Đorđe Kaličanin

Faculty of Economics
University of Belgrade

MANAGING ENERGY STRATEGY IN FUNCTION OF IMPROVEMENT OF NATIONAL ECONOMY COMPETITIVENESS AND ENTERPRISE COMPETITIVENESS*

Upravljanje energetsom strategijom u funkciji unapređenja konkurentnosti nacionalne privrede i konkurentnosti preduzeća

Abstract

Energy issue is very much important for national economy competitiveness and enterprise competitiveness and its consideration has to respect strategic approach. That means that all important energy issues have to be considered in strategy of energy development in one country with all the necessary documents that support the strategy implementation as programs and investment projects. On the other side, in enterprises as cells of national economy, this issue deserves to be solved respecting strategic approach, too. That leads to energy strategy formulation and implementation on the level of business units and enterprise as whole entity. Great help in this job we get by using techniques of strategy map and Balanced Scorecard. This paper tries to present connection that should be made between strategic decisions on national and enterprise level with affirmation of modern techniques of strategic management in formulation and implementation of energy strategy.

Key words: *energy strategy, national economy competitiveness, enterprise competitiveness, strategy map, Balanced Scorecard*

Sažetak

Pitanje energije je vrlo važno za konkurentnost nacionalne ekonomije i konkurentnost preduzeća, te njegovo razmatranje mora da uvažava strategijski pristup. Ovo znači da sva bitna pitanja iz domena energije treba da budu obuhvaćena u strategiji razvoja energetike u jednoj zemlji kao i svim dokumentima koja podržavaju implementaciju ove strategije, kao što su programi i investicioni projekti iz ove oblasti. Sa druge strane, i u preduzećima kao ćelijama jedne nacionalne ekonomije, ova pitanja takođe treba budu rešavana uvažavajući strategijski pristup. Ovo vodi ka formulisanju i implementaciji energetske strategije na nivou poslovnih jedinica i preduzeća kao celine. Veliku pomoć u ovom poslu dobijamo koristeći tehnike strategijskih mapa i Usklađene liste. Ovaj rad pokušava da predstavi vezu između strategijskih odluka na nacionalnom nivou i nivou preduzeća sa promocijom korišćenja modernih tehnika strategijskog menadžmenta u formulisanju i implementaciji energetske strategije.

Ključne reči: *energetska strategija, konkurentnost nacionalne privrede, konkurentnost preduzeća, strategijska mapa, Usklađena lista*

* This edition is dedicated to the project financed by the Ministry of education and science titled "Strategic and tactical measures to overcome real sector competitiveness crisis in Serbia"(n. 179050, period 2011-2014)

Introduction

The issue of energy sector development is one of the most important issues in focus of creators of national economy strategy and competitiveness strategy, as well as strategy of national security, ecological strategy and sustainable development of one society. In the situation of general geopolitical instability, energy becomes the cause of big turbulences, but also it becomes a link of states' integration and integration of their national economies. Energy security becomes a priority and condition of survival of national economy in the long run. Achievement of energy efficiency goals nowadays are seen to be factor of national economy competitiveness as well as enterprise competitiveness. On the other side, energy consumption indicates to stage of economy development. The logic is following: sustainable economic development should be achieved by a combination of higher economic efficiency with more efficient energy consumption at the same time [1].

Energy sector includes research and production of primary and secondary resources of energy, as well as their transformation, transfer and distribution to producing customers and end consumers. All these activities cause costs. So, by their economical doing with acceptable costs of imported energy, we can lower energy costs in producing products and services, and in that way we can lower costs per unit of production. The benefit for end consumers is in decreasing sum of money they pay for energy usage, and consequently, in discretionary revenue increasing.

Looking at energy as one of condition factors of national competitiveness, we are coming to the need of establishing strategic approach to energy management on the national level, and on an enterprise level, too. Respecting strategic approach we can recognize that we have to affirm strategic planning process on both levels. Experience shows that energy strategy is much more discussed on macro level, than in micro level. Actually, strategy for energy development (as well as energy policy) is a document which is usual for the most countries in the world. On the other side, strategic plan for energy efficiency is not often reality in individual enterprises, except ones that are "energy aware". Since that awareness about need of energy efficiency has to be spread, there is

necessity to establish mechanisms for its achievement. Consequently, it is useful to promote techniques which usage leads to energy efficiency. Today, very often we talk about two modern techniques of significant technical usefulness. These techniques are strategy maps and Balanced Scorecard (BSC). They are universal techniques which can be used in all industries, in financial sector, in non-profit organizations, public sector, local and national governments, etc.

