

## Managing Corporate Strategic Changes in the Context of Climate Change

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*The paper provides the solutions for managing the corporate strategic changes in the context of climate change, specifying the techniques for the improvement of the strategic management, rationalization of the corporate management functions as well as measures evaluating the influence of the changes executed to the enterprise competitiveness.*

*The paper presents in a detailed, however concise manner, as the outcome of the economic evaluations and empirical investigations on actions towards climate change taken by the enterprises in Lithuania, Latvia and Poland executed by the author, the set of corporate management measures to solve the tasks arisen with regard to climate change challenges (UN, 1998; EC 2003, 2009; EP, 2009) facing the enterprises and respectively inevitably leading to corporate strategic changes.*

*In this context paper analyses the solutions of strategic changes, specifying the techniques of their application in the context of improvement of the strategic management, rationalization of the corporate management.*

*When executing corporate strategic changes the author propose to use the complex set of measures determined as to ensure the reasonable efficiency of functions of the enterprise as well as its products. In order to ensure rational management of the corporate changes the author recommends to evaluate the efficiency of corporate strategic changes respectively proposing the toolkit created thereof. This allows to evaluate the benefit of the executed changes within the enterprise as to identify the directions and actions needed to continue the increase of the efficiency of the enterprise activity in the context of climate change.*

*The paper reveals the benefit of utilization of the proposed solutions.*

*According to the results of the implementation of the solutions suggested by the authors for the corporate strategic changes the conclusion is also made that the solutions concerned are featured by flexibility of the utilization of the considered techniques thereof as their characteristics can be modified and adjusted to the specifics of business environment. Hence, this let the competitiveness of the enterprises sustain and develop when pursuing the climate change challenges (UN, 1998; EC 2003, 2009; EP, 2009) set towards economic activities.*

*In this context the greater possibilities to rationalize the process of the strategic changes, the use of human potential, material and financial assets, to develop the resources of an enterprise and thus to reach the greater competitiveness of enterprises are formed.*

**Keywords:** *Management, strategic changes, climate change factors, Carbon emissions, Carbon Emissions Trading Scheme.*

### Introduction

Processes of corporate strategic changes take place continuously in the countries of market economy. This is a natural process, which is stimulated by competition, market changes, and processes of integration and globalization of countries' economic systems. They virtually affect all the sectors of economic systems as to the increasing competition of business entities, the desire to maintain or strengthen positions in competitive markets on national or international scales.

Nevertheless, in addition to this context, the adopted United Nations Convention on fighting climate change (UN, 1998) has set for the decades ahead further economic challenges for economic systems for the entire world. As the fundamental result thereof the business subjects have become engaged for and inevitably encouraged to take greater efforts rationalizing the usage of their human, material, financial resources for reducing carbon<sup>1</sup> emissions as a result of their business cycles generated over the life cycles of the products created while maintaining and strengthening their competitiveness.

The last decade of the economic system development has shown that corporate strategic changes in the context of climate change are a complicated task for enterprises and is related to a great risk due to its essentiality and extent. Many enterprises, eg., as in the Baltic region and across Europe, were not able to modernize their activity and had either incurred economic difficulties or, having not evaluated the impact of fast changes of external conditions, neither achieved the expected results in the last decade of the economic systems' transformation. There can be stated that business entities are facing contradictions: short or mid-term success versus long term sustainable development; efficiency versus creativity; exploitation versus exploration; speed versus time-consuming resource building (Cantwell, Iammarino, 2001; Nonaka, Toyama, 2002). Economic performance is influenced positively not only by the degree of diversification, for instance, but also by the ability of the company to increase its corporate coherence as the ability to generate and explore synergies of various types (Piscitello, 2004).

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<sup>1</sup> Carbon unit - the greenhouse gas emission allowance – one carbon unit equals to one ton of greenhouse gas emitted (EC, 2003, 2009).

These factors reveal the necessity to improve in a complex manner the management of corporate strategic changes. It needs solutions, which would give a possibility to an enterprise, acting in the changing economic environment, to rationalize the management of the combination of its human, material and financial resources and other relevant strategic property thus increasing the competitiveness of an enterprise and reducing carbon emissions (UN, 1998; EC 2003, 2009; EP, 2009).

**Scientific Problem.** The topic of corporate strategic changes has been analyzed in various aspects by Ansoff (1984), Greiner (1998), Zakarevicius (2003), Stripeikis, Zukauskas (2004), Christensen, et al. (2006), Porter, Kramer (2006), Sae (2008). Nevertheless the scientific research towards the corporate strategic changes in the context of climate change as fundamental factor of effective development of organizations is fragmentary. There was no research made until now, the results of which could set the background for preparation and effective implementation of the economically justified complex solutions for corporate strategic changes.

**The Purpose of the Research** is to propose the solutions for corporate strategic changes which would let enterprises rationalize the use of human, material and financial resources as well as other relevant strategic property, and develop possibilities of the use of enterprise potential reaching the competitiveness increase in the context of climate change.

**The Object of the Research** is corporate strategic changes as a radical and rational way to increase the competitiveness of enterprises.

Methods of the investigations are comparative analysis of the problem, synthesis, modelling.

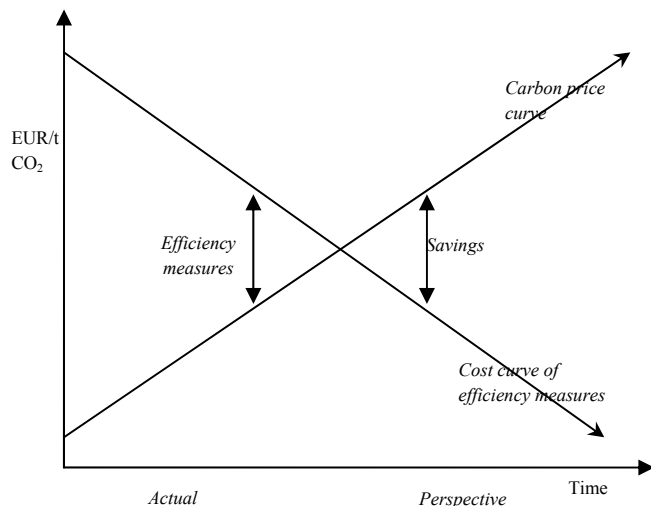
**Scientific Novelty and Practical Benefit.** The solutions for corporate strategic changes are proposed in the paper. They create the possibility to rationalize processes of corporate strategic changes and the use of human, material and financial potentials of an enterprise enabling to identify, adjust and implement measures allowing to reconcile controversial management ways, to strengthen the integrated links between strategic, tactical, operational tasks in each of the functions (and among the functions) and focus on the permanent improvement of the management systems of the enterprise.

### Climate Change and Corporate Strategic Changes

The physical impacts of climate change are already being experienced in the most parts of the world. Europe has seen an increase in the number of adverse weather related events in the past decade (Stern, 2006). The EU's climate policy is in keeping with the target of limiting the global temperature rise to 2°C in relation to its pre-industrial level (EC White Paper, 2009). This level is considered sufficient to reduce the probability of irreversible and extremely damaging effects but will not suffice to avoid a change in the climatic conditions currently experienced (UN, 1998). A consensus is emerging that addressing climate change will require a cut in global greenhouse gas emissions of at least 50% by the middle of the century (EC, 2009) – considerably more in

developed countries – which will have to bear the brunt of the abatement effort (EP, 2009).

It is clear that the significance of climate change is becoming such that enterprises will have to adapt to changing regulatory frameworks, such as constraints on carbon emissions for energy production and car & airplane production, construction and maritime also aviation as well as many other energy intensive economy sectors and the Carbon Emissions Trading Scheme<sup>2</sup> (EU ETS; EC 2003, 2009) leading to strategic changes at least in energy resources and carbon intensive economy sectors and businesses.



