

# LEGISLATIVE AND POLICY IN ENERGY EFFICIENT DESIGNING AND RENEWABLE ENERGY SOURCES – APPLICATION IN SERBIA

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*This paper analyses political and legislative frames in the field of energy efficient building and renewable energy sources in planning and implementation in Serbia. „Development strategy until 2015.“ is reviewed in concise portrait. This strategy maps a way for the application of energy services of much higher quality than ones offered at a present day. It reviews relevant laws concerning the subject, as well as institutions, programs and their implementation. Basic principles of energy policy in Serbia and their achievement are also given by that strategy. Serbia's energy policies are designed to allow new legislative, structural, organizational, institutional, and economic frames and visions of unification of Serbian energetics into regional and Pan-European integrations.*

*One of the key factors is the inclusion of sustainable development and energy efficient design concerned policies. Application of these, almost completely neglected, energy sources, for which there is high potential in Serbia, would allow preservation of primary energy sources and local environment. This potential hasn't seen significant research, and therefore, neither the technical improvement. Apart from that, one of the goals of wider application of renewable energy sources is lowering the poverty level. This helps avoiding the already used “dirty development” method.*

**Keywords:** *energy policy, legislative, renewable energy sources, energy efficient planning, Serbia.*

## INTRODUCTION

Energy crisis that was prominent during the 1970's was an after-effect of disturbances on the oil market. Fossil fuel reserves (the one that are in current and presumed future, usage) are limited, and according to different predictions, most of them will be depleted by the middle of this century, when the next energy crisis might occur.

Energy crisis, followed by an ecological crisis, both on local and global levels, were primary factors in the formation of the general attitude that the current methods and levels of both energy exploitation and means of its consumption are unsustainable. This attitude clearly comes from the range of data considering the water and air pollution, chemical changes in the atmosphere, ozone holes, soil degradation, extinction of many

plant and animal species, declination of the forest regions, etc. (Kaya, 2006.).

Energy, ecologic and economical crises led to the definition and wider acceptance of the unsustainability of traditional resources and the environment's limited capacity on local and global scale. Sustainable development concept could be transposed into all human activities (Baumgartner, Zielowski, 2006.).

Out of the overall energy produced, around 50% is used on communal buildings, which makes measures that could potentially lead to the reduction of these figures very important in the process (Walker, Devine-Wright, 2007). The reduction of energy consumption in communal buildings (in heating, cooling, illumination, etc.) is possible through the utilization of the energy efficient urban planning and building design methods and

with the application of the bio-climatic planning and design principles with an emphasis on renewable energy sources (further R.E.S.).

There is a need for strategic, politically-legislative frames, institutions, programs and instruments for the realization and implementation of the sustainable development concepts.

## ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES (R.E.S.)

### Energy efficient buildings

The European directive (Directive 2002/91/ 1 from 4.1.2003) on energy consumption in communal buildings, which is an obligation for the member countries to implement in their

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national legislatures since January 2006. ensured that building standards for the whole European Union are unified. This, while not demanding additional financial burden, allowed a more efficient usage of energy in European communal buildings. At the same time, this directive ensured an increase in the quality of life for the population. This, and similar measures, which are targeted at a broader public of energy consumers, represent basic component of the European Union's strategy towards the facilitation of responsibilities undertaken by the ratification of the Kyoto protocol (Jager-Waldau, 2007).

But, it is not always applied in European Union, mainly because all the countries still are in a kind of unsustainable condition, using traditional energy resources, instead of renewable one.

Entire European Union will implement the common methodology for calculation of the communal energy consumption, which will consider climate differences as variables. Member countries will define minimum in standards for consumption which will be applied both, in the design of new buildings, and in the significant reconstructions of old ones. For the most part, these standards will be based on contemporary or planned European norms. Energy certification system will allow owners, tenants and users to be better informed on the consumption of the energy in the building they buy or rent.

Establishing the energy efficiency will encompass several different elements, like thermal isolation, heating system, cooling, natural ventilation as well as passive lighting and heating using solar energy. Positive factors could include heating using solar energy, electric energy production, distant heating and co-generation of electric energy and heat. Local climate limitations, because of its high diversification on the territory of Europe, play an important role in the facilitation of the energy efficiency in communal buildings.

On the other hand, communal energy consumption in buildings in Serbia is near 40% of the overall consumption. Lighting, heating, cooling and hot water in Serbian homes, offices and recreational buildings consume more energy than it is used in

transport or industry. This trend is growing with the amount of consumed energy, because the growth in life standard leads to a broader application of the air conditioning and heating systems. It means that present conditions in Serbia are not so promising, especially because of the fact that Serbia has a large potential in renewable energy sources, and not using almost any of it for her basic needs in energy.

