

Tutorial on Energy Efficiency to Managers of the Bulgarian Industry

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Summary: Bulgaria is one of the important energy center not either on the Balkans but on the CEE in the last few years. Besides the sector development we can expect a shrinking of this energy influence in the next 5 – 10 years. The fast and adequate measures on the macro, mezzo and micro level are needed.

The existing Bulgarian Energy Strategy gives some important decisions of those problems at the macro and mezzo level. The energy decisions of each enterprise are very important for energy efficiency on the micro level

The following paper discussed some important energy problems on enterprise level for Bulgaria and EU. The main points are connected to development of energy efficiency education, respectively acquiring knowledge and skills about energy efficiency, in the Bulgarian enterprises of all economy sectors.

Key words: Bulgarian enterprise, energy efficiency, training, EU, CEE.

JEL: L94, M53, O13.

Treatment

The last necessities determine the must from optimizing a range of activities in the broadcast area of the organization and the operation that will be directed to confirming proof development not only to the occupation, but to the society as well as before the industrial companies.

Achieving fixture in the development, as well naturally its economic and social consequence, is one of the main reasons among the precessions to the European Union that such directions hit the deck as human's resources development, ecology, energy efficiency etc.

The priorities are played in using the energy resources for production of energy effective society in a range of European and national documents. Among the main European community documents the decision-the 1639/2006-the EU of the European parliament, the different commissions reports to EP (the European catfish (2007) in 1, the European catfish (2006) in 848, the *Silurus glanis* (2006) in 357, the *Silurus glanis* (2006) in 1173) etc. are got. They join in among the main national documents: the law for the energy efficiency, the energy scheme to Bulgaria, the report on the energy efficiency in the area etc. among the ground directions for an indemnity to energy efficiency crucial point fills boosting the investments with the new members in newer, more kind technologies in areas in the energy efficiency, renewable energy resources and energy diversification, by zooming

the barriers between the success displays to advanced technologies and their effective market presentation in meaning to investing implements to the public and private sector, the generation to the strategic technologies, reducing the spending, zooms to market-attempt The distribution At the fiscal risk and starting gates, the investing had reached the likes.

In the pointed direction achieving the energy efficiency can be achieved by diversification to the energy resources, used by the industry, as follows:

- Cutting using energy in industrial sector;
- Promoting traditional and renewable energy sources for electric power, heating and cooling in industrial sector off;
- Desegregating using things and renewable sources in local energy system at industrial yard.

With the presented paper their writers put the following main goals and tasks:

- **The goal:** The actual directions on originating the good competence of the Bulgarian administrators on efficaciously using the energy sources.
- **Tasks :**
 - a) The state of the Bulgarian energy sector is analyzed, as the cardinal fix domains, calling the more kind management of the energy resources, are limited as well;
 - b) The cardinal, needed knowledge and the skills that the decisions for the use of the energy resources need have got get are led;
 - c) Fuel gauges (standards and indicators) are outputted for consequence judgment from improved competence in the area in the energy efficiency;
 - d) The goal groups for which one similar education is needed as well admirably are identified;
 - e) Predict What The results can be achieved in a short - term and long - term period.

The object to investigation in the article is the learning in energy efficiency, as its particularities, the goal audiences and the results are declared.

1. The status of the power grid, the energy powers, the production and the consumption to the electricity in Bulgaria.

Bulgaria is a stiff pre-range of severe challenges in the energy sector, creative from objective reasons and circumstances, of result in the new courses in the world economy from delaying the reforms as well in the sector in the years of passage. The must from making the habits for efficaciously using the energy resources of the party determines on this, as from the individual users, largely from the industrial users as well, they use largest share up as entities so from the manufactured energy of country.

Bulgaria is very strong energy dependency, for it brings more from 70 of hundred of its primary energy resources.