**Figure 1.** Trade Off between Efficiency Cost & Carbon Price

The changes needed to respond to climate change policies to reduce carbon emissions provide a clear example of a corporate strategic changes process. There are many opportunities - for example through the early adoption of innovative new technology - to place enterprises ahead of global competitors that are slower to anticipate change. Conversely, a failure to anticipate by business entities may lead to forced later adjustment, which could damage enterprises and, leave them inadequately prepared. Climate change will act as a key factor of evolution for the private and public enterprises (and organizations) involved. The enterprises' senior management bodies have to anticipate the changes and meet the challenges. To do so, enterprises will need to adapt their current products, processes and technology, and to develop more innovative solutions. Respectively, the changes will inevitably target a strategic management of enterprises.

EU regulations set fundamental requirements<sup>2</sup> (EC 2003, 2009) towards carbon emissions reductions hence pushing the demand for carbon permits. Therefore as well as with regard to the theory of scarcity (Robbins, 1932) the costs over efficiency measures are considered to decline in relative terms over the time (Figure 1).

<sup>2</sup> Business entities covered by National Allocation Plan (NAP; EC 2003, 2006, 2007, 2009) are allowed for carbon emissions to the size not exceeding the amount of carbon units assigned under NAP. If annual actual carbon emissions exceed the amount of carbon units assigned the business unit in question has to purchase respective lacking amount of carbon units via EU ETS or elsewhere otherwise it is subject to strict financial sanctions (EC 2003, 2009).

Investments in new technologies are more expensive than those in old technologies, but the costs of the former can be assumed to decrease with increases in their market share and hence to the point of being justified in cost-benefit terms than the old technology, which is more mature and experiences less cost reductions (Grübler et al., 2002).

### **Climate Change: Factors Affecting Enterprises and Measures Taken to Fight against**

35 Lithuanian, 76 Polish and 45 Latvian enterprises of NAPs have been interviewed by the author of this article seeking to examine how businesses are being influenced by, and responding to climate change related policies.

The enterprises interviewed (Appendix 1) were selected according to the number of carbon units assigned under NAP (EC, 2006, 2007) of each country covered. Respectively volumes of carbon unit assigned to the enterprises let to target economy sectors of the concerned countries with the most direct exposure to climate change policy. Interviews have been conducted over the phone with senior management of enterprises during the period of 2008-2009. The following issues have been covered:

- ✓ the main factors influencing enterprises' performance and response;

- ✓ the measures taken by enterprises in response to these factors;

- ✓ the potential implications for the enterprises in the context of climate change (UN, 1998; EC 2003, 2009).

The key findings of the investigation are the ones following below (Table 1).

These three main areas for climate change policy factors were determined, namely:

- ✓ social responsibility and reputation: only few of the interviewed enterprises seek to be seen for the customers, stakeholders as the ones taking action on climate change. Social responsibility and competitiveness were considered to be relevantly extended by energy intensive sector - cement, quicklime, coke and steel – due to themselves being exposed to the risk of competition from non-EU countries (as the latter are not covered by EU ETS and not affected by any climate change regulations similar alike to those applicable in the territory of EU);

- ✓ competitiveness: enterprises consider taking action on carbon emission reduction as a source of competitive advantage to maintain and expand a relevant market position, while being carbon intensive would result in a disadvantage and a risk of losing a market share<sup>2</sup>. Competitiveness was a dominant factor for energy intensive sector - cement, quicklime, coke and steel also fertilizers, other chemicals –especially when competing with non-EU entities. For energy intensive construction, wood processing materials, paper sector a competitive positioning and regulation remained a potential risk;

- ✓ regulation: the EU ETS and the regulations on renewable sources (EC, 2003, 2009; EP, 2009) were the strongest regulatory factors. Regulation was the dominant factor for the all sectors analyzed as all of them consequently are affected directly by the EU ETS.

These key four internal measures taken were determined, namely:

- ✓ increasing energy efficiency was relevant for all the sectors (except oil transportation and water transport): investing in more efficient fossil fuel and renewable energy technologies; improving building energy efficiency; diversifying energy sources minimizing dependence on fossil energy sources; measuring carbon emissions on daily basis (though most of enterprises interviewed are doing such measurement on annual basis thus leaving enterprises less flexible to market dynamics in short and mid terms);

- ✓ substituting raw materials: replacing fossil fuel with renewable sources (all sectors to significant extents, except oil transportation and water transport with lesser efforts set thereof); using waste materials to a greater extent against clinker (cement, quicklime, coke and steel industries);

- ✓ developing environment-friendly products were dominant for energy: heat & power sector; 100% renewable electricity and (or) heat product due to the utilization of biomass and other renewable energy sources.

- ✓ reducing climate vulnerability: seeking for long term bio-fuel supply agreements; importing bio fuel to secure efficient peak load operations; ensuring utilization of several alternatives of sources for fuel supply – were dominant for heat & power sector and significant for such energy intensive sectors such as cement, quicklime, coke and steel also fertilizers, other chemicals.

The following external measures were determined:

- ✓ trading in carbon allowances in the secondary market was dominant for all the sectors while only few entities (of heat & power and energy intensive: cement, quicklime, coke and steel, also fertilizers, other chemicals) were reaching the primary market via CDM and JI Kyoto Mechanisms (UN, 1998; EC, 2003);

- ✓ engaging early with the policy process (dominant for heat & power and energy intensive: cement, quicklime, coke and steel, also fertilizers, other chemicals) in order to influence influential relevant governmental institutions at national and EU levels;

- ✓ establishing partnerships (was relevant for all the sectors (except oil transportation and water transport) to research, lobby and develop projects sharing risk, skills; launching relevant initiatives on sustainable development, establishing relevant councils (e.g., cement, quicklime, coke and steel (CEMBUREAU, 2008) as to a respective sector; setting up the cooperation agreements on climate change issues with national stakeholders (such as ministries of economics, ministries of environment, also with local governments (for development of alternative energy sources, renovation of old, inefficient multi-flat dwellings (e.g., heat & power sector);

- ✓ influencing customer behavior (dominant for heat & power sector): public actions fostering broader use of energy saving measures for individuals as well as private and public organizations; political-social actions to fight against climate change (ICLEI, 2009).

With regard to impacts on jobs and skills the following conclusions are made:

- ✓ seeking for energy efficiency, reduction of carbon emissions enterprises interviewed have been improving managerial, technical capacities of their work force rather than changing their staff numbers;

- ✓ all enterprises have had environmental training to raise general skills and awareness of environmental and

climate change issues, energy efficiency opportunities etc. In addition to general training, bigger but few enterprises (of heat and power and energy intensive: cement, quicklime, coke and steel, also fertilizers, other chemicals) have tailored training to address specific needs such as exchange trading techniques and CDM & JI project management.

With regard to the findings presented above hereby in the subsequent chapters the author proposes the solutions for management of the corporate strategic changes as to achieve the goals of the relevant convergence of corporate strategic management and climate change.

### Programme for Strategic Changes

Corporate strategic changes are subject to the strategic management techniques used to rationalize the enterprise activity and resulting in essential changes of corporate strategy and structure, pursuing to increase enterprise competitiveness in clearly defined time outlook (Ginevicius, Bivainis, Tamosiunas et al., 2005). In this context it can be stated that corporate strategic changes are based on the programme (or plan) of the objectives and their tasks for changing the enterprise activities, covering the complex of the measures and ways thereof, which due to its content are similar to the programme for the implementation of the corporate strategy at both tactical and strategic levels of the enterprise management (Ansoff, 1984; Feldman, 2003; Sulkowicz, 2004; Paulet, 2008; Gudonavicius, Bartoseviciene et al., 2009; Meyer, Estrin, et al., 2009; Wood, 2009).

The following aspects are considered as the main ones with respect to the content of the programme of the enterprise strategic changes (Greiner, 1998; Ginevicius, Bivainis, Tamosiunas et al., 2005; Christensen et al, 2006; Hurley, 2006; Jasinevicius, Petrauskas, 2006; Greve, 2009):

- the enterprise activity objectives (long and short-term);
- the alternatives of strategic decisions towards corporate changes, respective techniques, validity of their application;
- the demand of human, material and financial resources and other property necessary for their application;
- the possible benefit of the strategy to the enterprise (if the latter were implemented) and risk factors which may reduce this benefit;
- the changes of enterprise organizational management structures to be made in order to implement the strategy;
- the necessary changes of human resources (reduction of staff number, employing, the change of functions, authority and responsibility);
- the changes of functional strategies to be done (concentrating on departments and divisions of the lowest efficiency level);
- the forecast of enterprise activity results (having implemented strategic changes) and their comparison with the expected results of the competitors activity;
- implementation plan for the programme of enterprise strategic changes, indicating the tasks to be solved and persons, divisions responsible for the execution of the tasks as well as the time schedules thereof.