Very good promotion of national economy strategy that is explained in this way we can find in [4]. In the strategy map of Serbian development 2020, Djurićin as one of relevant measures in Private sector management perspective includes two measures: energy efficiency and renewable energy production/whole energy production. Proposed task for energy efficiency is $>0.57\%$ toe /1000\$GDP with initiative of adopting new Law on rational energy consumption. Proposed task for measure renewable energy production/whole energy production is $>18\%$ with initiative of adopting Program with green component. When he considers macro management perspective, he sees adopting one of the initiatives "capital increase in Elektroprivreda Srbije."

In this paper because of its limitation in extent, we will focus on the issues of strategic framework of energy management in the Republic of Serbia, and on energy strategy planning at the level of an enterprise in real sector. Strategic planning process in an enterprise from energy sector (sector of energy production) because of its specificity and complexity deserves special attention in special paper.

Strategic framework of energy management In the Republic of Serbia

The question of energy development in one country is articulated by strategy and policy of energy development. Moreover, energy policy represents a part of economic policy. It comprises goals, objectives, principles and instruments in domain of research and development, production, distribution and energy consumption with the aim of providing enough amount and structure of energy with reasonable prices. Energy strategy, on the

other side, represents document with specified goals and instrument of their achievement in domain of energy in precise period of time. Usually policy and strategy arise in collaboration of government's institutions, scientific and professional organizations. As main goals which are being realized by energy strategy implementation, we can list [9, p.102]:

- Certainly providing of energy
- Strengthening energy independence
- Providing energy with available prices
- Environment protection
- Maximizing economic effects.

In Republic of Serbia strategic document that comprises all these questions is Strategy for Energy Development in Serbia by 2015 [14]. In strategy formulation (and in policy formulation as it is written in the document), the first task is to make overview of current state in this sphere. That means that it should be formulated on the base of insight in the state of energy resources, production capacities and future energy needs, i.e. future energy consumption. As main elements of Serbian energy policy, there are listed: Basic goals, Priority programs (chosen regarding previously listed goals) and Initiatives and instruments (for the purpose of Priority programs achievement).

In Strategy for Energy Development by 2015, there are listed next types of goals: basic – energy goals, specific – technological and ecological goals and general – developing and strategic goals.

The main energy goals are:

- The safety and regularity of supply of the economy and citizens with alignment of development of energy production systems with the needs of the consumption sectors
- Economic and energy-efficient use of energy, in terms of
 - Reduction of energy intensity in industry and transport sectors and
 - Changing the structure of final energy in non-productive sectors – households and public and commercial activities
- Diversification of supply sources and routes of energy imports
- Selective use of new renewable energy sources (RES).

Specific – technological and environmental objectives are:

- Safe operation of power plants
- Reliable operation of equipment and vital systems of power plants
- Technological modernization of power plants
- Installation of equipment to reduce emissions of harmful effluents from energy sources.

General – development and strategic objectives relate to:

- Harmonizing the development of energy industry with other sector of the real economy, which will enable sustainable social, economic, technological and environmental development of Serbia
- Active participation of Serbia in planning and construction of strategic regional and pan-European energy infrastructure for transportation of oil and gas from new sources of supply (including construction of underground gas storage)
- Finding strategic partner for planning, construction and use of new power facilities in the border rivers and joint ventures in new power plants based on lignite from Kosovo and Metohija.

There are five basic priority programs by which the Strategy is implemented:

1. The Main Priority of the continuity of technological modernization in the sectors like oil, natural gas, coal (with surface and underground mining), the electric power sector with producing facilities (power plants and hydro power plants) and distribution system, as well as the thermal energy sector in terms of district heating and industrial power plants
2. Targeted Priority of rational use of high-quality energy and energy efficiency increasing
3. Special Priority of usage of new renewable energy sources, new energy efficient technologies and devices
4. Optional Priority for emergency / urgent investment in new energy sources with a new gas technologies
5. Long-term developing strategic priority at the level of the region, in terms of building new energy in-

infrastructure facilities and electric power and heat sources in Serbia and the capital-intensive energy infrastructure in the framework of regional and pan-European infrastructure systems connected with our systems.