The most important local energy resource is the lignite coals with high content to sulfur are a local energy resource. It is deciphered largely to import Russia fuel-petroleum, natural gas, qualitative coals and nuclear fuel. This framework of the energy balance wakes the alert from the viewpoint to the security of the power grid. The European union, whose addiction is less from a import, Around 40 in hundred but with tendency for waxing to 70 in hundred after 20 years it commits serious attempts in two main directions :

- Relative energy consumption decrease of unit-gross intrinsic merchandise (GDP) to economy and bettering energy efficiency.
- It uses on - scene energy sources in m. The number separates the greatest attention to the so called energy renewable sources.

Despite the short local energy potential, the Bulgarian economy excels in the other countries (as From Advanced, So from the countries in walk of central and eastern Europe as well) with the energy extravagance. Due to this the main strategic economy goal as well as of the industry is **to use of the energy resources of the produced energy as well must be rational**. The lack to the market mechanisms for the impact does not allow to this stage the sensible solutions to be not achieved despite her no - nonsense science technical potential, admitted in her performance.

1.1. Electricity consumption in Bulgaria

The electricity consumption in the side is in direct connection with the economic development. From 1990 to 2003 it declines reasonably by nearly 20-25 percent, as the function is shifting for the period and they are watched as the periods of the drop, caused by hyper-inflation, and the stagnation to the economy, the periods to the low elevation so as well.

The production sector, receives and processes industry in that number, is an underlying consumer of energy with relative share of 45 of up to 56 percent as well largely on the Restructuring owes whittling the consumption It is blue for the period – 1990-1997 that the sector clearing of industry reduces its relative partition in the industrial consumption of energy as well. This does not apply to/for the big establishments in this sector that are with traditions in the machines production, the metallic structures etc. They as well still function, but with reduced powers. The course with these is establishments for retaining the level to consumption to electricity in the last 6-7 years. The solid fuels, predominate in the general consumption of electric energy in Bulgaria as can be scored, that altogether.

The energy is nearly 50 percent from the general consumption of primary energy, as the difference

consists largely in outages in transduction (81 percent), consumption from energy producing powers (12 percent) and loss in the rent and the allocation (7 percent). That data show that the party excels as losing with ineffective electricity and a distributional net, so with a industry, that is wasteful in energy attitude, as well generating energies, that are big.

1.2. Bulgarian energy produce

The industry of electricity is in volume that permits the smooth satisfaction to the needs of the side (of the industry and the population), and effecting the exporting as well as well for neighboring stand back in Bulgaria. In the context to the presented percent allotment to powers of production of electricity and captive of 3rd and 4th block in Nuclear-electricity power station Kozloduy (but the unclear future of nuclear-electricity power flakes off). It is told that the prognosis's know the share to the mass – produced energy is increased from the remaining two types of powerhouses, namely from thermo-electric power station and water-electric power station as well and from the last energy renewable source, as is the course in entire Europe most already. Observing despite the good candidates of the attitude the ecological norms at the production to the energy for water electric power station as well compounds they the construction in Bulgaria in the last 2-3 years is still you with small production powers and fulfills largely local need.

Increasing the number of electricity, produced by the renewable energy sources, is good course, because this type of fabrication features short production cost and ecological features, but it meets together despite this, That The contribution to the mass - produced electricity from these two kinds of the powers is still low It cannot be deciphered on it as well in a full grade for covering need in the energy balance.

The water energy really so called renewable used part-energy head (Renewable Energy Resources) is mainly. In comparison with the direct use of the sunny, aeolian or geo-thermal energy as the sea disorders water electric power station used the centralized hydro-potential with better proficiencies-economic indicators.

Produced by water-electric power stations despite all favorable facets to the energy it can be pointed, reads the nature conditions (the flow to the rivers on which the precipitations that have fallen are framed up as well in the year) are heavily contingent. Despite this the views are good for their growth and the share of the produced by them of electricity will continue growing. In the EU-15 countries the greater attention is spun off always to building alternative electricity sources. This is ordered as from aligning with a range with ecological factors (for instance: The statement From Kyoto they start restricting and reduce to the emissions of greenhouse gases), so from the more short production cost to the mass - produced electricity in comparison as well thereupon, Mass – produce by coals and petroleum. They decline to the alternative electricity sources: geo-thermal, solar, the biomass, the use of the personnel of the winds to the flood tides as well and the ebbs. The known candidates for the construction of solar energy production exist for Bulgaria the powers work in such as well with a staple-biomass, because for using remainder the alternate origins do not exist in the country good nature as well climatic the provision. Therefore, after the captive in 3rd – and well 4th block of Nuclear-electricity power station the major increase to their contribution of the general fabrication to the electricity need to be expected with general European tendencies in connection as well. At the present moment Bulgaria used the following renewable heads of energy, as the specificity and the volumes are as follows manufactured energy:

- Water energy – In a native state the nature rarely indicates waterfalls pressure as well For they them to be achieved the construction is put artificially on cisterns etc. This qualifies the power to the hydroelectric centrals to 10 MW. Despite this in the country the several waters centrals with the capacity of 120-160 MW are built.
- The hydro- and geo-thermal energy – using hydro- and geo-thermal technologies the preoccupation to the hydro and geo-thermal potential can reach until 47-75 MW, but the Bulgarian nature conditions do not provide such opportunity.
- Solar energy – The MW heat power from the sunlit thermal facilities has installed 20 to the moment in Bulgaria and there aren't installed photo-voltage facilities.
- Aeolian energy – Using the Aeolian energy is in dependence from the force in the wind and the number of year blowy days. The potentials for using this generator are limited, as the output is limited to energy until 100-200 W /m² at maximum in 4-7 MW. The following subtractions in the relation can be done in conclusion The output, the consumption and using the different sorts potential (renewable and traditional) energy resources as follows:

1. The relative advantages and the defects at using the different standards of the assessment have got different energy resources. Renewable energy resources have relative advantages upon treatment of prices to the investing, ecological effect and the energy dispatch of the consumption.
2. The country must excite building things Power, reasoned, On Traditional The renewable sources as well, for the balance to be effected on the market of energy products
3. They are with inspection to resource finiteness to the traditional resources expediently building new powers, established as renewable energy resources.

The analysis and the so defined discounts suggest the individualizing to the following (more crucial) problematic fields, on resolution of which the education will be built:

1. Analysis to the state of the Bulgarian industry of relation level of the energy efficiency of the companies;
2. Researching and noting in practice in the European countries, related to the energy efficiency, the diversification to the energy sources and foreclosing on alternative as well renewable origins;
3. Determining potential and prospects for efficaciously using renewable energy informants and their point of energy balance of area (1) and their part for reducing costs of energy of industrial enterprises (SME and large-scale);
4. Executing connections between scientific-exploratory and development components (technical and economic) and the contractors, the owners and the directors of the industrial enterprises of Bulgaria and Europe.

2. Education for getting skills for building energy club

It is from CEE in the areas among the base directions on efficaciously using the energy sources for the construction to be boosted on energy the effective way of the organization and the rule of the occupation by the diversification to the energy resources in the things and the renewable sources, established as the modern society, to the knowledge.

The reaching of that general goal can be executed an instrumentality developing the concrete plans for the universe and the circularization to the knowledge and the road senses for efficaciously using the energy in the areas of the so called "east block" as well as in Bulgaria. One similar education to leaders from industrial sector must be established as of the good the practices in

tutorial naturally, EU-15 deduces by the countries, as the peculiarity as well pleasantly to national energy organizations and the opportunities for their more kind use.

2.1. Guidance to the education

Some main commissions in which the production is necessary and promoting of extra knowledge and skills can be led in Bulgaria to using the energy resources in the condition at analysis, and they namely:

1. Exploring in theory as well practice in countries with advanced market economy for potential approaches, methodology, methods, tools and another, for bettering energy effectiveness of industrial clientele by use on miscellaneous traditional and new, including renewable, energy sources.

The performance of this commission corresponds with the European policy of energy efficiency, with the home strategy and numbers for energy policy and as well as with the status of the party in that area of the collation with the skills in the economics technical sciences.

First of all she is directed to showing the skills in theory as well the practice the skills can be authenticated as good practice. At the performance of the task it is expected that the several results are achieved:

- The part of the things and renewable is showed energy sources for energies the balance of Bulgaria in the context of the fact that the country is the cardinal energy center in Eastern Europe of the Balkans as well.
- The list is done, with goal subsequent proportioned, to the "advanced ideas" for reducing the energy costs in the production or for using various energy sources of continuing the production process.

