

Summary

Sustainable development of country energy sector is closely related with country universally sustainable development. Thus the paper aims to reveal the theoretical and practical content of country energy system development sustainability, as well as systemically assess possibilities, means and the role of government in preparing and implementing universally sustainable integrated development strategies for the energy sector and energy companies of a medium size country.

Keywords: Energy Sector, Universally Sustainable Development, Sustainability of Energy System, Renewable Energy Sources, Energy Security.

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INTRODUCTION. In today's globally driven universal country and energy industry sustainability, it is no longer possible for an energy company to focus solely on deriving value only for its shareholders. In the same time, sustainable energy policy cannot be efficiently developed on a national level [2]. In European Union the solutions made by one Member State on energy policy inevitably impact other Member States, as well as the whole market of the region. Only the market bigger than a continent could be suitable for determining the proper match of energy types and for developing renewable sources of energy. Energy sector is a specific market sector that can achieve the highest economic efficiency through global actions.

The Law on Energy of the Republic of Lithuania [6] presents overall objectives of the energy activity, including the following: "...sustainable development of energy sector, reduction of negative impact of energy activity on environment, creation and fostering of conditions for efficient competition in energy sector, development of the use of local and renewable energy sources". However, the problem remains: how these key provisions of universally sustainable development are included into the development strategies of energy companies, and, the most important, how they are applied in the implementation practice of strategic investment projects.

The objective of the paper can be defined as follows: considering provisions of economic theory and with regard to the concept of universally sustainable development, to reveal the contemporary theoretical and practical content of medium size country energy system development sustainability. In order to reach this objective, the following

tasks have been formulated:

- to reveal the conception of energy sector sustainability, to analyse its components and influencing factors;
- to analyse Lithuanian energy sector and related strategies intended to foster the universally sustainable development; also, to evaluate the current state of the country energy system in the context of sustainable energy sector development;
- to analyse systemically the possibilities, instruments and the role and effectiveness of government actions in preparing and implementing universally sustainable integrated development strategies of the energy sector and energy companies of a medium size country under conditions of globalization.

COMPONENTS OF COUNTRY ENERGY SYSTEM SUSTAINABILITY. Sustainability of country energy system can be defined as current and future potential of a technological energy system that ensures a long-term reliable supply of energy and energy resources formed on the basis of innovations for the national business, public sector and citizens under conditions of active competitive market. The country policy of sustainable energy should be coordinated with objectives of supply reliability, competitiveness and environmental sustainability [5].

It is possible to measure the energy system sustainability using the indicators of the first and second level.

First level indicators:

- overall level of energy resources consumption;
- energy independence;
- the ratios of energy sustainability index provided by the World Energy Council [15].

Second level indicators:

- the use of renewable energy sources;
- the amount of greenhouse gas emissions;
- electricity produced using renewable sources;
- transport energy consumption to GDP ratio;
- electricity produced using combined cycle method;
- efficiency of energy production and consumption;
- applied and planned taxes for the energy resources.

The intelligence of country technological energy system is the ability to foresee how the utility of energy resources and energy provision services results in a monetary expression and how time, uncertainty and globalization changes this value. The provided concept can be supplemented with a perception how to manage the creation of innovative wealth in order for the country to remain competitive and innovative with regard to energy production and consumption.

Technological energy intelligence can be reached using

following means:

- to prepare and implement the energy policy coordinated with sustainable development objectives;
- to include the energy efficiency into the general policy of the country by coordinating actions of the sectors and by creating and implementing the respective regulation;
- to implement applied scientific research works, information and education activities in the fields of efficient energy consumption and use of renewable and waste energy sources.

Overall sustainability of country energy system is impossible without the adequate consideration of country energy problems and the perception of energy system sustainability demand by the individual subjects of society – energy business companies and the consumers of their provided services. Energy companies should foster management intelligence, based on value creation chain knowledge and experience, as well as on adequate management system. It is worth recalling that a business management system is a set of management structural elements, decisions and means intended towards the change of current situation into the preferable state using feedback channels and related processes. The system can contain human resources, organizational structures, methodologically-grounded ways, methods and procedures that are linked together to ensure efficiency of business solutions [16]. Thus an adequate management system is equally important in fostering management intelligence in energy sector as through its ways, methods and procedures it can allow increasing the efficiency of energy resources and energy consumption, and the use of renewable energy resources in all the sectors of economy.

