Network.
- SEEA took part in the project “Planning of Sustainable Municipal Investments in the Field of Rational Use of Energy” in co-operation with the Ministry of Energy and Mining, the Standing Conference of Towns and Municipalities and the German Agency for International Cooperation (GTZ).
- SEEA is partner to the Standing Conference of Towns and Municipalities (STCM) in the activities in the field of energy efficiency and renewable energy sources followed by the Memorandum of Understanding signed in 2008 ever since SEEA has chaired working groups within the Energy Efficiency Board.
- SEEA signed memorandums on co-operation with the cities of Kragujevac, Niš and Novi Sad, the Municipalities of Varvarin and Vršac, the *People’s Office of the President of the Republic*, the *Faculty of Mechanical Engineering*, the *GTZ Project “Strengthening of Local Government”*, the State University in Novi Pazar, and Electric Power Company “Elektrovojvodina”. SEEA is, also, partner with the Serbian Chamber of Commerce in the activities in the field of energy efficiency and renewable energy sources.
- SEEA supported publishing of the manual for energy efficiency in industry, which was the result of our project, *i. e.*, the cooperation between the Agency and Serbian Industry Energy Efficiency Network.
- SEEA participated in the work of the National Convention on the European Union in Serbia within the Working Group on Environmental Protection.
- SEEA is conducting activities within the Action Plan to implement the National Strategy for Sustainable Development. Within this initiative, SEEA suggested projects (which were accepted) for financing, as one of two State Agencies, besides other ministries and state institutions. SEEA took part in the first four conventions of the Partners’ Forum.
- SEEA took part in writing Local Environmental Action Plan Proposals (Working Group for Energy Efficiency) for the Belgrade’s Municipality of Palilula.

- SEEA participated in the Working Group for Energy Efficiency of the National Competitiveness Council. Government adopted the conclusions of the Working Group.
- With the People's Office of the President of the Republic, SEEA organized appropriate program and the donation of energy saving bulbs to a kindergarten in one poor municipality.
- SEEA participated in the seminar "Improvement of Energy Efficiency in Countries Aspiring to Become EU Member", within the European project BeEAMS, organized by the *Consumer Association of Serbia*.
- SEEA participated in "Career Day" organized by the Students' Union of Serbia.
- SEEA supported and participated at the founding meeting of the Serbian Energy Managers Network, etc.

International co-operation

Today, international and especially regional cooperation represents not only a need but also a necessity. The countries in our region have similar problems and in the systematic sense will be solving them in a similar way – with the assistance and coordination of the Energy Community Secretariat of South East Europe. By signing and ratifying the Agreement on the Energy Community of South East European Countries, Serbia has confirmed its commitment to implementing reforms in South East Europe in the energy sector. Also, Serbia has signed the Energy Charter, whereby it has fulfilled all conditions necessary for becoming a full-fledged member of the Conference of the Energy Charter. This Charter represents a multilateral agreement offering guidelines for creating a broader European energy market and strengthening its efficiency which, besides trade and protecting investments, includes energy efficiency.

International co-operation is important also because of the possibility of participating in joint projects, which, among other things, are an opportunity to exchange experiences and further connect similar institutions in different countries. We should also stress that Serbia can use the EU pre-accession funds.

Out of SEEA activities from the international cooperation, we have selected the following:

- SEEA participated in the activities of the improvement of energy efficiency entitled "Energy Efficiency Task Force" within the Energy Community Treaty for South-East Europe and within these activities prepared the Report on the State of Energy Efficiency in Serbia for 2008 (Stocktaking Report 2008).
- SEEA participated in the project BIOM-ADRIA in the field of biomass utilization, together with Vinča Institute of Nuclear Sciences, the Central European Initiative and the Emilia Romagna region in Italy.
- SEEA took part in the project of the European Program TEMPUS in the field of environmental protection and energy efficiency together with Kragujevac City Assembly, the Faculty of Mechanical Engineering Kragujevac, Polish town of Bydgoszcz and the University of Bydgoszcz, as well as the Agency for Environmental Protection.
- SEEA took part in the project "RES Boat" (use of renewable energy sources), financed from EU funds and in the project "Alterenergy", financed from EU funds.
- SEEA supported the project of energy efficient construction of the City Public Library in the City of Tulumagum in Indonesia, realized by the team of young architects.
- SEEA participated in the project for the introduction of energy management in Serbia in co-operation with the Japan International Cooperation Agency (JICA), coordinated by the former Ministry of Energy and Mining and current Ministry of Infrastructure and Energy.

- Together with the ministries in charge of environmental protection and energy, SEEA participated in the project on strengthening capacities for the execution of national campaigns of mitigation regarding climate changes, financed by the Government of Japan through the Japan International Cooperation Agency (JICA).