Thinking about the future energy consumption, we must not forget the fact that renewable energy sources such as geothermal energy, solar energy, and energy of hydro power plants could substitute a large amount of traditional energy sources (oil, coal, wood, etc.) which are causing an green house effect. Domestic strategies should not base themselves exclusively on the European directives, but they should seek instead a model appropriate to the local environment, political and financial conditions and also local legislative. Serbia must adjust European traditional values to our local contextual conditions.

### **Renewable energy sources (RES)**

Renewable energy sources (RES), apart from other energy sources like fossil fuels or nuclear fuel, are being naturally renewed. Renewable energy sources are apparently inexhaustible, but only if the current natural conditions are not disrupted. However, RES are limited in intensity (Hein, 2005).

All of the aforementioned renewable energy sources are of interest for Serbia, except the ones related to the energy from the sea.

Renewable energy sources are clean energy sources, and they remarkably contribute to the decrease of air, water and soil pollution. In the last decade, great importance has been given to the problem of global warming and the greenhouse effect, which is the consequence of an increased content of carbon-dioxide in the upper layers of atmosphere, preventing reflection of solar radiation from the surface of the Earth through the atmosphere.

The increased use of RES will contribute to increasing reliability of energy supply, will help in sustainable development of the energy sector and will increase the standard of living,

particularly in rural areas. The reduction of harmful gases emission will improve quality of the environment.

Serbia is relatively poor in fossil fuels. It is expected that in the near future the share of RES will be significantly increased in the energy balance of Serbia.

Serbia with its territory of 88.361 km<sup>2</sup> has a natural suitability for use of renewable energy sources. It is estimated that the biomass has the greatest energy potential in Serbia. Biomass energy sources are distributed at an area of 24 000 km<sup>2</sup> covered with forests and at an area of 48.000 km<sup>2</sup> used for agriculture. Some 900 locations are identified as appropriate for small hydro power plants. At more than hundred locations there are geothermal wells with water temperature ranging between 20 and 100°C.

It is a large amount of renewable energy sources which could be used instead of traditional once, not only in their original locations, but also they could be installed on a long distance through appropriate infrastructural equipment. So the large number of cities and villages could be heated from geothermal resources, or bio gas (originally received from bio mass or bio waste).

It is possible to expect that in next several years private investors and stake holders will invest in hydro power plants, investigative works for geothermal resources etc. which could provide more clean energy to the whole country.

## **STRATEGY, LAWS, IMPLEMENTATION**

### **Serbian energetics development strategy till 2015**

On May 25th 2005. the National assembly of the Republic of Serbia ratified the „Energetics development strategy until 2015“, developed by the Ministry of mining and energy. By appointing the council members of the Serbian energy efficiency agency, the regulatory agency has been established. „Energetics development strategy until 2015“ represents a vision of local energetics development. It predicts that in the next ten or more years the

aspect of energetics activities will have improved quality, with simultaneous development of subjects included in energetics industry.

It proposes new legislative, institutional, structural, organizational and economical frames and visions on integration of local energetics into regional and pan European integrations.

The elementary premises of mentioned Strategy are based on the assumed trend of socio-economic growth of Serbia until year 2015 with respect to its current economic abilities.

A new category, Renewable energy sources, which includes biomass energy, hydropotential of small flows (with objects up to 10MW), geothermal energy and wind and solar energy, is planned for development and application because of Serbia's natural capabilities for their exploitation in the processes of decentralized production of heat and electric energy. Through these means it is believed that local users needs could be facilitated in a more qualitative and cost-efficient manner.

Energy potential of mentioned energy sources is considerable in Serbia and is over 3 M t.en per year. Around 80% of the potential comes from the biomass exploitation.

Although for the most part of Serbia's territory, there is a considerably higher number of sunny days (over 2000 hours), because of the high costs of solar receivers and auxiliary equipment, intensive usage of these technologies depends mostly on social and economic incentives for facilitation, implementation and exploitation of the National program for the renewable energy sources.

### **Serbian energy policy**

Energy Law ("Official gazette of the RS", NO. 84/2004) in Energy policy section includes measures and activities taken for achieving long-term objectives in the energy sector, and particularly: creating conditions for stimulating the use of renewable energy sources and combined heat and electrical power generation, and providing conditions for

promoting energy efficiency in carrying out energy activities and energy consumption

Energy sector Development strategy in Energy law is defining long term development objectives of specific energy activities, development priorities, sources and methods of providing the required energy quantities and incentives for increasing energy efficiency

### **Instruments for implementation of energy policy goals in Serbia**

Energy policy realization tools are:

- Legislative instruments – are concerned with the Energetics law, and other, following packages of law instruments concerning the regulations of new functioning methodologies.
- Institutional instruments - which define the role and mission of the Energetics agency, which includes innovations into technical work practices, business of energetics subjects and development of the energy sector, and defines a methodology for definition of the justified costs of production, transport and distribution of the electrical and heat energy and natural gas.
- Structural and organizational instruments - are concerned with methods of reorganization of current vertically integrated EPS and NIS, into divided, productive and profit units, economically motivated for rational functioning and financially capable to invest into their own development.
- Economic and financial instruments - are concerned with the rates and price policies of the energy sector.
- System instruments - are concerned with facilitation of the Energetics statistics system and founding of the National fund for energy efficiency.