One of the first tasks of implementation of the programme of the enterprise strategic changes is to renew the strategic management system. The second task is to rationalize the management of the enterprise in terms of efficiency increase

of corporate strategy and its functional strategies. The subsequent thing thereof is execution of programme tasks at the level of enterprise functional departments and business units (Greiner, 1998; Khanna, Palepu, 2006; Moatti, 2009).

### Improvement of Strategic Management

The purpose of strategic management system improvement task in the context of climate change is to rationalize execution of the main strategic management functions of an enterprise (corporate management, production, finance, marketing, innovation and human resources management) at operational, tactical and strategic levels. In order to solve this task it is necessary to select the set of measures and techniques allowing to form the combination of human, material and financial resources, the efficiency of which at operational, tactical and strategic levels would exceed the efficiency level of strategic management of the enterprise when strategic changes were not implemented. In this context the efficiency of strategic management ( $E$ ) formally could be expressed in the following manner:

$$E = f(E_h, E_m, E_f), \quad (1)$$

where:

$E_h$  – the efficiency of the usage of human resources;

$E_m$  – the efficiency of the usage of material resources and other property;

$E_f$  – the efficiency of the usage of financial resources.

In terms of enterprise strategic management efficiency in the context of climate change the measures and techniques creating the possibilities for the increase of the efficiency of the usage of enterprise resources, as well as their application procedures have to be provided within the programme of the corporate strategic changes, i. e.:

$$E_h = f(R, J, A) \geq E_h^0; \quad (2)$$

$$E_m = f(R, T, A) \geq E_m^0; \quad (3)$$

$$E_f = f(R, C_M, A) \geq E_f^0; \quad (4)$$

where:

$R$  – sales in monetary terms,

$J$  – number of employees;

$T$  – value of active share of assets (production measures);

$A$  – indicator of asset turnover;

$C_M$  – cost of materials.

Respective indicators of enterprise when strategic changes were not implemented are the following:  $E_h^0$ ,  $E_m^0$ ,  $E_f^0$ .

With regard to the enterprise strategic management efficiency in the context of climate change it is recommended to develop the following:

a) the possibilities for multifunctional application of resources;

b) the technological and production resources creating the competitive advantage.

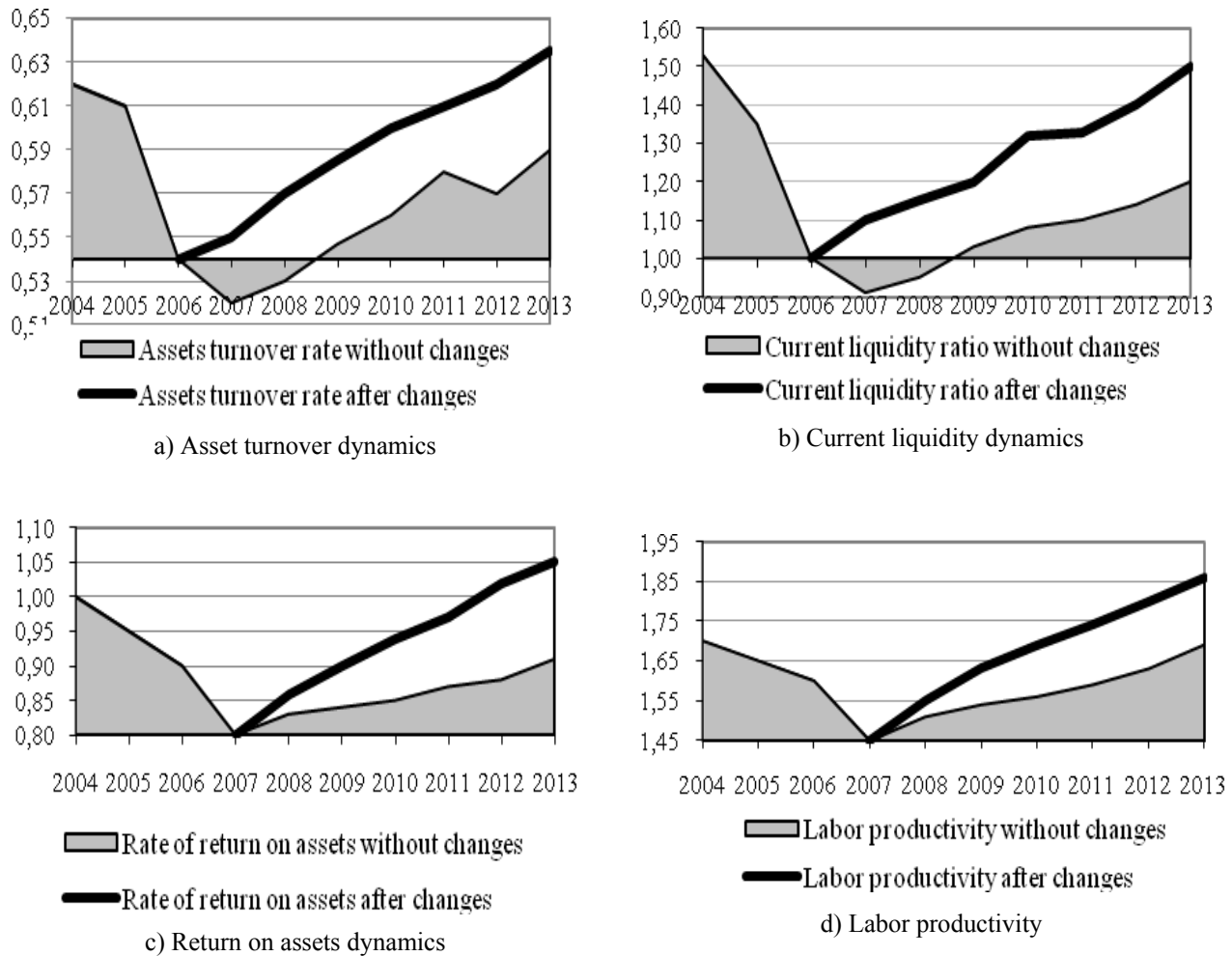
In terms of security of resources creating the competitive advantage the level of concentration of enterprise management rights, endowing the authority to control and manage the enterprise, would provide the greater possibilities to control these resources and minimize the risk of their loss.

The possibilities of multifunctional application of enterprise resources, employing the technological and production resources creating the competitive advantage to form conditions for the expedient change of enterprise strategy and its implementation techniques with regard to the enterprise competitiveness in the markets and mitigating the exposure to the climate change related factors (Table 1).

This is especially important trying to maintain or increase the enterprise market share in the markets as energy intensive (e.g. sectors of heat and power, cement and quicklime, coke and steel, fertilizers and other chemicals also construction and wood processing materials also paper

production) as receptive to innovations as well as subject to the products of relatively short life cycles (e.g. in the markets of information technologies, internet service, wireless communication, biotechnologies and, in certain cases food industry).

The results of application of this strategic management system improvement technique, when implementing programme of the corporate strategic changes of fertilizers production enterprise show that enterprise is of disposition of measures creating the possibility to reach the level of strategic management efficiency which exceeds the one the enterprise has had before the changes made under the programme considered above (Figure 2).



**Figure 2.** Dynamics of efficiency of strategic management of enterprise: after versus without changes (period for implementation of strategic changes is 2006-2008)

**The Rationalization of Corporate Management in the Context of Climate Change**

The rationalization of corporate management functions in the context of climate change determines the specific of enterprise activity, i. e.: the strategy, the nature of product, its market and human, material and financial resources (Christensen et al, 2006; Karpavicius, Gatautis et al., 2007; Greve, 2009; Kersiene, Savaneviciene, 2009; Sliogeriene, et al., 2009; Wood, 2009; ). In order to rationalize corporate management for modeling the corporate management

decisions (i. e.: strategic, administrative, functional, operational) and their possible combinations it is necessary to evaluate the characteristics of enterprise products, the markets subject to the enterprise activity as well as the enterprise strategy and functional strategies, their interdependence.