Second, it corresponds with the European politics for energy efficiency. The execution of that undertaking is pointed at achieving better preparation on those who take decision-directors in the area to the energy efficiency as well as by attitude to the opportunities for diversifying of the used in the production energy resources. We in that way think that some main requirements fulfill themselves in the complete Lisbon Strategy of making proof development by societies to knowledge as well as some more concrete conditions to the directives to resounding for straining using to renewable energy sources the energy system of the EU countries.

2. Researching at practical opportunities for desegregating kind practices in business of enterprises of new EU members (Bulgaria etc.).

The performance is steered away from unveiling specifics to using at renewable energy resources at diversification to the used energy sources in the production on this task. By that it correspond as with the directives of the European the politician.

- By performance of the put concrete undertaking the latitude between the EU policies in the area to increasing the level to using the things and the renewable energy sources was made. Due to the recent full membership of the country in EU Bulgaria could capitalize only on the pre-accession pools to resounding for the moment. It is important for the Bulgarian business due to that reason for harboring countries with advanced market economy to regale the attempt (for instance: Germany, France etc.). Collate these results with the past drive on the nations are joined earlier (for instance: Poland, Czech Republic, Hungary etc.).
- It is other solution that can be expected for the possible consequence judgment from using the national measures for the energy efficiency to be led. By collation with the analyses, it is practicably the parties reference EU (particularly

EU-15) members for the hoped consequence judgment from using the measures and the creatures of the national politics in the discipline of the energy effectiveness by the relation to the parcel to the increase in the consumption of the energy for the things or renewable of the sources to be led as well. To a second point, naming the knowledge and the skills in that direction corresponds with the conditions of the side for using various energy sources. It is necessary in that direction for modeling behavior of different industrial players to be held. The underlying hypothesis, knows the behavior of the companies in the face in addiction from the sector of the economy as from scale as well the structure in the yard is possible to be monitored had differentiated to their directors of esteem to taking the diversification in things and renewable sources for the process to production. That can be had at holding cluster-analysis by the method of analogue programming and by Delphi-method as well. The results are showed here:

- Educing ground types of behaviors of those who make decisions of industrial enterprises;
- Stipulating potential drives to growth at diversification of consumption of energy, particularly at up tick the share of energy, received by renewable sources.

3. Promoting and the trainings the administrators of the real economy to the feasibilities and the candidates from the diversification to use in the practice energy sources.

Initiating enough knowledge and skills of those who make the decisions in the Bulgarian industrial occupation gives on reaching as of short – term points, and long – term so aim. In closer plan raising the level to the knowing is achieved from those who make decisions to the alternative energy sources and of esteem to the methods of judgment the potency of them from its diversification as well (the diversification) respectively. This is particularly valid on the heads of modest and average enterprises in the country.

The cardinal consequence that can be watched in this more short-time period is the number of the successfully trained administrators. Making by the execution of this task the pro forma and informal chains can contribute development to the cooperation in the area for communication, as on national, so to a European level as well. By carrying the various acts in communication in the number and the education for the Bulgarian directors brought about they to better a potential real own much knowledge and road senses at using things and renewable energy sources. In the same time of European degree, the aces and the EU-countries directors, participating in the education, will have the potential to develop knowledge, road senses and experience in construction of systems for energy efficiency they in the industrial enterprises in the same time as well to will have the opportunity to use the good practices still to draft stages, in own the work for the homegrown members to the industry achieving those solutions.

2.2. Expected results of holding training

The indices, measuring the grade in which the put tasks are affected of the educations, more energy force Fuel gauges for consequence of education and fuel gauges for impact of education.

1. Fuel gauges for the consequence of the education they appreciate contacting the put more general problems of the tutorial, and initiating knowledge and skills among those who make decisions in following directions:

- Building the knowledge at efficaciously using the energy sources says in the systematization of the attainments in theory and the practice in the area, including As well that can be shopped as real pursuance in nearest future. In that direction the database is built with the following directions:
 - A database with the abstract attainments in the area of the energy

efficiency, notably by relation of the approaches, the methodology, the methods and the instruments for achieving efficiency at using the energy resources.