It is important to know that all of these instruments must be included in global strategy of the RES and energy efficiency implementation in Serbia. Without any of these instruments, the whole strategy could not be implemented in Serbian laws and instructions for usage.

Expected results of these instruments are overall usage of renewable energy sources in Serbia and mutual cooperation of all interest

group in process (investors, stake holders, population, politicians, local government etc.)

### **Laws**

Promotion of energy efficiency and usage of renewable energy sources can be exhilarate through enactment of new laws in the field of energy, environmental protection etc. In Serbia, these are:

- Energy Law ("Official gazette of the RS ", NO. 84/2004) determines long term goals for development and stimulating measures for increasing energy efficiency
- Law on Planning and Construction ("Official gazette of the RS ", NO. 47/2003): this law is not mentioning energy efficient buildings
- Law on environmental protection ("Official gazette of the RS ", NO. 135/2004)
- Law on integrated environmental pollution prevention and control ("Official gazette of the RS ", NO. 135/2004)
- Law on environmental impact assessment ("Official gazette of the RS ", NO. 135/2004)
- Law on strategic environmental impact assessment ("Official gazette of the RS ", NO. 135/2004).
- Laws on international investments, concessions etc.

All of these legislative documents are functioning on internal level, without corresponding to each other. One of the main objectives in Serbian legislative is the harmonization of laws and politics in order to make an implementation of RES and energy efficiency in Serbia easier and more operative.

### **Institutions**

There are several competent institutions in Serbia in the area of energy efficiency and renewable energy sources: Ministry of Mining and Energy of the Republic of Serbia; Energy Efficiency Agency of the Republic of Serbia (SEEA); Ministry of science, Ministry of environmental protection – Directorate for the environmental protection; Ministry of Energy and Mining, Ministry of Finance; Ministry of Infrastructures; Ministry of Economy and Regional development; Republic Development Bureau; Republic Statistical Office; National Information Technology and Internet Agency; Recycling agency; Energetics agency; Republic agency for spatial planning; Serbian land

development agency; Belgrade land development public agency; The European Agency for Reconstruction, EPS, NIS etc, innovation centers, technological parks, etc, research institutions qualified for development of energy efficient buildings and settlements, public agencies, public utility companies; local governments and communities, city managers and city architects.

Main goal is to harmonize working, objectives and strategies of these institutions, because it is the only way to implement „Energetics development strategy until 2015“. These are the basic interest groups in process of implementation of renewable energy sources in Serbia.

#### **Energy Efficiency Agency of the Republic of Serbia (SEEA)**

Taking into consideration the current state within energy efficiency issue and renewable energy sources, energy policy objectives, as well as the contemporary practice in European countries, Ministry of Energy and Mining of the Republic of Serbia recognized the need for national agency. Therefore, according to Energy Law, adopted on August 1, 2004 and with the financial support of the European Agency for Reconstruction, it has been re-established and thus operating for the period of two years as a separate republic organization.

Energy Efficiency Agency of the Republic of Serbia (SEEA) was formed by new Energy Law. Energy Efficiency Agency is formed as a special republic organization meaning separate legal entity. Serbian Energy Efficiency Agency executes the tasks envisaged by the Energy Law, as an integral part of the overall energy policy, led by the Ministry of Energy and Mining of the Republic of Serbia.

The managing of the agency is carried out by director who is appointed by the Government of the Republic of Serbia. Internal organization and job description in the Agency is approved by the Government.

Agency's mission is to improve the usage of renewable energy sources. Agency implements its mission through sector, multi year programs for energy efficiency improvements and promotion of renewable energy sources. All programs are funded by European Union's

donation, through European Agency for Reconstruction.

Agency also organized a number of educational programs for local self governments, professional experts from industry, then energy engineers, energy management and business plans, thus aiding institutional capacity building in Serbia.

#### **Agency for energetics**

Energetics agency is the most important newly formed institution in the field of energetics. It is planned to maintain licenses issuing for the facilitation of energy subjects, define the methodology for the calculation of cost justification, define rate systems for the regulation of energy systems, and approve price policies of energy subjects whose functioning it regulates.

