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SERVICES IN ENERGY EFFICIENCY

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Rezumat. *Lucrarea prezintă conceptul de servicii în domeniul eficienţei energetice. Autorii au prezentat şi argumentat necesitatea serviciilor de manager şi auditor energetic şi importanţa lor pentru promovarea şi susţinerea eficienţei energetice. A fost prezentat şi cadrul legislativ care stă la baza formării acestor specialişti. În lucrare s-au definit termenii pentru domeniul serviciilor în eficienţă energetică. Autorii au prezentat serviciile care pot fi prestate de către managerul energetic şi auditorul energetic. Au fost prezentate obiectivele generale şi specific pentru pregătirea managerilor şi auditorilor energetici În concluzii au fost evidenţiate rezultatele care pot fi obţinute în urma pregătirii managerilor şi auditorilor energetici atât pe plan profesional cât şi pe plan etic şi psihologic .*

Abstract. *The paper presents the concept of services in energy efficiency field. The authors have presented and motivated the necessity of services of energy manager and auditor and their importance for promotion and support of energy efficiency. There has also been presented the legal framework for professional training of these experts. There have been defined in the paper different terms for energy efficiency services sector. The authors have presented different services that can be provided by energy manager and auditor. There have been presented general and specific objectives for training and formation of energy managers and auditors. In conclusions there have been highlighted results that can be achieved after formation of energy managers and auditors from the professional ethic and psychological points of view.*

Keywords: Energy efficiency, energy manager, energy audit, energy management, energy auditor

1. The role of service science in science innovation

Increasing the weight of services in industry represents a reality of today's world. The scale and complexity of service systems dispersed all over the world are increasing rapidly, as well as the importance of efficient, effective and sustainable use of resources, since the services become more and more important in world economy for creating adding value.

The actual tendency is to pay more for experience, consultancy, information, guarantees, using different infrastructure than for having goods, producing or manufacturing them. Searching, obtaining, installing, maintaining, re-actualization and disposal of different products consumes often more time and

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resources than their production and purchase – offering, thus, great opportunities for efficient and sustainable innovation of services.

Governmental programmes (having different components: economic, energy, administration, commerce and supply, health, financial and insurance) and those of private companies are more and more complex in order to meet the needs of services, which are increasing constantly.

The service science (SS) is a new subject for innovation of services and service systems having a science component; according to SS clients contributions are playing a major role in the service processes for generating service results.

This makes clients a major component of a service system.

A service system, according to SS, is a number of configurations of people, technologies and valuable proposals connecting internal and external systems and shared information (language, processes, prices, action principles, strategies and laws).

2. Necessity and importance of energy services – energy manager and energy auditor on the labour market. Legal framework.

Valorization with maximum efficiency of all categories of resources (material, human, financial, etc.) represents a requirement of a very high importance for productive as well as for non-productive activities.

From all the resources enumerated above, material resources (energy resources are among major material resources) are not only the most expensive but are also depleting, which is an additional argument for utilization of material/energy resources with highest efficiency.

Energy management and its final aim maximization of energy efficiency assume systematic implementation of different techniques and procedures developed and constantly improved.

Increasing energy efficiency within a given contour with a profitable organized activity is a requirement that comes from the general necessity that this activity should provide a maximum profit to investors.

National policy for energy efficiency is an integrated part of national energy policy, and aims the following targets:

a) Elimination of barriers for promoting energy efficiency of renewable energy sources utilization at the final energy consumers.

b) Promotion of mechanisms for energy efficiency and financial instruments for energy savings.

c) Education and awareness increase of final energy consumers regarding the importance of implementation of measures for increasing energy efficiency.

d) Cooperation between final energy consumers, energy producers and distributors and public authorities for achieving the objectives set by national policy for energy efficiency.

e) Promotion of fundamental and applicative research in the field of efficient use of energy and renewable energy sources.

Among the main leverages that are used for increasing energy efficiency there are scientific and technical:

- Development of energy efficient technologies.
- Promotion of new and renewable energy sources.
- There are also leverages that aim at human resources:
- Demand side energy management.
- Development and diversification of services in the field of energy efficiency.
- Professional training and education in the field of energy conservation.
- Creation of proper conditions for implementation and promotion of energy services market.
- Promotion of international cooperation programmes in the field of energy efficiency.