For instance, dependence of enterprise strategy efficiency on functional management decisions could be the following one:

$$E_s = f(E_{s1}, E_{s2}, \dots, E_{sn}), \quad (5)$$

where:

$E_s$  – the efficiency of enterprise strategy,

$E_{si} = f(E_{i1}, E_{i2}, \dots, E_{in})$  – the efficiency of functional strategies (i. e.: finance, production, marketing, management of human resources and information flows),  $E_{sj} = f(E_{j1}, E_{j2}, \dots, E_{jn})$  – the efficiency  $E_{sj}$  of function  $j$  as to implement efficiently the functional strategy (to achieve the respective level of efficiency  $E_{si}$  of the functional strategy),  $E_{j1}, E_{j2}, \dots, E_{jn}$  – efficiency of operations as to implement efficiently function  $j$  (to achieve respective level of the efficiency  $E_{sj}$  ( $j = 1, \dots, n$ ) of the function).

In this context the efficiency of operation to be executed to implement efficiently function  $j$  (to achieve respective level of the efficiency  $F_j$  of the function) could be characterized as following:

$$E_{jk} = f(w_{k1}, w_{k2}, w_{k3}, w_{k4}, w_{k5}, w_{k6}, w_{k7}, w_{k8}, w_{k9}), \quad (6)$$

where the factors determining the efficiency of operation  $k$  to be executed to implement function  $j$  are the following:

$w_{k1}$  – number of employees, necessary to execute the operation;

$w_{k3}$  – input of time, necessary to execute the operation;

$w_{k8} = \sum_j (y_{kj} / y_{nj})$  – homogeneity with respect to other

operations of function  $j$  ( $y_{kj}$  – characteristic of operation  $k$  of function  $j$  ( $k = w_{k1}, \dots, w_{k7}$ );

$y_{nj}$  – characteristics of operations  $n$  of function  $j$ ;

$n = 1, \dots, l$ );

$w_{k9}$  – actual carbon emission amount emitted when executing operation  $k$  to implement function  $j$  shall be measured (by respective physical measurement devices as to respective legitimate standards and norms) by environmental protection or production either other respective organizational unit assigned on daily basis in quantitative terms.

The following indicators show the level of qualification of employees  $w_{k2}$  necessary to execute operation  $k$  for function  $j$ ; the level of specialization  $w_{k4}$ ; value of vertical/horizontal links with respect to other operations  $w_{k5}$ ; the need of information  $w_{k6}$ ; the standardization level of operation execution  $w_{k7}$  are proposed to be evaluated by scores (applying ten-point evaluation system).

In order to ensure the comparability of quantitative ( $w_{k1}, w_{k3}, w_{k8}, w_{k9}$ ) and qualitative ( $w_{k2}, w_{k4}, w_{k5}, w_{k6}, w_{k7}$ ) indicators it is proposed for qualitative indicators to attribute the value of scores (applying ten-point evaluation system) having evaluated the significance of quantitative indicator on the basis of comparison of its quantitative value of the period considered with the average of its quantitative values per last three years of enterprise activity.

Having determined the values of factors of efficiency  $E_j$  of operation  $k$  of function  $j$ , the importance coefficients of these characteristics could be calculated in the following manner:

$$Y_e = N_e / \sum_e N_e, \quad (7)$$

where:

$Y_e$  – importance of value of indicator  $e$ ;

$N_e$  – value in scores of indicator  $e$ .

In the case of fertilizers' production enterprise, having characterized the strategic management functions of enterprise (Table 2) and compared them it was found, that it is expedient to improve the strategic management functions of enterprise as following:

a) managing finance means to ensure provision of information on time and reach maximal standardization of operations with respect to product  $g=1$ ;

b) managing production has to apply product  $g=1$  production organization techniques for product  $g=2$  production in broader scale and ensure provision of information on time;

c) managing human resources must implement the measures increasing potential of human resources with respect to product  $g=1$  and strengthen the links with other strategic management functions of product  $g=1$ ; due to the homogeneity of operations of human resource management functions among products  $g=1$  and  $g=2$  it is expedient to use the human resource management techniques applied in the context of product  $g=1$  for management of personnel working with product  $g=2$ ;

d) managing marketing means to increase standardization of operations of marketing functions of product  $g=1$  and partially apply them in the process of development (production) and sale of product  $g=2$ ; due to the importance of time input with respect of product  $g=1$  it is expedient to ensure that this function is executed flexibly and operatively;

e) as to the strategic management it should to ensure (in the context of product  $g=1$ ) that operations are executed flexibly, operatively, and information is provided on time; strategic management operations of product  $g=1$  may be partially standardized and applied for product  $g=2$  management;

f) as to carbon emission volumes it is expedient to consider applying efficiency measures on a broader scale with regard to marketing (namely as to delivery networks efficiency) and production of product  $g=2$ .

Having identified values of enterprise business process management characteristics in terms of enterprise strategy efficiency, it is necessary to evaluate the affect of enterprise product characteristics to the efficiency of enterprise strategy (Ginevicius, R., Bivainis, J., Tamosiunas, A. et al., 2005).

Applying the techniques described in this paragraph the dominating characteristics of enterprise strategic management functions and their operations can be identified. On the basis of these characteristics the enterprise strategic management functions could be rationalized at the level of enterprise and its functional departments or business units.

Table 1

## Significance of factors effected thereto and measures taken by the enterprises interviewed

	Economy sector	Heat & power	Cement, quicklime, coke and steel	Meat, sugar, dairy & agriculture products	Textile; car, truck tires	Fertilizers, other chemicals	Construction, wood, paper materials	Oil transportation and water transport	Significance of factor value
<b>Climate change policy factors</b>	Social Responsibility	0.25 <sup>3</sup>	0.5	0	0.25	0.25	0.25	0	2.9%
	Regulation	1	1	1	1	1	1	1	<b>16.4%</b>
	Competitiveness	0	1	0.25	0.25	0.5	0.5	0	5.8%
<b>Internal measures</b>	Increasing energy efficiency	1	0.5	0.5	0.5	0.5	1	0.25	<b>9.9%</b>
	Substituting raw materials	1	1	0.5	0.5	1	0.5	0	<b>10.5%</b>
	Developing the environment-friendly products	0.5	0.25	0.25	0.25	0.25	0.25	0	4.1%
	Reducing climate vulnerability	1	0.5	0.25	0.25	0.5	0.25	0	<b>6.4%</b>
<b>External measures</b>	Influencing customer behaviour	0.5	0	0	0	0	0	0	1.2%
	Trading in carbon allowances (EU ETS)	1	1	0.5	0.5	1	1	0.5	<b>12.9%</b>
	Engaging with the policy process	0.5	0.5	0	0	0.5	0.25	0	4.1%
	Working in partnerships	0.5	0.5	0.25	0.25	0.5	0.5	0	5.8%
<b>Implication on Jobs</b>	Direct Jobs	0	0	0	0	0	0	0	0.0%
	Indirect Jobs	0	0	0	0	0	0	0	0.0%
	Upskilling	0.5	0.25	0.5	0.5	0.25	0.5	0.25	<b>6.4%</b>
<b>Implication on skills</b>	Environmental training on management issue	0.5	0.5	0.25	0.25	0.5	0.25	0.25	5.8%
	Environmental training on technical issues	0.5	0.5	0.25	0.25	0.5	0.25	0.25	5.8%
	Tailored training	0.25	0.25	0	0	0.25	0	0	1.8%
<b>Total factor value per sector</b>		<b>8.75</b>	<b>8.25</b>	4.5	4.75	<b>7.5</b>	<b>6.5</b>	2.5	<b>42.75</b>
<b>Significance of factor value for sector</b>		<b>20%</b>	<b>19%</b>	11%	11%	<b>18%</b>	<b>15%</b>	6%	

<sup>3</sup> Maximum value 1 is given if more than 75% of interviewed enterprises have acknowledged the importance of the factor/measure taken, 0,5 – if less than 75% of interviewed enterprises have acknowledged the importance; 0,25 is given if less than 50% of interviewed enterprises and 0 value is given if less than 25% of interviewed enterprises have acknowledged the importance of the factor/measure in question taken.