And, finally, the innovative energy intelligence of society can be defined as knowledge and abilities how to adapt to the changes of external environment and use its own potential more efficiently in order to cover and implement the sustainable development provisions on all levels and implement the transformations ensuring sustainable development. The function of individual subjects of society (users) – to form the intelligent resources and use rationally and efficiently the energy resources – requires substantial responsibility and intelligence.

SUSTAINABLE STRATEGIES IN ENERGY SECTOR AND THEIR INSTRUMENTS. According to the World Energy Council [15], Lithuania is on 31st place among 94 world countries in energy sustainability ranking. Lithuanian Sustainable Development Strategy (SDS) is the main policy document describing the priorities of Lithuanian environmental policies and tools for the implementation of targets set by strategy [12].

The Committee from representatives of all relevant Ministries for the preparation of biennial reports on the implementation of sustainable development strategy and the submission to Sustainable Development Commission chaired by Prime Minister was established on 28 July 2000

by the Governmental resolution. The Biannual Report on implementation of Lithuanian SDS was prepared by group of experts and was evaluated on 2005 and amendments for SDS were prepared in 2006. The Second Biannual Report was prepared in 2007 and analysis of sustainable development indicators was performed for 2002–2006. The sustainable development indicators set established in Lithuanian SDS for monitoring progress towards implementation of SDS goals.

Economic indicators: gross domestic product (GDP), final energy consumption, share of biofuels in transport fuels, share of renewables in electricity production.

Environmental indicators: urban air quality, groundwater quality, amount of households waste.

Social indicators: employment rate, poverty rate, life expectancy, etc.

Regional development indicators: GDP per capita and its ratio to national average, foreign investments and its ratio to national average, etc.

Eco-effectiveness indicators for indication of decoupling: energy and resource consumption per GDP, emission of pollutants per unit of TPES and unit of GDP.

The list of indicators is being published annually by State Department of Statistics to monitor progress of implementation of Lithuanian SDS since 2004. The best result in Lithuania based on biannual reports is achieved in development of eco-efficiency indicators.

The GDP growth rates since 2000 exceed the final energy growth rates and final energy consumption growth rates exceeds the pollution growth rate. Therefore the main conclusion from Biannual Report on implementation of sustainable development strategy is that Lithuania has reached the path of sustainable development then decoupling of resource consumption from economic growth and decoupling of pollution from resource consumption is achieved however the main challenges for implementation of sustainable development in Lithuania are related with social dimension of sustainability. The main social indicators of welfare (inequality of income, average life-time expectancy, poverty, etc.) set for monitoring of implementation of SDS of Lithuania are not decoupling from economic growth. Some of them even exhibit negative trends.

Other strategies (National Energy Independence Strategy, National Energy Efficiency Programme, Programme for the Promotion of the Production and Use of Biofuel in 2004–2010 [10, 11, 13]) also include the eco-efficiency indicators mentioned above. These eco-efficiency indicators in energy sector can be used for monitoring progress towards sustainable energy development in Lithuania and for the comparison of results achieved by other Baltic States.

CURRENT SITUATION AND PERSPECTIVES.

The highest level of energy consumption during the independent life of Lithuania was achieved in 2008. According to the information provided by the Lithuanian Energy Institute (LEI) [7] in the mentioned year Lithuanian final energy consumers used 57 TWh of energy. The biggest

yearly amount of final energy was used for the production of heat – about 26 TWh, or 46 percent of all energy amount used in Lithuania. The overall consumption of electricity in the decade of growing economy also experienced a steady growth for about 0,4 TWh per year, so in 2020 Lithuania should consume about 13 TWh of electricity. Even if Lithuanian industry sector consumes only about 20 percent of all final energy (in 2012 – 19,9%), often the possibilities of energy consumption efficiency increase are related with structural and technological changes in industry.

In recent years the progress has been achieved by the broad use of renewable energy sources: in 2012 the share of these resources in the overall primary energy balance of the country has increased to 15,8% and in overall final energy expenses to 21,6% [8].

The energy consumption efficiency improved substantially. To produce a unit of GDP, in 2012 the primary energy accounted for 64,4% less than in 2000. However, in order to reach the EU average according this ratio, Lithuania should increase its energy consumption efficiency to almost 20%.

Currently the energy produced using renewable resources is more expensive compared to traditional energy sources. In other words, relative initial investment into the technologies of renewable energy sources is bigger than the investment into traditional fossil fuels technologies. Thus in order to promote the use of renewable energy sources for energy production, on the first step the government support or the shift of highest costs on consumers will be required [1].