In accordance with previously established goals and priority programs, the Serbian government makes decisions on initiatives that will facilitate their implementation. These initiatives are:

- Initiatives for establishment rational market environment, alignment of tariff, price, tax, customs and anti-monopoly regulations, as well as initiatives for the structural reorganization of energy sector and more effective supervision and management of social assets in energy sector.
- Initiatives for establishment of new, modern technical regulations, standards and regulations for energy technology/ activity and the establishment of special instruments for stimulating activities for rational use and energy efficiency, including the formation of a body to monitor and manage the processes of energy reforms and to monitor the implementation of Serbian energy development strategy, the priorities of innovation and actualization of instruments, according to the country's economic development and the situation in the energy sector in the country and region
- Initiatives to achieve the conditions for equal access to the Energy Community of Southeast Europe (*ESCEE Treaty*)
- Initiatives to determine the basis for ratification of the Kyoto Protocol and our obligations arising from its implementation in our regulations and practices, including the institutional organization of our participation in the use of appropriate relief that is allowed by application of some mechanisms of Kyoto Protocol
- Initiatives to stimulate and support strategic initiatives in the area of investment in new energy sources / technologies and energy-efficient appliances / equipment for the use of energy, and Financial initiatives to encourage the private investment in economically -effective programs / projects of energy

efficiency and selective use of new renewable energy sources, including initiatives for the establishment of the national fund for these programs / projects.

- Initiatives for the balanced policy of social protection of the poorest populations and protection of the economic position of the energy enterprises responsible for security of supply economy and population, through adjustment in energy prices with the real costs of electricity and heating.

Instruments for Strategy implementation are:

- The legal and institutional instruments. It is the Energy Law and the Mining Act as the primary legislation, but there are also some laws that treat giving concessions, obligations regarding environmental protection, construction and operation of public enterprises. Institutions in charge of the implementation of elements of the Strategy are the Energy Agency and Energy Efficiency Agency. Energy Agency is responsible for issuing licenses for energy activities, establishing the methodology for calculation of eligible costs in performing energy companies, preparation of draft tariff systems for energy services, etc. The Energy Efficiency Agency is responsible to promote the use of final energy and to promote the rational use of primary energy sources. Also, one of instruments for Strategy implementation is foundation of five regional centers for energy efficiency, located in five university centers (Belgrade, Novi Sad, Nis, Kragujevac and Kraljevo) with aim to promote exploitation of renewable energy sources, as well to promote old and new solutions in energy efficiency projects.
- Structural - organizational and economic instruments that made possible the establishment of new entities to perform certain energy activities.
- Program and system tools in terms of drafting and adopting the following programs:
 - The program for the rational use of energy and energy efficiency
 - The program for the selective use of new renewable energy sources
 - The Program for Environmental Protection

- The program of scientific and technological development in energy activities in Serbia
- Establishing a modern system of energy statistics.

Further, in the Strategy before the planning of energy sector development, two projections of energy consumption and need are given. Two scenarios are assumed. One scenario is with the dynamic economic development of the country, and another involves a moderate economic development. The first scenario proceeded from the rapid growth of gross domestic product (GDP) and value added industry (DVI). This approach to the formulation of the strategy is relevant considering that it respects the principle of contingency. Contingency planning is a kind of planning that includes more than one strategy, program or plan leading to established goal. For the case of every scenario there is a decision to be implemented. But, unfortunately, non-anticipated global economy and financial crisis made both scenarios optimistic ones and in that way irrelevant. The main consequence of such situation is that implementation of specific projects have to be delayed and only ones with the high priority to be implemented planned in new schedule.

The strategy is being implemented by program and projects implementation. Currently, we are in the process of implementation of the Program for Implementation of Strategy for Energy Development in Republic of Serbia by 2015 for the period 2007-2012 (in the rest of paper called *Program*) [11]. Program established the conditions, methods and time schedule of implementation of the strategy in question in all important domains: surface mining and underground mining of coal, oil economy; transportation of oil; gas industry, electric power sector (hydro and thermal power plants, thermal power plants - power plants, transmission and distribution); district heating and individual boilers; industrial energy; energy efficiency in the consumption sectors: industry, transport, buildings, and the Energy efficiency fund strategy in accordance with governing the economic development of Serbia by 2012; renewable energy sources; environmental protection in energy sector.

This document (in much more details than strategy as it is normal because of hierarchy of these decisions) on

two hundred pages gives what have to be implemented in terms of programs and projects in all fields in energy production and energy consumption sectors. Respecting project approach to investment activities in this Program we can find specified list of a project's components, location and purpose, goal to be achieved, project's dynamics (feasibility, specification, contracting and construction), amount of investment, financing sources, perspective profitability in terms of Net present value and Internal rate of return, project's impact on environment in the sectors of energy production.

According to the Strategy, one of the five main priorities is the priority of rational use of quality energy and energy efficiency in production, distribution and use of energy by end users of energy services. Increasing energy efficiency is recognized as priority in strategy of development of national economy of Republic of Serbia by 2012, as well as in National program of environmental protection. There are two threats for international competitiveness of our enterprises: first, high energy costs can significantly reduce the competitiveness of our products over the foreign, and second, restrictions related to the activation of international standards in environmental protection can seriously jeopardize the position of some industrial enterprises in the market. Because of that, it is essential to develop an aggressive and organized approach to planning and promoting activities related to energy efficiency improving.