Table 2

Characteristics of management functions for enterprise products  $g=1$  and  $g=2$  and results of their comparison

Characteristics of enterprise products	Importance of characteristics of enterprise products $g=1$ and $g=2$ management functions												Comparison of characteristics of management functions of product $g=1$ and product $g=2$ (%)				
	$g=1$ management functions						$g=2$ management functions						Management functions				
	Total importance	Strategic management	Marketing	Human resources	Production	Finance	Total importance	Strategic management	Marketing	Human resources	Production	Finance	Strategic management	Marketing	Human resources	Production	Finance
Carbon emission level	0.317	0.063	0.060	0.062	0.066	0.066	0.404	0.081	0.092	0.062	0.104	0.066	-22%	-35%	-1%	-37%	1%
	100%	20%	19%	19%	21%	21%	100%	20%	23%	15%	26%	16%					
Operations homogeneity	0.610	0.122	0.119	0.129	0.121	0.119	0.565	0.113	0.111	0.116	0.103	0.121	8%	7%	11%	18%	-2%
	100%	20%	20%	21%	20%	19%	100%	20%	19%	21%	18%	22%					
Standardization level	0.582	0.116	0.114	0.116	0.095	0.139	0.567	0.113	0.108	0.128	0.100	0.118	2%	6%	-9%	-5%	18%
	100%	20%	20%	20%	16%	24%	100%	20%	19%	22%	18%	21%					
Information demand	0.582	0.116	0.114	0.108	0.138	0.106	0.551	0.110	0.112	0.118	0.110	0.100	6%	2%	-9%	25%	5%
	100%	20%	20%	18%	24%	18%	100%	20%	20%	22%	20%	18%					
Link to other functions	0.563	0.113	0.114	0.116	0.108	0.112	0.564	0.113	0.120	0.109	0.108	0.114	0%	-5%	6%	0%	-2%
	100%	20%	20%	21%	19%	20%	100%	20%	22%	19%	19%	20%					
Specialization level	0.583	0.117	0.125	0.114	0.122	0.106	0.579	0.116	0.118	0.120	0.116	0.109	1%	5%	-5%	5%	-3%
	100%	20%	21%	20%	21%	18%	100%	20%	20%	21%	20%	19%					
Time input	0.586	0.117	0.109	0.126	0.108	0.125	0.557	0.111	0.097	0.132	0.103	0.113	5%	12%	-5%	5%	11%
	100%	20%	19%	21%	18%	21%	100%	20%	18%	24%	18%	20%					
Qualification level	0.626	0.125	0.125	0.119	0.128	0.129	0.669	0.134	0.123	0.127	0.137	0.148	-6%	1%	-6%	-7%	-13%
	100%	20%	20%	19%	20%	21%	100%	20%	18%	19%	20%	22%					
Employees number	0.551	0.110	0.120	0.110	0.112	0.099	0.544	0.10	0.118	0.088	0.118	0.111	1%	1%	25%	-5%	-11%
	100%	20%	22%	20%	20%	18%	100%	20%	22%	16%	22%	20%					

## Model for the Evaluation of the Benefit of Corporate Strategic Changes

No any specific methods for the evaluation of the effectiveness of the programmes of the corporate strategic changes in the context of climate change were found in the literature studied. It was observed that ordinary methods for the analysis and evaluation of the effectiveness (the concept of competitiveness is often used thereof) of the enterprise activity are often applied. In this respect vast system of the indicators are presented in the analyzed literature (Ginevicius, Bivainis, Tamosiunas et al., 2005; Streimikiene, Girdzijauskas, 2008; Kazlauskienė, Christauskas, 2008; Ponikvar, Tajnikar et al., 2009; Schieg, 2009; Wood, 2009). These indicators could be brought in the following groups:

- market share indicators – enterprise market share, rate of the sales growth in the market;
- financial indicators – coefficients of the enterprise liquidity and financial risk, turnover and profitability, profitability of the shares and dynamics of their market value variation, size of expenditures;
- development indicators – investments scope, expenditures for scientific exploratory works, expenditures for improvement of management and engineering qualifications in order to attract volumes of the foreign investments;
- marketing indicators – qualitative characteristics of products and services, quality of the customer servicing activities, the use of the up-to-date technologies, sales network, advertisement, enterprise image, size of marketing expenditures;
- productivity indicators – expression of the size of annual sales in physical units and the value added per employee annually created, dynamics of the productivity indices, reflecting the variation of the competitiveness level for the considered time period.

Having summarized the possible indicators for the evaluation of the effectiveness of the programmes of the corporate strategic changes, the following main criteria for the evaluation of the considered programmes are determined: market share; financial capacity; business development potential; product competitiveness; enterprise productivity.

Basing upon the criteria stated above the respective model is proposed which generalized expression is following:

$$E_s = f(C, P, M, B, F) \geq E_s^0 = f(C^0, P^0, M^0, B^0, F^0); \quad (8)$$

where:

$E_s$  – the benefit of the programme of the corporate strategic changes;

$C$  – product competitiveness;

$P$  – enterprise productivity;

$M$  – market share;

$B$  – business development potential;

$F$  – financial capacity;

$C^0, P^0, M^0, B^0, F^0$  – respective indicators of enterprise when strategic changes were not implemented;

$E_s^0$  – enterprise activity effectiveness if the programme of the corporate strategic changes were not applied.

In the context of the model stated above the calculated indicators for the enterprise after the changes are compared with the respective ones determined the enterprise without

changes. Each component of the above model is detailed in the subsequent paragraphs to the level ensuring the practical application of the considered model.

It is proposed to use the following principles when evaluating the effectiveness of the programmes for the corporate strategic changes under the above described model:

- the results of corporate strategic changes can be considered as satisfactory when there is only one indicator lesser and there is also at least the one higher than the respective ones of the enterprise when strategic changes were not implemented;

- the results of corporate strategic changes can also be considered as satisfactory when there are at least three indicators values of which are higher than the ones of the enterprise when strategic changes were not implemented.

Other modifications are proposed to be defined as the subjects to the not satisfactory results of the corporate strategic changes.

The proposed principles of assessment of the results of the corporate strategic changes present the possibility to determine the minimal necessary level of the benefit of the changes made and evaluate the effectiveness of each enterprise management area.

## Conclusions

Carbon emission has become the one of critical factors determining effectiveness of the strategic management of enterprises and subsequently their potential of sustainable development.

Trade-off between the level of effectiveness of strategic management of enterprises and a level of carbon emission reduction directly impact the competitiveness of the enterprises.

The proposed solutions of the management of the programmes for the corporate strategic changes in the context of climate change challenges (UN, 1998, EC, 2003, 2009, EP, 2009) gives the following possibilities to the enterprises which have implemented strategic changes:

- to rationalize the strategic management of the enterprise, ensuring the effective utilization of the human, financial and material resources and other relevant strategic property, and the control of the main processes of the activity as well as its flexibility achieving greater convergence of corporate strategic management and climate change goals;

- to improve management of the enterprise, increasing the effectiveness of the management of the enterprise independent business units as well as the functional departments in the context of the competitiveness of the corporate as well as functional strategies;

- to control the implementation process of corporate strategic changes, evaluating the effect of the measures applied with respect to the tactical and the strategic levels of the corporate management (applying these measures for the rationalization of the set of the resources), correcting (improving, changing) the latter ones (the process of their implementation and the way and object of application) in order to increase efficiency of the utilization of the resources of the enterprise;

- to evaluate the benefit of the programme for the corporate strategic changes in the context of the following criteria: market share; financial capacity; business development potential; product competitiveness; enterprise productivity;
- to evaluate the enterprise effectiveness, its development possibilities as well as viability of the corporate strategy and its functional strategies with respect to its strategic, tactical and operational management levels in terms of the main characteristics of the enterprise within the context of the competitive advantages of the enterprise.