- The database with the practical attainments in the shopped area, consorted with the so called good practices. They can be got here as the corollaries and the old applied investigations results, so as well the results for the efficiency from using the various things and the renewable energy-the resources of the industrial practice (largely in the countries with an market, that is advanced, the economics).
 - The database with the new developments (largely to the idea draft phase to the development) that can they are priced as energy resources, that are long - term notably at attitude of using the things and renewable.
 - Building concrete road senses for using concrete procedures and methods for efficaciously using energy resources. In that direction those procedures have to match flat as to the European the directives for the effective energy, so to the opportunities and the state of the industrial companies (notably for the new members Romania and Bulgaria) as well. Those procedures can be viewed in two directions:
 - A procedure for specifying the necessity and the directions to diversification to foreclosing the energy resources as the economy aspects of the proof sustainable business development;
 - A procedure of specifying the necessity of renewable energy resources for production tasks foreclosing organizational and technical (including ecological) aspects of sustainable development policy.
2. The indicators for the impact of the adult education they price the degree in which the consequences of the adult education determine on achieving long – term effect. They can be got for them.

- The serviceability of the European and national measures of the energy efficiency. It can be told in that direction. The policies of the energy efficiency had gambled in the frameworks of its home for achieving the consequence on the snowball in trained directors, prepared to use the perspectives of turn.

The green energy in the consequence of the held training and the practical usage the developed before the procedure of the training procedures – had additionally produced.

- The number of the extra investments of the things and the renewable energy sources.

3. Goal groups and cardinal participants in the education

Making the knowledge as well needs means overtakes road senses for efficaciously using the energy next to a large body of interested faces, notably to directors at including to thing number best practice (in meaning on is showed) specialists in the area on: the economy, the organization and the rule to the industrial enterprises and to their energy resources. Concrete the following discrimination can be done:

Directors of small, medium and large-scale industrial enterprises is scheduled the spokespersons to get this aim group active engagement in each one degree of adult education. Booking their attention is anticipated to happen by their involvement in the various forms of communication and sale promotion of the developed procedures for diversifying of energy resources in production. During stage seminars the directors will have opportunity not to meet only together with the alternate opportunities for using things and renewable energy resources, but they will be able to articulate stands by the discussions, to establish contacts for building new raw energy powers by

her games as well. The resolved education can be held as well with the engagement in seminars.

The resolved training of interested during the seminars administrators can be held as well upon seminars for the engagement okay. The adult education is reasoned on the must from establishing concrete knowledge and skills that are needed for the creation, the forming, the rule and the control to building new energy powers, established as renewable energy resources. In the course of the adult education the administrators can obtain adept help, that to direct them to using the anticipated in the European commission directive – European and national measures for energy efficiency.

- Directors of small, middle and large-scale enterprises develop and / the energy resources grow energy powers, had rested on the things and renewable. The engagement of the spokespersons from this aim team must be really active during various activities of education. The commitments of these administrators can be codified in two directions.

First of all, engagement in developing the modern molding on energy the effective powers, established as the renewable resources. The skills are in essential sense in the managed by them companies here. In the degree of goal (idea phase, an original or production of merchandise) their adept advisory help for the opportunities for bettering using the energy source is important for the developed procedures for diversification independently.

The second, active engagement to this goal – directed group in the seminars and the education of the administrators from the old aim team is in the ground of two of goals execution-introduction with the advantages and the opportunities from use of renewable energy resources and production to spouse's interrelations of new developments in this area.

- The heads of the state public agencies. They interact to this group the all public executives that can by their decisions in the area of the legislation and the government in the area and the region to influence on the degree to use or to diffusion of the technologies for production of energy of the things and renewable energy sources. The alteration, the adaptation, of the existing measures for encouraging the investing in the things and renewable of the energy resources can be achieved in aftereffect of the interaction with this aim group. Their engagements will be executed at holding seminars and the other communicational acts by representing the opportunities for diversifying to energy resources in the production sector.