One of big barrier for enhancement of energy efficiency is lack of solid base of energy indicators for consumption sector. Of course, there are data about energy consumption but not on the level useful for energy management on the highest quality level. Another big barrier for establishing energy efficiency is low prices of electrical energy. In developed countries, high electricity consumption per capita is the result of its intensive use in the production process and the creation of new value. Unfortunately, in Republic of Serbia high energy consumption is the consequence of a large electricity use in households and public and commercial activities primarily for heating. The main reason why this price is such low is that it is the way government tries to make costs of living lower (known as "maintaining social peace").

Perhaps the best way to make someone aware about necessity to be energy efficient is to make energy costs real ones. In that job, crucial role has national government. Additional role has to be given local authorities. Local authorities are in any way responsible for making plans of energy development on local area, for energy consumption monitoring as well for gathering all data needed for making energy balance of the Republic of Serbia. From local authorities it is expected to establish new managerial position – energy efficiency manager and new managerial practice - energy management.

Energy management as practice should be imposed by Law on Rational Use of Energy. Moreover, responsibility for energy management is imposed for every consumer whose total installed capacity is greater than 1 MW. This means that this entity is obligate for energy monitoring and constant concern about energy efficiency increasing. The measure will be introduced gradually, it does not require special investment funds, and it is financed from current investment maintaining costs. The experience of developed countries where this practice has been around for years, bringing the minimum annual savings in industry, municipal energy consumption and enterprises where the founder are local authorities is about 3 % of final energy consumption in these sectors [11, p.157].

Strong financial support for implementation of activities for energy efficiency increasing has to be foundation of Energy Efficiency Fund. This fund has not been established yet, and its formation in the jurisdiction of Ministry of infrastructure and energy is planned for January 2012.

After this short consideration of macro energy framework we can now analyze how should look like energy strategy on micro level, i.e. level of an enterprise, and tools for its successful implementation.

Enterprise energy strategy - map and Balanced Scorecard

Energy strategy is not a common strategy as regular strategic decision determined at the enterprise level, but certain elements of energy management very likely existed, especially in the leading companies in the world. Energy is an input and as such is object of management.

Management of inputs (inventory management) is the subject of operations management. Optimization of energy use as input also can and should be the subject of operations management. However, energy management should not result only in energy efficiency as a result of optimization, but also in energy effectiveness. In explanation of this term we can start from the original concept of efficiency and effectiveness. While the efficiency is related to optimization of inputs in output production, or the manner in which the selected activity is performed, the effectiveness is related to goals and methods of their achievement (“doing the right things”). In terms of energy management, energy efficiency means minimizing energy use and costs without compromising business processes in one company. What would be the energy effectiveness? It means that one enterprise is able to create offer that will be attractive from the standpoint of energy - energy-attractive products and services.

Due to the evident potential of energy management for satisfaction of requirements of effectiveness and efficiency, we can (and should) talk about the energy strategy at the enterprise level. At the very least, the energy strategy can be considered as complete strategic theme with its own strategy map and Balanced Scorecard. It follows that the energy strategy can be described, explained and changed into operational actions in the simplest way by using techniques of strategy map and Balanced Scorecard. For this reason, in the next part of text, we give an overview of the first two techniques, and after that we will be able to apply these techniques to the processes of energy management within a single enterprise in real sector of a national economy.

The strategy map as a technique of strategic management is used to articulate the strategic intent, programs and projects that lead to the realization of adopted goals. The emergence of this technique is related to the requirements of enterprise in the information era. In industrial era the most valuable resources were physical ones, but the most valuable resources in IT era are “intangible” ones. Intangible assets became the main source of competitive advantage and market value. The most valuable intangible assets related to relationships with customers, employees and their skills, knowledge, information technology and

organizational culture fertile for innovation, problem solving and general improvement of the organization [5].

Goals and their measures - measures of performance, the Balanced Scorecard concept, derived from the vision and strategy of a company and they are defined from four perspectives:

1. financial perspective,
2. customer perspective,
3. perspective of internal business processes
4. perspective of learning and growth [8].

Defining objectives and performance measures of financial and non-financial perspective is not something unusual. Most successful companies, before the advent of BSC, formulated goals and performance measures according to different categories with the main purpose of short-term technical control operations (business decisions). However, such systems of performance were not balanced. BSC provides exactly this balance on three grounds:

1. balance between external measures relating to shareholders and customers and internal measures relating to internal business processes and learning and growth;
2. balance out the measure of success, as a result of past actions and measures of future performance;
3. balance between the objective, easy-to-quantify measure of success, and subjective and qualitative performance measures. [8, p.10]

In addition, as balanced approach to performance measurement, the BSC has made another very important advantage over other key performance indicators systems. BSC makes it possible defining the cause-effect relationships within a single strategy. Strategy is a hypothesis about the cause-effect relationships between activities (leading indicators) and the desired outcomes (lagging indicators).