## References

- Ansoff, H. I. (1984). *Implementing Strategic Management*. Prentice Hall, 378.
- Cantwell, J., Iammarino, S. (2001). EU Regions and Multinational Corporations: Change, Stability and Strengthening of Technological Comparative Advantages. *Industrial and Corporate Change*. 10(4), 1007-1037.
- CEMBUREAU (2008). *Regarding the European cement industry's vulnerability to carbon leakage in relation to the ongoing EU Emission Trading Scheme (EU ETS) negotiations*. A press conference, Brussels, December 8.
- Christensen, C. M. et al. (2006). The Tools of Cooperation and Change. *Harvard Business Review*. October, 72-82.
- EC (2006). *Concerning the national allocation plan for the allocation of greenhouse gas emission allowances notified by Latvia in accordance with Directive 2003/87/EC of the European Parliament and of the Council*. EC Decision of Nov 26.
- EC (2006). *Concerning the national allocation plan for the allocation of greenhouse gas emission allowances notified by Lithuania in accordance with Directive 2003/87/EC of the European Parliament and of the Council*. EC Decision of Nov 26.
- EC (2007). *Concerning the national allocation plan for the allocation of greenhouse gas emission allowances notified by Poland in accordance with Directive 2003/87/EC of the European Parliament and of the Council*. EC Decision of March 26.
- European Commission (EC). *White Paper. Adapting to climate change: Towards a European framework for action*. Brussels, 2009.
- EC. *Directive 2009/29/EC of the European Parliament and of the Council of April 23 of 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community*. OJ L 140, 5.6.2009, 63.
- EC. *Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community (Community scheme) in order to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner*. OJ L 275, 25.10.2003, 32.
- European Parliament (EP). *Resolution of 31 January 2008 on the outcome of the Bali Conference on Climate Change (COP 13 and COP/MOP 3)*. OJ C 68 E, 21.3.2009, 13.
- Greiner, L. E. (1998). Evolution and Revolution as Organizations Grow. *Harvard Business Review*. May-June, 55-66.
- Greve, H. R. (2009). Bigger and safer: the diffusion of competitive advantage. *Strategic Management Journal*. 30, 1-23.
- Grubler, A., Nakicenovic, N., and Nordhaus, W. D. (eds), 2002, *Technological Change and the Environment*. Resources for the Future Press, Washington, DC, USA, 407.
- Ginevicius, R., Bivainis, J., Tamosiunas, A. et al. (2005). *Modern Business: Development Priorities*. Collective Monograph. Published in Lithuanian language: Siuolaikinis verslas: tobulinimo galimybes. Vilnius Gediminas Technical University, Vilnius "Technika", 447
- Gudonavicius, L., Bartoseviciene, V., & Saparnis, G. (2009). Imperatives for Enterprise Strategists. *Inzinerine Ekonomika-Engineering Economics*(1), 75-82.
- Feldman, M. S. (2003). A Performative Perspective on Stability and Change in Organizational Routines. *Industrial and Corporate Change*. 12(4), 727-752.
- ICLEI – Local Governments for Sustainability. *Report on the actual status of the Local Government Climate Roadmap*. June 2009.
- Hurley, R. F. (2006). The Decision of Trust. *Harvard Business Review*. September, 55-66.
- Khanna, T., Palepu, K. G. (2006). Emerging Giants: Building World-Class Companies in Developing Countries. *Harvard Business Review*. October, 60-72.
- Jasinevicius, R., & Petrauskas, V. (2006). Dynamic SWOT Analysis as a Tool for System Experts. *Inzinerine Ekonomika-Engineering Economics*(5), 33-35.
- Karpavicius, T., Cvilikas, A., & Gatautis, R. (2007). Application of Systemic Management Conception to Organization's Management Decisions Structuring. *Inzinerine Ekonomika-Engineering Economics*(4), 44-52.
- Kazlauskienė, V., Christauskas, C (2008). Business Valuation Model Based on the Analysis of Business Value Drivers. *Inzinerine Ekonomika-Engineering Economics*(2), 23-31.
- Kersiene, K., & Savaneviciene, A (2009). The Formation and Management of Organizational Competence Based on Cross-Cultural Perspective. *Inzinerine Ekonomika-Engineering Economics*(5), 56-66.
- Meyer, K. E., Estrin, S. et al. (2009). Institutions, resources, and entry strategies in emerging economies. *Strategic Management Journal*. 30, 61-80.

- Moatti, V. (2009). Learning to expand or expanding to learn? The role of imitation and experience in the choice among several expansion modes. *European Management Journal*. 27, 36-46.
- Nonaka, I., Toyama, R. (2002). A Firm as Dialectical Being: Towards a Dynamic Theory of a Firm. *Industrial and Corporate Change*. 11(5), 995-1009.
- Paulet, E. (2008). Corporate Governance for European Small and Medium Size Enterprises: An Ambivalent Concept on Theoretical and Empirical Basis. *Transformations in Business & Economics*, 7(3), Supplement C, 207-218.
- Piscitello, L. (2004). Corporate Diversification, Coherence and Economic Performance. *Industrial and Corporate Change*. 13(5), 757-787.
- Ponikvar, N., Tajnikar, M., Pusnik, Ks. (2009). Performance Ratios for Managerial Decision-Making in a Growing Firm. *Journal of Business Economics and Management*, 10(2), 109-120.
- Porter, M. E., Kramer, M. R. (2006). Strategy and Society: the Link Between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*. December, 76-94.
- UN (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate change*. United Nations.
- Robbins, L. (1932, 2nd ed., 1935). *An Essay on the Nature and Significance of Economic Science*. London: Macmillan: 16.
- Saee, J. (2008). Best Practice in Global Negotiation Strategies for Leaders and Managers in the 21st Century. *Journal of Business Economics and Management*, 9(4), 309-318.
- Schieg, M. (2009). Model for Integrated Project Management. *Journal of business economics and management*, 10(2), 149-160.
- Stern Review (2006). *The Economics of Climate Change*, UK Government.
- Stripeikis, O., Zukauskas, P. (2004). Smulkaus ir vidutinio verslo aplinka Lietuvos ir ES rinkose. *Organizacijų vadyba: sisteminiai tyrimai*. 31, 209-228.
- Sulkowicz, K. J. (2004). Worse than Enemies. The CEO's Destructive Confidant. *Harvard Business Review*. February, 65-71.
- Sliogeriene, J., Kaklauskas, A., Zavadskas, E. K., Bivainis, J., Seniut, M. (2009). Environment Factors of Energy Companies and their Effect on Value: Analysis Model and Applied Method. *Technological and Economic Development of Economy* 15(3), 490-521.
- Streimikiene, D., Girdzijauskas, S. A (2008). Logistic Growth Models for Analysis of Sustainable Growth. *Transformations in Business & Economics*, 7(3), Supplement C, 218-236.
- Zakarevicius, P. (2003). *Pokyciai organizacijoje: priezastys, valdymas, pasekmes*. Kaunas, VDU leidykla, 176.
- Wood A. (2009). Capacity Rationalization and Exit Strategies. *Strategic Management Journal*. 30, January, 25-44.