4. Results of prosecuting education

The expected results of one similar education the issues and the issues can be discovered in unsolved. Concrete can silhouette the following more important moments:

First of all, betters to the communication and the exchange of the information about things and renewable energy resources. Due to the particularities of her economic, political social status in the nations of eastern block (valid for Bulgaria in part for the other countries as well from CEE) large part from the modern ideas including as well as these about the things and the renewable energy sources and the systems, still stay largely put to idea draft phase. By the sciences of it there will be able to be initiated by the education the discipline of the applied energy – saving or green energy engineering. In one country the exchange can menstruate in the eastern countries to the western world (of new advanced technologies to idea draft phase), from another from the developed country as well the information on the applicable already in practice such technologies is accumulated. Information of all concerned country will bring

not only to more one similar exchange, but they can create advantage in the same time for the implementation of new such technologies that will increase the level at long – term plan to green energy of European level

Second, the important positive kick can be heard in the opportunity for the attempt to be analyzed in each and every one from the sides from CEE by the work at the European and national funds on energy efficiency. The outputted models of operation of different of characteristic-companies can serve for an important fuel gauge of the European commission, particularly for those who are numbers in that area. In addendum, as the prominence of the energy efficiency is minded as well on the proof development, the held seminars and adult educations can tell her that the numerous other measures, relate the advanced development, the ecological sets as well another consequences of the proof growth.

5. The model work plan for holding the education in Bulgaria

The work plan gives impression for the main activities and their succession at the education performance-project. The three phases to the education can be individualized:

First phase, making knowledge for the opportunities of the efficaciously plying of the energy resources in the production and the concrete European and national measures for promoting using alternative things and renewable of energy sources. To this phase synthesis to the limit of the known the collation is made between where that is now and where do we must ground. It is here special that the troubles comes the models of her regions national needs and those, produced from directives to European commission, are viewed.

Second phase, creating knowledge and skills of report, analysis and leading model of behavior of industrial entities by attitude to diversification of their energy heads-methods, systems, investments, ground energy from green resources etc. in this phase the solution from the old is used to be made what are the possible-the reactions of the different in characteristic-industrial entities (by cluster-analysis). At this phase the potential commissions, set as well to the proof development by innovations in the ecological energy with the things and renewable energy resources are made as well. Second, the important positive kick can be heard in the opportunity for the attempt to be analyzed in each and every one from the sides from CEE by her work at the European and national funds on energy efficiency. The outputted models of operation of different of characteristic-companies can serve for an important fuel gauge of the European commission, particularly for those who are numbers in that area. In addendum, as the prominence of the energy efficiency is minded as well on the proof development, the held seminars and adult educations can tell her that the numerous other measures, relate the advanced development, the ecological sets as well another consequences of the proof growth.

The third phase, tried distribution of the knowledge. They happen at this phase the stage of the events that are meant executed the exchange to the ideas, know-how, investments and others in the domain of the efficient exploitation to new energy sources in the industry sphere.

Decision

Engendering the new knowledge and the skills of those who make decisions are a key

for more kind as well efficient operation of the industrial companies of the used resources in as well surely.

Breveting the competence at attitude to the used energy resources can be heard as important stage in adaptation to the Bulgarian enterprises (In the director face) to the requirements of the EU (In using good practices).

The consequences of the training can be proved in energy efficiency in the Bulgarian directors as on region (national), so to an European level as well. That speculates upon one similar training to happen by cooperation with European representatives to each one level. For instance:

- The European enterprises: produce prerequisites for transfer of know-how by treatment of the efficient use of energy resources;
- European education agencies: the accumulated experience makes a possibility and the knowledge, educed In good practices are used in the adult education to administrators by the Bulgarian industry;
- European science institutions: collaborative work in direction to using developed procedures for forming and prosecuting plans of education by energy efficiency and holding subsequent control for degree of their effectiveness;
- The European institutions: the engagement in the plans of the structural funds of the EU for bettering the efficiency to the national industries and letting using energy renewable sources out.

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