In defining a strategic hypothesis we start from the perspectives of owners (shareholders) and costumers. The basic question is "what are the financial goals in terms of revenue growth and productivity increase? What are the main sources of growth?" When one defines the goals of the financial perspective, the next question would be "who are the target customers that will provide revenue growth and profitable mix of products and services? What are

our goals in this perspective and how to measure success in achieving them? Costumer perspective includes the definition of "value proposition". The value proposition defines the way a company differentiates from competitors in terms of product mix, pricing, services, customer relations and image to attract and retain target customers and deepen relationships with them. Financial and customer (marketing) objectives are the desired outcomes, but they also do not specify the ways in which they reach. The perspective of internal processes in which, for example, are included product design, brand and market development, sales, services, manufacturing and logistics, define the activities needed to create the desired value proposition and differentiation and consequently desirable financial outcomes. The fourth perspective, the perspective of learning and growth reveal the conditions and capabilities necessary to conduct internal business processes. These are an organizational infrastructure, skills, abilities and knowledge of employees, the technology which employees used, as well as the climate in which they work [6, p.76].

However, for authors Kaplan and Norton, BSC, designed in this way, became the basis for formulating a new framework for describing and implementing strategies under the popular name of a strategy map. The strategy map is a logical and comprehensive architecture for the description of a strategy. It describes the critical elements of the strategy and their interrelationships [7]. Strategy maps are particularly useful tool nowadays when intangible assets are of the biggest importance for the market value of companies. Companies in the energy sector predominantly use material assets. However, this does not mean that this technique can be applied. Moreover, the application of these techniques will enable more effective and efficient achievement of the objectives defined by business strategy.

Energy strategy that would be formulated should be part of a comprehensive business strategy that is adopted at the enterprise level, as well as strategy that is formulated at the level of one business unit. The issues it touches include a number of business activities, and from that side it can not be placed on the same level or category of functional strategies. Moreover, many elements of this strategy have been previously formulated by functional strategies of

production, supply chain, marketing and distribution, et al. That is the why elements of energy strategy could be incorporated into strategy map and BSC in three ways: first, adding a fifth perspective to the BSC, second, developing a separate energy BSC, and third, integrating the measures throughout the four perspectives (similarly done with sustainability measures in [2]). In this paper we opted for second option as it will be presented later.

Energy strategy under this name has not been appeared (and still does not appear), so much as it will be in the future. The reasons are simple - it is a consequence of projected growth of the importance of energy for sustainability of businesses and a rising costs of energy usage. Therefore, when defining a strategic energy plan, you should ask the following questions [12, p.7]:

1. How vulnerable are our business to energy-price volatility and/or increase?
2. What energy risks do our products and services
3. create for our customers?
4. How vulnerable are our operations to energy supply disruptions?
5. How much energy does the organization require to function effectively today?
6. Who is accountable within our organization for procuring and managing energy use at both executive and operations levels?
7. What energy use or cost savings are possible?
8. Are energy productivity and efficiency goals in place with achievement measured and recognized?
9. Are our programs and processes for managing energy and climate risk sufficient?
10. Do our equipment and site selection strategies include energy efficiency and climate risk as critical decision factors?
11. Do our policies make it easy to invest in energy efficiency or greenhouse gas emissions reductions?
12. What investments can be made now that will have

Figure 1: Map of energy strategy
Goal: Energy effectiveness and efficiency (EEE)

large payoffs in the future?

12. Do we envision new business opportunities in the changing energy context in areas in which we operate?

Perhaps the best way for making consistent answer on all this questions would be promotion of strategic map of energy strategy. Again, strategy mapping imposes to us asking several questions regarding each of perspectives of BSC. In financial perspective a key issue is how much savings in energy costs can we make and thus ensure the growth of operating profit, and how we can increase revenue side of income statement respecting energy constraints and trends. From the customer's perspective, the key question is whether customers perceive us as an energy and environmental (and thus socially) responsible company and whether our products help them become more energy efficient. From the viewpoint of internal business processes a crucial question is in which business processes energy efficiency can be achieved, how to do it and how to measure it. In the last, learning and growth perspective, the key question is how will be managers and employees able to make responsible decisions on energy issues and do we create and use key performance indicators regarding energy as well.

Trying to find answers on all above questions, we dare to make a proposition of generic map of energy strategy as it is given in Figure 1.