Appendix 1

**Enterprises<sup>4</sup> investigated in Lithuania, Latvia and Poland**

Sector	Lithuania		Latvia		Poland	
	Enterprise	Carbon units <sup>5</sup>	Enterprise	Carbon units	Enterprise	Carbon units
Energy: heat & power	1. Mažeikių nafta, AB, Orlen S.A.	9.347.149 <sup>6</sup>	A/S „Latvenergo”	6.356.629	BOT Elektrownia Belchatow S.A.	116.106.620
	2. Vilniaus energija, UAB	5.252.858	A/S „Rīgas siltums”	1.563.128	Elektrownia Kozienice S.A.	52.066.375
	3. Kauno termofikacijos elektrinė, UAB	2.811.253	A/S „Liepājas metalurģs”	1.999.170	Elektrownia Rybnik S.A., Everen S.A.	39.659.440
	4. Lietuvos elektrinė, AB	2.732.529	SIA „Liepājas enerģija”	769.410	PKE S.A.	26.240.960
	5. Litesko, UAB	1.006.353	DP A/S „Daugavpils siltumfiki”	709.035	Elektrownia Skawina S.A., CEZ S.A.	10.126.765
	6. Panevėžio energija, AB	947.802	A/S „Rīgas siltums”	582.870	Polski koncern naftowy Orlen S.A.	17.072.555
	7. Klaipėdos energija, AB	944.351	A/S „Latvijas Gāze”	317.331	Elektrocieplownia EC Nowa sp. z o.o.	12.671.085
	8. Šiaulių energija, AB	586.597	PP SIA „Pārventas siltums”	262.033	ZE Ostroleka S.A., Energia S.A.	11.726.725
	9. Ignalinos atominė elektrinė, VI	425.135	SIA „Latgales enerģija”	253.026	ZE PAK S.A.	7.933.365
	10. Kauno energija, AB	281.690	SIA „Jūrmalas siltums”	244.453	ZE Wrocławskich Kogeneracja S.A.	6.214.460
	11. Ukmergės energija, UAB	275.969	PP SIA „Ventspils siltums”	207.442	ZE Bydgoszcz S.A.	5.462.495
	12. Mažeikių šilumos tinklai, UAB	215.340	AS „Olainestidens un siltums”	180.400	Energetyka Dwory sp. z o.o.	2.741.455
	13. Utenos šilumos tinklai, UAB	191.333	SIA „Līvberzes enerģija”	166.930	Elektrownia Nowa Sarzyna sp. z o.o.	1.816.475
	14. Geoterma, UAB	222.764	SIA „Jelgavaskogenerācija”	150.542	Kompania Wegliowa S.A.	1.656.625
	15. Jonavos šilumos tinklai, AB	183.971	DP A/S „Daugavpils siltumfiki”	147.575	Radomskie PEC "Radpec" S.A.	1.411.190
	16. Varėnos šiluma, UAB	97.044	SIA „Valmieras siltums”	116.817	PEC w Jastrzebiu Zdroju	872.320
	17. Plungės šilumos tinklai, UAB	95.656	Ogres novada PA „Mākalne”	132.969	MPEC sp. z o.o. Wlclawek	830.975
	18. Šilutės šilumos tinklai, UAB	93.632	SIA „Latgales enerģija”	130.515	Nadwislanska SE sp. z o.o. Brzeszcze	823.860
	19. Tauragės šilumos tinklai, UAB	91.371	SIA „Salaspils siltums”	115.580	MEC sp. z o.o w Ostrowcu Swietokrzyskim	706.780

<sup>4</sup> As to EC Directive (EC, 2003) all the main energy and carbon intensive business entities within EU are subject to NAPs. Respectively the regulations are applicable for entities investigated under NAPs of Latvia, Lithuania and Poland (EC 2006, 2007).

<sup>5</sup> Carbon units assigned to the business entities for the period of 2008-2012 as to respective NAP of countries investigated (EC 2003, 2006; 2007).

<sup>6</sup> As to the size of the enterprises a volume of carbon units assigned under NAP directly correspond to the size of the enterprise in physical and monetary terms.

Energy intensive - cement, quicklime, coke and steel	20. Akmenės energija, UAB	67.605	SIA „Aizkraukles siltums”	75.580	MPEC sp. z o.o. w Białymstoku	649.575
	21. Radviliškio šiluma, UAB	61.643	SIA „Tukuma siltums”	67.670	MEC Sp. z o.o. w Koszalinie	693.860
	22.		SIA „Dobeles enerģija”	65.415	WPEC w Legnicy S.A.	644.615
	23.				PEC w Dabrowie Gorniczej S.A.	499.490
	24.				PEC "Legionowo" sp. z o.o.	425.035
	25.				PEC S.A. w Walbrzychu	398.170
	26.				PEC sp. z o.o., Ciechanow	394.480
	1. Akmenės cementas, AB	4.928.084	SIA „Cemex”	2.054.281	Arcelormittal Poland S.A.	20.350.380
	2. Naujasis kalceitas, AB	364.689			Grupa Ozarow S.A.	9.895.410
	3.				Zakłady Koksownicze "Zdzieszowice" sp. z o.o.	8.580.890
	4.				Cementownia "Warta" S.A.	4.829.955
	5.				Koksownia Przyjazn sp. z o.o.	2.416.110
	6.				Zakłady koksownicze "Zdzieszowice" sp. z o.o.	1.813.825
	7.				Cementownia "Odra S.A.	1.570.290
	8.				Kombinat Koksowniczy "Zabrze" S.A.	1.315.000
	9.				Cementownia "Rejowiec" S.A.	1.004.515
10.				Cementownia "Nowa Huta" S.A.	944.765	
11.				Polchar sp. z o.o.	822.415	
12.				CMC Zawiercie S.A.	774.620	
13.				Walbrzyskie zakłady koksownicze "Victoria" S.A.	622.490	
14.				Celsa "Huta Ostrowiec" sp. z o.o.	534.175	
15.				Koksownia Czestochowa Nowa sp. z o.o.	384.595	
16.				Carbo-koks sp. z o.o.	348.785	
Energy intensive - meat, sugar, dairy and agriculture products	1. Danisco Sugar Panevėžys, AB	278.000,0	A/S „Jelgavascukurfabrika”	204.109	Krajowa spolka cukrowa S.A. w Toruniu	2.251.750
	2. Pagirių šiltnamiai, AB	131.632,0	SIA „Jaunpagasts Plus”	168.312	Zakłady "Animex" S.A.	2.156.170
	3. ARVI cukrus, UAB	85.765,0	A/S „Putnu fabrika „Kekava””	153.628	Pfeifer & Langen Polska S.A.	1.202.500
	4.		SIA „Sabiedrība Mārupe”	115.112	BSO Polska S.A.	627.155
	5.		A/S „Rīgas piena kombināts”	80.677	Spółdzielnia Mleczarska "Mlekpól"	350.500
	6.		A/S „Valmieraspiens”	70.842	Zakłady tłuszczowe Bodaczow sp. z o.o.	318.115
	7.		A/S „Preiļu siers”	52.820	Zakłady miesne "Lmeat-Lukow" S.A.	256.275
	8.		A/S „Balticovo”	41.395		
Employment intensive: textile; car, truck tires	1.		A/S „Ligija teks”	96.742	Michelin Polska S.A.	1.419.675
	2.		SIA „KP Tehnoloģijas”	85.000	Firma oponiarska Debica S.A.	320.710
Energy intensive-fertilizers, other chemicals	1. Achema, AB	1.062.787			Soda polska Ciech sp. z o.o.	5.249.360
	2. Lifosa, AB	499.696			Zakłady azotowe Anwil S.A.	1.460.625
	3.				Elana - Energetyka sp. z o.o.	1.500.430
	4.				Zakłady azotowe Kedzierzyn S.A.	2.621.295
	5.				Zakłady azotowe "Pulawy" S.A.	7.013.305
	6.				Zakłady azotowe w Tamowie Moscicach S.A.	4.341.545
	7.				Zakłady chemiczne "Police" S.A.	3.563.620
Energy intensive: construction, wood processing materials, paper	1. Paroc, UAB	350.744	SIA „Kalnciema ķieģelis”	268.227	"Trzuskawica" S. A.	4.130.260
	2. NEO Group, UAB	296.155	A/S „Valmierasstiklašķiedra”	169.084	International paper – Kwidzyn S.A.	2.632.745
	3. Grīgiškės, AB	256.626	SIA „Lodes ķieģelis”	145.849	Warta glass S.A.	1.706.870
	4. Klaipėdos kartonas, AB	161.563	SIA „Brocēnu keramika”	129.601	O-I produkcja polska S.A.	1.231.605
	5. Klaipėdos mediena, AB	121.949	A/S „Latvijas Finieris”	127.473	Komex sp. z o.o.	1.155.015
	6. Panevėžio stiklas, AB	119.014	SIA „Bolderaja Ltd.”	92.598	Steico S.A.	1.093.595
	7. Matuizų plytinė, UAB	66.158	A/S „Lauma”	91.618	Arctic paper Kostrzyn S.A.	1.086.470
	8.		SIA „Cēsu būvnieks”	80.290	Kronopol sp. z o.o.	1.023.100
	9.		SIA „Līvānuķieģelis”	76.675	KZPP "Koniecpol" S.A.	894.595
	10.		SIA „Papīrfabrika Līgatne”	74.309	Kronospan Szczecinek sp. z o.o.	880.065
	11.		A/S „Grīziņkalns”	30.000	Ardagh glass Ujscie S.A.	781.680
	12.				Guardian Czestochowa sp. z o.o.	686.335
	13.				Pfleiderer prospan S.A.	550.015
	14.				Fibris S.A.	521.255
	15.				Fabryja papieru "Malta-Decor" S.A.	377.480
	16.				Fabryka papieru Myszkow sp. z o.o.	441.900
	17.				Hardex S.A.	411.870
	18.				Ceramika budowlana sp. z o.o.	245.000
Oil transportation and water transport	1.		SIA „Port Milgrāvis”	549.360		
	2.		A/S „Ventbunkers”	156.456		
	3.		A/S „BLB Baltijas Termināls”	64.019		