Also, until now SEEA has participated actively at important international public meetings such as:

- “European Sustainable Energy Week” in Brussels, Energy Forum “Invest in the Production of Electric Energy and Renewable Energy Sources”, Regional Conference “Energy Week 2009”, International Congress for South East Europe in the field of energy efficiency and renewable energy sources in Sofia, Conference “Invest in Energy Efficiency and Renewable Energy Sources within the Energy Community” in Vienna, organized by the Energy Community Secretariat for Southeast Europe, International Conference “Promotion of Joint Actions and Co-operation within OSCE in the Area of Sustainable Energy and Transport” in Vienna, *etc.*

SEEA has established the co-operation and has become recognizable outside Europe, too (Japan, India, Brazil, United States of America, Canada, China, Russia, Israel, *etc.*) in the field of energy efficiency and renewable energy sources.

Co-operation with NGO

Energy efficiency on the demand side, we can define as the level of rational use of energy. If that level is higher, we are more energy efficient, accordingly: at the micro (company, municipality) or macro levels (state). Energy efficiency improvement is a continuous process that requires organized and systematic approach of relevant state authorities and social organizations, local government, companies and all individuals. Figure 2 shows the perception of people and legal entities in Serbia regarding who should mainly work on energy efficiency. We can observe that each social segment has a certain role and responsibilities.

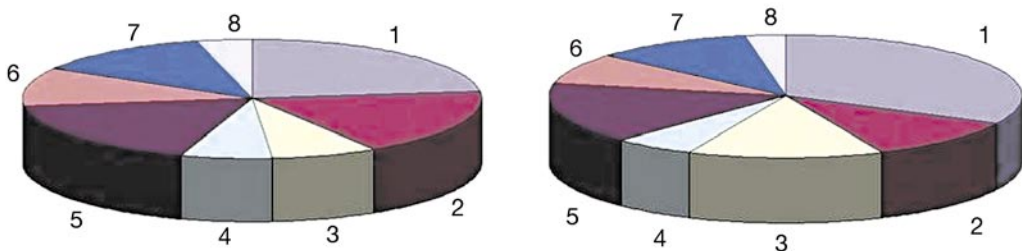


Figure 2. Survey results: who should mainly work on energy efficiency: left – individuals, right – legal entities [6]

1 – all people, individually; 2 – every household, family; 3 – every company, organization, school; 4 – local community, government; 5 – state, ministries, Serbian government; 6 – producers and distributors of energy; 7 – manufacturers of devices and machines; 8 – specialised agencies and experts

This survey SEEA has been conducted in cooperation with NGO. This co-operation is, generally, very important in order to promote the significance of energy efficiency and renewable resources through direct contact with people. SEEA is strengthening non-governmental sector in the field of energy efficiency and renewable energy (in the period between 2007 and 2009, SEEA financed twenty NGO projects).

Important aspects for promoting energy efficiency

One of the most important preconditions for improving energy efficiency in Serbia is introducing energy management in all consumption sectors (buildings, industry, transportation, local government). Regarding local government, an additional reason why they should be among the first to implement energy efficiency measures is that with their success they shall motivate households, commercial companies and industrial companies to also improve energy efficiency. All this should lead to improving the quality of municipal services.

An important element in developing the market of energy efficiency services are stimulus packages. They can differ: subsidies, tax and customs allowances, voluntary agreements, favorable loans, *etc.* On the other hand, non-fulfillment of obligations regarding energy efficiency should be provided for along with appropriate sanctions. Support should also be given through the national Foundation for Energy Efficiency, whose founding has been determined by the Program for Implementing the Energy Development Strategy of Serbia by 2015 in the period from 2007 to 2012.

In order to understand the current situation and monitor policy efficiency, above all at the macro level, it is of great importance to have a reliable statistical system. Energy efficiency should be included in criteria for public purchases and technologies, where it is feasible. Speaking long term, it is very important to introduce the topic of energy efficiency into programs of different social structures, ministries, schools, universities, military and police, *etc.*

Conclusions

Promoting energy efficiency is a continuous process that requires systematic and co-ordinated actions of different segments of the state and society as a whole. The crucial role in this process should belong to executive agencies at the national, regional and local levels. Their role is to influence other factors in the society and the state to rationally use energy *i. e.*, implement activities in their relevant fields in order to achieve this. take place. The range of activities of the energy efficiency agencies is broad and diverse, starting from demonstration projects and making different studies, to international cooperation, and informing and raising awareness in the society.

Political, economic and environmental reasons, as well as increasing need for intensified use of existing energy resources accompanied by an intensified industrial development, require Serbia to develop new energy sources and energy efficiency. The improvement of energy efficiency is one of the priorities of the National Sustainable Development Strategy [7], as well as one of the preconditions that need to be fulfilled in order for Serbia to become a competitive member state of the EU. The economic effects of energy efficiency are reflected also in strengthening the domestic industry, above all in the sector of electrical engineering, as well as more jobs, which is important during the current economic crisis. The governmental support in that sense has to be committed over a longer period of time, accompanied with tax and financial incentives, regulatory demands, investments in education and research and the strengthening of relevant public institutions. The Energy Efficiency Agency of the Republic of Serbia (SEEA) is strongly committed to having Serbia systematically begin to use energy in responsible, rational and sustainable way.

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