In mapping energy strategy we are starting with its goal. The goal can be described as triple E – Energy effectiveness and efficiency. Energy effectiveness relates to revenue growth side of profit in terms of profitable growth of sale of energy-attractive products. Energy efficiency relates to savings in energy costs, i.e. productivity in energy use in all business processes inside an enterprise. Energy effectiveness has its financial expression in “profitable growth of sale of energy-attractive products”. Energy efficiency has its financial expression in terms of “decreasing energy costs”. Profitable growth of sale of energy-attractive products is a consequence of several benefits and perceptions customers have about products and services: lowering energy costs in product using, lowering energy costs in purchasing product, increasing possibility for using alternative energy sources, partnership

focused on energy issues (especially in case of B2B), and connection with enterprise with image of good corporate citizen. On the other side, goal of decreasing overall energy costs could be achieved by previously achieving several goals in internal business process perspective: energy efficiency in production and distribution, as well as efficiency in heating, etc. Goals from learning and growth perspective include all necessary conditions to be fulfilled in order to achieve goals in financial and customer perspective. These goals relate to achieving a high level of knowledge of energy management, creating base of indicators regarding energy effectiveness and efficiency and creating “triple E” culture.

After creating strategy map, next step in energy strategy “operationalization” is creating BSC as a system of balanced measures, objectives and initiatives. The greatest challenge is to find appropriate measure which will show progress in achieving previously determined goals in strategic map.

The financial perspective of one energy strategy should include several measures which examines the impact of energy strategy on overall financial performances of an organization. It relates to lagging indicators that show the costs of energy use. Energy strategy through cost reduction activities leads to the objectives of profit maximization. The actual costs of energy use can not be controlled in a manner of control of energy prices, but should be controlled by energy usage. The starting point is that the costs are the valorization of the use of inputs, this time of energy. On the other hand, regarding goal called profitable growth of sale of energy-attractive products, measures should express revenue achieved through including such products into product assortment. The most appropriate example for this kind of products are ones with characteristic like “energy star” or products with “energy” sticker with level A,B,C or D. Usual measures of goals of energy efficiency and energy effectiveness in financial perspective are given in Table 1:

Fuel and energy costs are different from the cost of raw materials. Material substance is included in the product. Other materials, fuel and energy, on the other hand, are spent in the processing of materials in product manufacturing and other processes. These costs are treated

Table 1: Financial Perspective Measures [modified 12, p.8]

Measure	Formula	Example
Cost of energy per dollar of sales	$\frac{\text{Cost of energy}}{\text{Sales revenue}}$	$\frac{\$50.000}{\$1.000.000} = \$0,05$
Cost of energy used in manufacturing as a percentage of total costs	$\frac{\text{Cost of energy used in production}}{\text{Total production costs}}$	$\frac{\$50.000}{\$600.000} = 8,3\%$
Cost of energy used in manufacturing per unit of production	$\frac{\text{Cost of energy used in production}}{\text{Units of production}}$	$\frac{\$50.000}{250.000} = \$0,20$
Fuel cost per km for delivery vehicles	$\frac{\text{Delivery fuel costs}}{\text{Total delivery km}}$	$\frac{\$30.000}{250.000} = \$0,12$
Heating/air conditioning cost per heating/ cooling degree day	$\frac{\text{Total heating and air conditioning cost}}{\text{Total heating/cooling degree days}}$	$\frac{\$8.000}{750} = \$10,67$
Revenue from sale of energy-attractive products as percentage of total sales	$\frac{\text{Revenue from sale of energy-attractive products}}{\text{Sales revenue}}$	$\frac{\$250.000}{\$1.000.000} = 25\%$

Table 2: Internal Business Process Perspective Measures [12, p.9]

Measure	Formula	Example
Production:		
Energy usage per unit of production	$\frac{\text{Kilowatt-hours used}}{\text{Units of production}}$	$\frac{20.000}{250.000} = 0,08$
Energy used from waste products and sources	Amount of joules of heat produced from waste products	8.000.000
Number of activities supported by renewal energy sources	Number of using renewal energy	180
Number of facilities using energy from heat by-product	Number of facilities	20
Distribution:		
Energy usage per delivery km	$\frac{\text{Amount of fuel used for delivery}}{\text{Number of delivery km}}$	$\frac{18.000}{216.000} = 0,083$
Number of partial load deliveries	Number of loads delivered that were not full loads	300
Administration:		
Energy usage per heating/cooling degree day	$\frac{\text{Kilowatt-hours used}}{\text{Number of degree days}}$	$\frac{64.000}{750} = 85,33$
Use of renewal energy sources as a percent of facility electricity use	$\frac{\text{Kilowatt-hours of green energy used}}{\text{Total kilowatt hours used}}$	$\frac{20.000}{64.000} = 31,25\%$
Percent of offices with occupancy sensors to turn off	$\frac{\text{Number of offices with sensors}}{\text{Total number of offices}}$	10

as overheads and only one part of the proportional volume of activity. On this basis, we can conclude that among them there are fixed costs [13, p.89].