The existent legislative framework supports the necessity and importance of services for energy manager and energy auditor on the labor market, and includes the following legislative documents:

- Law 199/2000 – efficient utilization of energy, complemented and modified by Law 56/2006.
- Law 3/2001 regarding ratification of Kyoto Protocol.
- OUG 174/2002 regarding specific measures for rehabilitation of multi-level blocks of flats, approved by Law 211/2003.
- HG 1535/2003 – "Strategies for valorization of renewable energy sources".
- HG 443/10.04.2003 regarding promotion of power generation from renewable energy sources.

- HG 163/2004 – "National strategy for energy efficiency".
- Directive 2006/32/CE (ESD).
- HG 219/2007 regarding high efficiency cogeneration.
- Law 13/2007 – Electricity Law.
- OG 22/2008 regarding energy efficiency and promotion of utilisation of renewable energy sources.
- Ord. 34/2011 regarding modification and complementation of Regulation for attesting energy managers, approved by Ord. 42/2010.
- Ord. 42/2010 Regulation for attesting energy managers; Regulation for attesting energy auditors.
- HG 835/2010 regarding modification of National Programme for increasing energy efficiency and utilization of renewable energy sources in public sector for 2009-2010.

3. Service definition – energy manager and energy auditor

For supporting abilities and competences that should be achieved through professional training of energy managers and auditors there should be defined different terms in the field of energy efficiency service (according with OG 22/2008 regarding energy efficiency and promotion of utilization of renewable energy sources at final consumers).

Energy manager – individual or legal person who provides services in energy field, having as activity domain organization, administration and management of energy processes of a consumer.

Energy management – all activities of organization, administration and management of energy processes of a consumer.

Energy auditor – individual or legal person attested/authorized, according with national legislation that has the right to elaborate energy audit as shown at item a). Energy auditors have their activity as individual persons authorized or employed of a legal person, according with legislation.

Energy audit – systemic procedure to obtaining different data regarding existing energy consumptions of a building or a group of buildings, an activity and/or industrial equipment or private or public services, to identify and quantify feasible opportunities for achieving energy savings and results reporting.

Those two actors, energy manager and energy auditor, should elaborate and implement programmes for increasing energy efficiency, including activities

aiming final energy consumers, activities that lead to increasing energy efficiency with a value that can be verified, measured or estimated.

Thus, through the service science point of view, an energy service is defined as an activity that leads to a material benefit, a utility or a good obtained through a combination of energy use and a technology and/or efficient action from the energy point of view, which can include activities for exploiting, maintenance and control that are necessary for providing the service on a contractual basis, and that in normal conditions, leads to increasing energy efficiency and/or primary energy savings that can verified and can measured or estimated.

4. Services provided by energy managers and auditor

4.1. Energy manager – Energy management

The aim of energy management is to valorize with maximum efficiency all energy flows entered into an analyzed contour.

The energy manager is the individual or legal person providing attested energy services having as activity domain organization, administration and management of energy processes of a consumer.

Energy management procedures at final consumer include:

- Knowing in depth the specificity of activity within analyzed contour.
- Monitoring each energy flows that enter and respectively exit the analyzed contour and establishment of links between them.
- Elaboration of different measures and actions aiming at increasing efficiency of energy use within the analyzed contour.

Energy manager activity includes the following:

- Gathering information and data that can be useful in the field of energy efficiency.
- Obtaining support from the employees and company's management for different energy efficiency actions.
- Providing different advices, solutions and technical information to all company's departments aiming at increasing energy efficiency on the entire energy chain.
- Implementation of energy efficiency programmes that have resulted from performing energy audit.
- Estimation of effects of implemented energy efficiency measures.

The main role of the energy manager is not to save energy by him/herself, but to know and encourage, stimulate and convince others to do so.

Training and professional education of energy managers for operating on the labor market is the responsibility of technical universities that have been accredited in accordance with legislation to organize short courses. The programme content for training of energy managers is set in the Training and Examination Guide in the field of energy management, approved through ARCE Decision 58/2003.

Today's legal framework for energy manager's attesting is Regulation 42/2010, published in Official Gazette 67/2011, elaborated by ANRE.

4.2. Energy auditor – Energy audit

Energy audit is a fundamental component and working instrument of an action programme having as objectives energy savings and increasing energy efficiency.