By ratifying the „Energetics development strategy until 2015“ and foundation of the Energetics agency, the Ministry of Energy and mining rounded the legislative activities in the application of energy sector reforms.

#### **Energy communities of South-East Europe, Athens**

Signing the Athens memo in 2002. and 2003., Serbia integrated into the regional energy market of the South East Europe. The meeting of the European Union ministers was held on the December 2004. and the basic principles of the Energy community contract were established on that occasion.

## **PROGRAMS AND IMPLEMENTATION IN SERBIA**

### **Programs**

„Energetics development strategy until 2015.“ proposes several specific programs: energy efficiency, new and renewable energy sources, environment protection, scientific, research and technological progress, aimed education and expert education in new and existing activities in the sector, including the implementation of contemporary statistics system, and additional energy regulations for the energy activities in new conditions, both locally and in the region.

If this Strategy would be properly carried into effect, the results in Serbia will be notable in every household, residential and business building.

### **Strategic programs of the Agency for energy efficiency**

- Coordination of national policies with trends of energy efficiency
- Energy efficiency in building design
- Energy efficiency in communal energy
- Energy efficiency in industrial environments
- Energy efficiency in transport
- Renewable energy sources (R.E.S.)

Co-generation of heat and electricity Program realization of program (A) is, through “Energy efficiency in Serbia” project, helped by the “World bank”, with \$21 million. This project consists of three components:

- (a) Clinical center of Serbia - reconstruction,
- (b) School, hospital and other buildings of public interest - reconstruction for the improvement of the energy efficiency, and
- (c) Technical help offered to the Agency concerning the realization of this project.

### **National energy efficiency program (NEEP)**

Ministry of environmental protection – Directorate for the environmental protection of the Republic of Serbia unified the research, development and engineering activities and potentials of Serbia under the “National energy efficiency program” (NEEP). The goal of this action was to raise the efficiency of the production, distribution and usage of all means of energy and energy sources.

### **Some building energy efficiency projects and programs**

It is important to mention when the development of energy efficiency is concerned the “Energy revitalization and comfort optimization” for 22 schools and kindergartens in Belgrade, the project invested by the Education secretary of the Belgrade city Assembly.

For a number of years, Serbia's standard U.J5.600 had been neglected. Higher project

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temperatures are recommended, which would lead to significant increase in efficiency with long distance heating. Summer temperatures and humidity are established as parameters relevant to summer climate. Data, acquired by the Republic hydro-meteorological institution, are based on daily averages. Research should be continued, based on the hourly values.

## **CONCLUSION**

With the application of principles of energy efficiency in planning and design, need for conventional energy sources, which are not renewable, and represent high pollution potential, is lowered. Sustainable urban planning, from the aspect of rational energy consumption, is an important task of planners, engineers in energetics and architects. This is why the concept of energy distribution should be based on the integration of urban planning and energy consumption planning.

One of the key points is the connection between policies concerning sustainable development and the ones concerning the exploitation of renewable energy sources. Application of mainly neglected, renewable energy sources, for which there is a high potential in Serbia, but are not researched and technologically improved, is one of the solutions which strives towards the preservation of remaining resources and the environment. Apart from that, one of the broader goals of the renewable energy sources is the poverty minimization. The value of R.E.S. lies in its ability to adequately respond to all challenges of the energy sector: energy distribution safety, economic growth, sustainable development and ecological plausibility.

Insistence on energy as public good with long term effects on the environment must have an appropriate legislative base, as well as actualization instruments, with adequate stimulations through tax and other incentives. All this is to build awareness for the need for rationalization and usage of the renewable energy sources. This is why an additional attention should be paid to education, legislative and regulation systems.

These systems should constantly adapt to the technological progress of the public. In order

to meet these goals, a joint action of energy suppliers, republic and local government and end users should be developed and maintained.

Republic of Serbia has not yet taken any serious actions in the path of preserving its resources. This is the reason for the Assembly through its ministries to research the options and set the policies concerning the subject in that direction.

Knowledge on possible effects of climate changes on the application of long term development goals and poverty limitation, as well as the strategic goal of Serbia to participate in European integration processes as an active member in solving the problems of mentioned climate changes, were reasons for the creation of the adequate strategy with its measures action plan. This facilitates the support on the creation and realization of the national policy and measures concerning climate changes, and compliance to obligations from the UN convention on the climate changes and Kyoto protocol.

Based on all that is said, it is safe to assume that cities of Serbia are ready for the application of program and implementation of principles of sustainable planning and rational energy consumption. With this, it is possible to significantly lower the amount of traditional energy sources, and their impact on the environment. Concerning the fact that the large part of energy and ecology problems represents an issue with global character, overcoming this problem is of great importance for the further integration of Serbia into international community.

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