Financial measures are lagging indicators. They are result of performing the relevant activities within business processes. So, performance measures, defined as energy costs are consequence of energy usage in business processes. The usual group of processes that are induced

by Kaplan and Norton are: innovation management, operations management (production), customer relationship management and managing relationships with public and regulatory community. On the other hand, the use of energy is clearly recognized in the following processes: manufacturing, distribution and administration. Therefore, the performance measures should include the use of energy in these processes (as shown in the Table 2).

This list of performance in perspective of internal business processes probably will be extended with performance about tax savings that could be achieved by construction of energy-efficient buildings and buying energy-efficient vehicles (hybrid ones, for example). Of course, this savings are possible only if they are enabled by law [more in 3, p.99].

Performance measures in the customer perspective should reflect the perception customers have about energy performances of products / services. Today as never before, as consumers we are very interested in using products that do not cause the high costs of energy, car that consumes less fuel and on that basis to reduce costs. However, here we can add another dimension to look at the problem of energy “suitability” of a product / service. Energy-aware consumers are generally environmentally aware, and among them can be developed the reasoning: “the lower level of energy consumed by using a particular product / service, the less needed energy to be produced. Additionally, if this energy is produced in power plants that are among the biggest polluters of air, then the consumption of such products will help us to protect the environment”.

The realization of “energy” goals and objectives in this perspective leads to the realization of the objectives of the generic perspective of customers which are related to customer satisfaction based on use of products that create lower cost, environmentally speaking are superior, and will, ultimately, lead to repeat purchases and growing sale on that basis. These are products that enable customers of

an enterprise to improve performance on several points: in terms of savings in the exploitation of products / services; regarding the possible tax advantages of using such products, and third, in the terms of contribution to corporate social responsibility rating of a client; contribution to its image of energy (and environmental) responsible entity. Common performance measures in customer perspective are given in Table 3.

Performance measures in learning and growth perspective should reflect the organizational skills and attitudes of employees on the occasion of achieving energy goals. These are leading indicators that have an indirect connection with the strategic objectives of the company. Here we should distinguish three types of performance. The first type of performance should include organizational skills an organization need to successfully focus on energy issues, as well as organizational culture colored with triple E (energy effectiveness and efficiency). The easiest way to check this is through the analysis of adopted procedures to ensure energy savings and employees’ attitude toward energy issues. Another type of performance from this perspective refers to the ability of IT to accurately measure energy use and costs that arise on this basis. The third type of performance refers to the ability of employees to personally contribute to lower energy costs. Common performance measures in learning and growth perspective are given in Table 4.

Here are listed only some measures needed for tracking progress in realization of goals from strategy map. As we

Table 3: Customer Perspective Measures [12, p.9]

Measure	Formula	Example
Number of products that can use alternative energy sources	Number of products	25
Number of products with Energy Star Ratings (or A, B, C, D)	Number of products	150
Energy required to operate vehicle	Km per gallon	48 kmpg

Table 4: Learning and Growth Perspective Measures [modified 12, p.11]

Measure	Formula	Example
Percentage of facilities with electric meters	Number of facilities	35
Hours of training provided in energy-saving procedure	Hours of training	3.200
Percentage of employees who have had training in energy saving procedures	$\frac{\text{Number of employees trained}}{\text{Total number}}$	60 %
Hours of training for product developers in energy saving procedure	Hours of training	800
Number of suggestions received from employees for saving strategy	Hours of suggestions	400
Number of suggestions (innovations) with green component	Number of suggestions	50

can see there is a possibility to include more measures than one for one goal from BSC perspective. In that way we get precise picture of energy strategy implementation progress. But, common rule that BSC shouldn't be cluttered with measures of not great importance is relevant here, too.

Conclusion

Because of high importance of energy for competitiveness of national economy, strategic approach to its development is needed. Strategy for Energy Development in Serbia by 2015 includes basic goals, priority programs and measures and instrument, and they together in the form of cause-effect relationship should lead to goals of "macro" energy management in terms of: certainly providing of energy, strengthening energy independence, providing energy with available prices, environment protection, maximizing economic effects. One of the most useful documents for strategy implementation is Program for Implementation of Strategy for Energy Development in Republic of Serbia by 2015 for the period 2007-2012. In the Program we can find all important investment projects in energy sector to be implemented in the specified period of time. Unfortunately, global economic and financial crisis made implementation of many projects impossible at this moment and delayed. Also, in the Program there are still good analyses and projections of needed projects in energy consumption sectors as industry, transport, buildings and construction.