Elaboration of an energy audit allows obtaining of a clear picture of how all energy flows enter, are distributed, transformed and consumed within the energy balance contour.

The energy audit highlights:

- Energy exchanges with exterior.
- Energy exchangers with different parts with the analyzed contour and how all energy flows entered from exterior is used.
- Energy consumption centers highly energetic inefficient and values of energy losses.
- Premises for future decisions having as aim increasing energy efficiency of the entire analyzed contour: reorganization, rationalization, improvements, changing technology, etc.

The aims of elaborating energy audit are:

- Evaluation of energy efficiency within an analyzed contour at a given moment in time and elaboration of an action plan including energy efficiency measures for the medium-term period.
- Continuous monitoring of energy consumptions for evaluating and improving energy efficiency and minimizing specific expenses with energy flows.
- Evaluation of technical solution and conditions of energy supply (energy supply contracts, tariffs, etc.) for minimization of energy bill for long-term period (at least 10 years).

Energy auditor is the individual or legal person attested/authorized, within legal framework that has the right to elaborate energy audit in accordance with national legislation. Energy auditors, individual persons, can activate as individual authorized persons or as employees of legal person (company), in accordance with national legislation.

Training and professional education of energy auditors for operating on the labor market is the responsibility of technical universities that have been accredited in accordance with legislation to organize short courses.

Today's Regulation for authorizing individual or legal persons for elaborating energy audit is set through Ord. 42/2010 – Regulation for authorizing energy auditors and Regulation for attesting energy managers.

The energy auditor qualification is obtained through emission by ANRE of an authorization of energy auditor, paper that proves technical competence of experts that elaborate energy balances in Romania.

The energy auditor qualification (thermal or electric) is proved through energy auditor authorization, stamp and badge. Authorization, stamp and badge are all nominal and are transmissible.

5. General and specific objectives for training energy managers and auditors

Training energy managers and auditors aims at systematization of general and specific knowledge in technical, economic-financial, legal and business fields of energy sector of Romania. The programmes aim at achieving all competences necessary for an energy manager or auditor who are the main actors for increasing energy efficiency.

Among the aimed objectives there are:

- Training of a technical and economic thinking pattern in accordance specificity of activity.
- Teaching and familiarization of scholars with different types of equipment and devices for measurement and monitoring in the energy field; processing and interpretation of measurements' results, error determination.
- Validation of different principles, methodologies and analytical calculus methods using measurements in experimental equipment.
- Understanding the impact of energy systems over the environment and their quantification.

- Knowing methods and solutions for reduction of environmental impact of energy production, transportation, distribution and utilization.
- Supporting the processes of professional formation and training of human resources with competences in solving different specific problems regarding the quality of energy supply.
- Knowing the issues regarding administration and management of systems of water, fuel and compressed air supply.
- Knowing the issues regarding different high performance systems for power and heat supply.
- Energy administration and management.
- Legal issues in the field of energy and environment.
- Business issues.
- Economic analysis and energy projects' financing.
- Achieving and improving specific knowledge in the field of quality of energy supply.

Conclusions

For increasing energy efficiency it is absolutely necessary:

- Development and diversification of services in the field of energy efficiency.
- Professional training and education in the field of energy conservation.

The effects of implementation of solutions for increasing energy efficiency are seen, first of all, at the level of company implementing these measures, leading to increasing the profitability and competitiveness on the market and through reduction of the environmental impact. Secondly, these measures are seen within entire human society in the context of promotion of sustainable development and efficient use of all material resources.

Professional estimated results are:

- Ensuring energy management within a complex energy contour (system).
- Elaborating simple or complex energy audit for an analyzed contour.
- Elaboration and implementation of different programmes for increasing energy efficiency (adapted to analyzed systems).

- Systemic analysis, performance evaluation, applicative research (quantitative and quantitative) including compared research in accordance with standards in the field.
- Public support and promotion of different projects in the fields of energy efficiency.

There are also ethical and psychological results:

- Respecting deontological code for applicative research.
- Learning the principles for being equitable and neutral while designing and administrating research in energy field and overtaking different data for analysis and further use.
- Development of an un-discriminatory attitude towards research and others in the field of energy.
- Using critical arguments for discussions.
- Increasing the capacity for understanding, empathy and cooperation with other gender, ethnic and religion persons.
- Increasing self-respect and desire of auto-education.

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