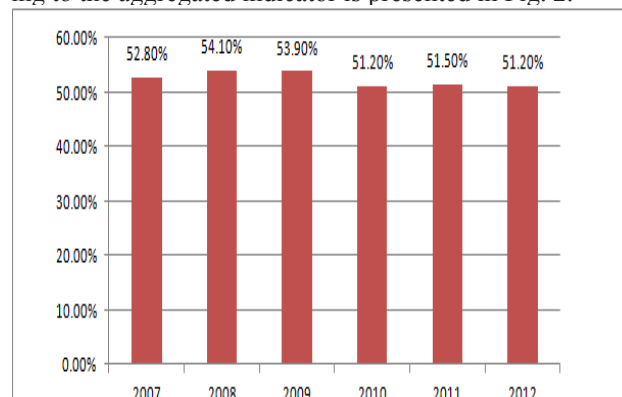
Table 2. Share of renewable energy in gross final energy consumption, % [4]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Tar-get
EU 28	8.3	8.7	9.3	10.0	10.5	11.9	12.5	12.9	14.1	20
Lith- uania	17.2	17.0	17.0	16.7	18.0	20.0	19.8	20.2	21.7	23

ENERGY SECURITY AS CONDITION OF SUSTAINABLE ENERGY STRATEGY. Sustainable energy sector strategy in the context of universal country sustainability is strongly related with ensuring the energy security. Energy security is a component part of the national security and requires a predictable, reliable, economically acceptable and environmentally friendly supply of energy. Energy security covers a whole of conditions ensuring a variety of traditional and renewable primary energy sources, a variety of energy supply channels and reliability as well as independence of the monopolistic suppliers, also the accessibility of energy for the final user under reasonable prices in a competitive energy market. Lithuania relates its energy security with the integration of national energy systems into EU energy systems and with efficient EU and national energy policy.

The Energy Security Research Centre provides indica-

tors of energy safety level, currently composed of 60 factors, conditionally divided into technical, economic and socio-political blocks. Every factor has its weight in an integrated rating that is measured in a scale from 0 to 100% (3). The evaluation of Lithuanian energy security according to the aggregated indicator is presented in Fig. 2.



As it can be seen from Fig. 2, according to the data provided by the Energy Security Research Centre, Lithuanian energy security level underwent minor changes in 2007-2012.

The following weaknesses of Lithuanian energy security can be distinguished:

- dependence on the sole supplier of natural gas (gas accounts for 70% of fuel consumed to produce the centrally-supplied heat);
- Lithuania is vulnerable in case of a malfunction of supply of natural gas and electricity or in case of big price shocks of imported energy resources;
- Lithuanian networks of gas and electricity still do not have any direct links to the Western European energy systems;
- because of very high natural gas prices, partly depending on monopolistic supplier, Lithuanian power-stations are not competitive in the electricity market;
- more than 70% of apartment buildings and a big part of public buildings inefficiently use energy. Their slow modernization can raise severe economic and social consequences.

Modernisation of buildings is one of the most important priorities of Lithuanian policy on energy independence, so it is attempted to comply with the EU requirements in this field, as well as develop Lithuanian legal acts and strategies regulating the instruments of buildings modernisation and implementation of these strategies.

Considering the problems of Lithuanian energy security, Lithuanian strategic goals in the field of energy are formulated with regard to public security and sustainable development goals. In contemporary society that is dependent on energy resources, the energy security is an important part of national security, while competitiveness and efficiency can be perceived as main assumptions for country sustainable development. Also, considering external and internal situation and in order to reach the common

strategic goals in the field of energy and ensure the energy security of Lithuania, in all energy sectors such principles as flexibility and rationality, diversification and liberalization, integration, energy efficiency, the use of local and renewable energy resources, as well as sustainable development should be implemented. The implementation of these principles in national legislation and in the practice of the energy business companies would form a strong base to reach the sufficient sustainability level of the energy sector in the context of universal sustainability.

CONCLUSIONS.

1. In order to contribute to the universal country sustainability development in energy sector, there is a need to provide dissemination of information on sustainable business, increasing public awareness in universal country sustainability and strengthening cooperation of stakeholders in energy sector.

2. Implementation of universal country sustainability in energy sector of Baltic States can stipulate implementation of other voluntary measures aiming at sustainable energy development in the Baltic States: increase in energy efficiency and enhance of use of renewables.

3. Sustainability of energy sector mainly depends on country energy security. After highlighting the weak points of Lithuanian energy security, the energy strategies being performed contain the principles and instruments allowing reaching sufficient sustainability level of the energy sector in the context of universal sustainability of a country.

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