Macro energy strategy is solid framework for strategic thinking and strategic planning on an enterprise level. Today and in the future in conditions of uncertainty of supply for many energy types and permanent rising of energy prices, every enterprise should have its own energy strategy. It is a product of micro energy management. Energy strategy should contribute to implementation of overall corporate strategy. We can say that this strategy should make achievable legitimate goal of every company – energy effectiveness and efficiency. Energy efficiency is well known concept regarding to efforts for decreasing energy costs in all business processes. Earlier that issue was in the competence of production and logistics managers. Today it deserves special attention and responsible person

/ organization unit in the form of energy manager (energy expert). On the other side, we introduce concept of energy effectiveness. This concept relates to requirements contemporary enterprises that have to respect. Customers want to buy and use products / services with optimal using energy for their buying and exploitation and do that with feeling they think and behave responsibly about energy and environmental issues. It causes enterprise's efforts to create energy-attractive products / services. Earlier the issue of creating new products was in exclusively competence of marketing and research and development departments. Today we think that this question is too important to be left only to marketing experts and engineers in R&D department. Knowledge about energy management has to be shared between departments and business units. That is the reason why we this issue include in energy strategy, too. Once again we can see that techniques of strategy map and balanced scorecard help in synchronizing efforts of different units in an enterprise to create profitable growth. Once again we can see that these techniques are of the greatest usefulness for strategy formulation and its translation into operational terms. Once again, we can see that they are solid techniques for describing how intangible assets could lead to tangible outcomes. We will agree that knowledge of energy management, solid base of energy indicators and sound culture that focuses on results in terms of energy effectiveness and efficiency are intangible assets used in business processes for achievement tangible outcomes for enterprise's customers and its owners in terms of created value.

Literature

1. Bojnec, Š., Papler, D., Economic efficiency, energy consumption and sustainable development, *Journal of Business Economics and Management*, 2011, Vo.12 (2): 353-374
2. Butler, J.B., Henderson, S.C., Raiborn, C., Sustainability and Balanced Scorecard: Integrating Green Measures into Business Reporting, *Management Accounting Quarterly*, Winter 2011, Vol. 12, No.2
3. Dennis-Escoffier, S. and Falsetta, D., Incentives to Energy-Efficient Businesses, *Journal of Corporate Accounting & Finance*, 2007, September - October: 99-105.
4. Đuričin, D., „Anti-krizni program u 2011. i strategija održivog razvoja (Srbija 2020)“, *Ekonomika preduzeća*, januar-februar 2011, 1-20.

5. Kaplan R., Norton D., Having Trouble with Your Strategy? Then Map It! *Harvard Business Review*, September-October 2000.
6. Kaplan R., Norton D., *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment*, Harvard Business School Press, Boston, Massachusetts, 2001
7. Kaplan, R., Norton, D., *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*, Harvard Business School Press, Boston, Massachusetts, 2004.
8. Kaplan, R.S., and Norton, D., *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press, Boston, 1996.
9. Mandal, Š., Mihajlović Milanović Z., Nikolić, M., *Ekonomika energetike: strategija, ekologija i održivi razvoj*, Ekonomski fakultet, Beograd, 2010.
10. Porter, M.E., The Competitive Advantage of Nations, *Harvard Business Review*, March-April 1990
11. Program ostvarivanja Strategije razvoja energetike Republike Srbije do 2015. godine za period od 2007. do 2012. godine
12. Roth, H.P., Cut Energy Costs with Scorecard Measuring, *Journal of Corporate Accounting & Finance*, 2009, March/April, 5-11.
13. Stevanović, N., *Sistemi obračuna troškova*, Ekonomski fakultet, Beograd, 2007
14. Strategija razvoja energetike Republike Srbije do 2015.
15. *Zakon o energetici*, Službeni glasnik, br. 57/2011

Web sites:

1. www.mie.gov.rs
2. www.ekoplan.gov.rs
3. www.seea.gov.rs
4. www.aers.gov.rs
5. <http://webzrs.stat.gov.rs>

Đorđe M. Kaličanin

is associate professor on subject Strategic Management in The Faculty of Economics – University of Belgrade, where he achieved all diplomas (B.Sc., M.Sc. and Ph.D.). On master studies he teaches subjects Strategic Finance and Business Strategy. He is the author of articles from the scientific fields of strategic management, business planning and value-based management. He led and participated in projects of strategic planning, investment decision making, business planning, organizational design, valuation and compensation system creating. He is Publishing Center Manager of The Faculty of Economics.