Andrius Tamošiūnas

## Įmonių strateginių pokyčių valdymas klimato kaitos kontekste

Santrauka

Straipsnyje nagrinėjami klimato kaitos įtakos įmonių veiklai aspektai ir priemonės įmonių strateginiams pokyčiams, sąlygojamiems klimato kaitos veiksnių, valdyti.

Atlikus analitinius ir empirinius tyrimus (apklaustos 35 Lietuvos, 76 Lenkijos ir 45 Latvijos įmonės, dalyvaujančios šiltnamio efektą sukeliančių dujų taršos leidimų prekybos sistemoje (EC, 2003, 2009) šių ūkio sektorių: a) šilumos ir elektros energijos gamybos, b) cemento, kalkių, plieno gamybos, c) mėsos, cukraus, pieno ir žemės ūkio produktų, d) tekstilės, automobilių detalių gamybos, e) trašų gamybos, f) medžio apdirbimo, statybos, popieriaus gaminių, g) naftos produktų ir vandens transporto) teigiama:

- klimato kaitos valstybinio reguliavimo priemonės (EC 2003, 2009) yra pagrindinės, lemiančios įmonių veiklos strateginius pokyčius, iš visų nagrinėtų ūkio sektorių įmonių. Socialinės atsakomybės veiksnyms nėra iš esmės reikšmingas įmonių veiklai, o konkurencijos veiksnyms svarbus tik cemento, kalkių, plieno, trašų gamybos ir medžio apdirbimo, statybos, popieriaus gaminių sektorių įmonėms, tačiau būtent dėl importuojamų iš ne ES valstybių produktų požiūriu dėl neadekvačių klimato kaitos valstybinio reguliavimo priemonių;

- dominuojančios (iš visų (išskyrus naftos produktų ir vandens transporto) sektorių įmonių) vidinės įmonių strateginių pokyčių priemonės, kurias įmonės naudojo, siekdamas mažinti dujų, sukeliančių šiltnamio efektą, taršą klimato kaitos valstybinio reguliavimo požiūriu, yra atsinaujinančių energijos šaltinių, atsinaujinančią energiją naudojančių produktų-pakaitalų plėtros priemonės, siekiant užtikrinti pastarųjų naudojimą ilgam laikui;

- dominuojanti (iš visų nagrinėtų sektorių įmonių) išorinė priemonė, siekiant mažinti šiltnamio efektą sukeliančių dujų taršą, yra dujų, sukeliančių šiltnamio efektą, taršos leidimų prekybos sistema;

- nustatytų klimato kaitos reguliavimo priemonių šiltnamio efektą sukeliančių dujų taršai mažinti poveikis nagrinėtų sektorių įmonių darbo vietų pokyčiams buvo minimalus – įmonės vengė mažinti personalo skaičių, jos taikė personalo kvalifikaciją keliančias priemones.

Atlikto tyrimo rezultatai parodė, kad pateiktas priemonės aktyviai naudojo būtent energiją intensyviai vartojančios (jos taip pat yra intensyviai aplinką teršiančios) įmonės šių ūkio sektorių: a) šilumos ir elektros energijos gamybos, b) cemento, kalkių, plieno gamybos, e) trašų gamybos, f) medžio apdirbimo, statybos, popieriaus gaminių.

Įvertinus atlikto tyrimo rezultatus, daroma išvada, kad šiltnamio efektą sukeliančių dujų tarša yra vienas iš kritinių veiksnių, lemiančių įmonių strateginio valdymo efektyvumą ir įmonių konkurencingumo stiprinimo galimybes.

Apibendrinus mokslininkų darbų apie įmonių strateginius procesus rezultatus ir atlikus analitinius ir empirinius tyrimus, straipsnyje pasiūlytos priemonės strateginiams pokyčiams valdyti: esminiai įmonės strateginių pokyčių programos komponentai; būdas įmonės strateginėms valdymo funkcijoms racionalizuoti. Taikant šį būdą, gali būti nustatomos dominuojančios įmonės strateginių valdymo funkcijų, jų operacijų charakteristikos. Šių charakteristikų pagrindu gali būti racionalizuojamos strateginės valdymo funkcijos tiek įmonės, tiek jos funkcinio padalinio lygmenimis.

Siekiant racionaliai valdyti strateginių pokyčių programos įgyvendinimo procesą ir gauti maksimalią naudą įgyvendinant programą, būtina stebėti, ar programos priemonės yra diegiamos racionaliai, ar jos dera prie esamų veiklos funkcijų ir operacijų vykdymo procesų bei priemonių, ar yra iš esmės tikslingos. Objektiviam strateginių pokyčių programos įgyvendinimui įvertinti siūlomi įmonės veiklos funkcijų vykdymo procesų valdymo vertinimo kriterijai ir jų taikymo mechanizmas. Pritaikius siūlomus kriterijus, galima iš esmės įvertinti strateginių pokyčių priemonių pagrindiniuose įmonės padaliniuose diegimo kokybę.

Pateiktas įmonės strateginių pokyčių programos efektyvumo vertinimo modelis. Aptarti modelio komponentai, jų turinys, atskleistos siūlomo modelio praktinės naudos galimybės.

Pasiūlytų įmonės strateginių pokyčių valdymo priemonių praktinio priimtumo patikrinimas kelių chemijos pramonės įmonių pavyzdžiu leido nustatyti, kad priemonių taikymas sudaro galimybes kompleksiška spręsti įmonės strateginius uždavinius, esant klimato kaitos reikalavimams:

- ✓ parengti įmonės strateginių pokyčių įgyvendinimo programą, numatančią būdus ir priemones įmonės veiklai efektyvinti racionalizuojant įmonės žmoniškųjų, materialųjų ir finansinių išteklių naudojimą, sudarant galimybes pritraukti išorinius išteklius įmonės veiklos efektyvumui didinti;

- ✓ racionalizuoti įmonės strateginį valdymą, užtikrinant efektyvų išteklių naudojimą, pagrindinių veiklos procesų kontrolę ir veiklos lankstumą, taikant šiltnamio efektą sukeliančių dujų taršą mažinančias priemones;

- ✓ tobulinti įmonės valdymą efektyvinant regioninių ir funkcinių įmonės padalinių veiklos valdymą;

- ✓ vykdyti strateginių pokyčių įgyvendinimo kontrolę įvertinant taikomų priemonių efektą (jas taikant išteklių deriniui racionalizuoti), koreguojant (tobulinant, keičiant) jas (jų diegimo procesą, taikymo būdą ir objektą), siekiant efektyvinti įmonės išteklių naudojimą;

- ✓ įvertinti įmonės strateginių pokyčių programos įgyvendinimo naudą ir prireikus nustatyti įmonės veiklos efektyvinimo tęstinumo kryptis ir veiksmus.

Raktažodžiai: *valdymas, strateginiai pokyčiai, klimato kaitos veiksniai, šiltnamio efektą sukeliančių dujų tarša, šiltnamio efektą sukeliančių dujų taršos leidimų prekybos sistema.*

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