Mariya Kuznetsova
Taras Shevchenko National University of Kyiv, Ukraine

ENERGY MANAGEMENT CONCEPT IN SCOPE OF SUSTAINABLE BUSINESS DEVELOPMENT

The paper deals with the issue of sustainable business performance in scope of energy management and focuses on establishing and implementing efficient approaches in order to achieve the continuing business development in three interconnected dimensions – economic, social and ecological. Based on the thorough analysis of modern scientific research as well as current business practice around the world, it provides complex overview of the issues related to energy consumption, innovative business development, management and audit. Following the comprehensive global policy of future development in sense of reaching and maintaining sustainability, the key strategic approaches and tactic measures for launching energy management system within innovative business development are proposed.
Keywords: energy management, sustainability, sustainable development, business strategy, innovative support.

INTRODUCTION

Energy consumption – is one of the most essential and urgent issues, which world community should address and solve. High level of carbon dioxide emissions results in exacerbating the ecological situation all around the world and jeopardizing human rights, social security and well-being. It is one of the key indicators of the efficiency of global policies in scope of achieving sustainability. Future of our planet is unpredictable due to the various risks, including not only natural disasters, but also hazards induced by human activities. Moreover, the pace of global development is quite high, so it is considerably crucial not to fasten it, but control and maintain the right combination of resources consumed and benefits obtained, taking into account up-to-date technological advancements and innovative business approaches.

Following modern global perspective, the issue of energy consumption is particularly emphasized in Goal 7 – *Affordable and Clean Energy* − within 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development[1]. Sustainable energy is considered an opportunity, as it transforms lives, economies and the whole planet. That is why it is so important to set up global, regional and local policies in order to provide access to affordable, reliable and modern energy services, deliver the improvement in energy efficiency as well as expand infrastructure and upgrade technology for supplying modern and sustainable energy services.

Technology innovation has reached the top of policymakers' agendas in many countries, including many member states of UNIDO. However, substantial work remains ahead for governments, industry and private sector, investors and organizations like UNIDO in order to effectively promote, support and accelerate the development of innovative clean technologies and solutions, especially in and for the industrial sector[2]. Moreover, there is lack of business practice in the area of energy management and audit, which set new challenges for companies while reaching sustainable development.

Therefore, the cognitive aim of this study is to present knowledge in the field of sustainable development and energy management in order to propose the innovative set of steps on establishing business processes following the principles of energy efficiency and sustainability.

The paper has the following unique outcomes:

- main insights emphasized by means of thorough analysis of academic research;
- set of measures to take in order to achieve sustainable development and energy efficiency within the company;
- discussion on possible future trends in innovative energy management for increasing the level of company competitiveness on the market.

[1] United Nations (2017). *Global Sustainable Development Report 2016.* <https://sustainabledevelopment.un.org>
[2] The energy Revolution: 2016/17 yearbook. *Global Sustain.* <http://globalsustainyearbook.org>.

Energy management as a concept

There are many different definitions of *energy management* notion in modern science. Taking into consideration the most well-known ones, it should be noted that this term highlights the process of using less energy for the same or even increased output. It is increasingly being recognized as one of the most important and cost-effective solutions for reducing greenhouse gas (GHG) emissions produced as part of industrial processes[1]. In fact, energy efficiency has the technical potential to reduce industrial energy use by about 20%[2].

Furthermore, the energy management policy influences organizational and technical procedures, as well as behavior patterns, in order to reduce the total operational energy consumption (thus also the energy required for the production), to use basic and additional materials economically and to continuously improve the energy efficiency in the company[3].

It is worth emphasizing that in modern scientific literature, there is also such a notion as *sustainable energy*, which defines the following parameters in the environment[4]:

- management and interpretation accepted theory, the existing experience, state regulations, navigation companies, the requirements of all stakeholders, level of education, awareness and commitment, and general orientation toward social responsibility;
- energy − legislation, existing energy resources, new energy resources, energy efficiency level, the level of technology development, production and consumption levels, system stability, connectivity with other systems, the degree of self-sufficiency;
- sustainable development and acceptance of the concept at the state level, the ratification of the international agreement, the parameters of national sustainable development strategy, the list of priorities.

Current business perspective gives another approach to understanding the notion of *energy management*. It states that the scope of energy management should not only be limited to utility consumption by heating, ventilation and air conditioning (HVAC) systems in facilities or IT infrastructure, but must extend to optimization of waste management, building infrastructure, supply chain networks, product design, transportation networks and plant controls and equipment. Moreover, enterprises must embrace smart grid/meter systems and renewable energy sources to enact more effective cost-management strategies and utility consumption, thereby improving their long-term sustainability[5].

In general, energy management in the form of implementing new energy efficiency technologies, new materials and new manufacturing processes and the use of new technologies in equipment and materials for business and industry is also helping companies improve their productivity and increase their product or service quality. Often, the energy savings is not the main driving factor when companies decide to purchase new equipment, use new processes, and use new high-tech materials. However, the combination of increased productivity, increased quality, reduced environmental emissions, and reduced energy costs provides a powerful incentive for companies and organizations to implement these new technologies[6].

All definitions considered, it is possible to conclude that energy management is a modern concept, which focuses on improving the level of efficient energy consumption by means of innovative cost-effective strategies and green-thinking policies within the company in order to achieve sustainable development and increase the competitiveness on the market.

Energy management system: main obstacles and multiple benefits

Every company has specific goals and less broad targets to achieve in the short-term and long-term perspective. Among the most important ones: financial stability, sources for investment, production capacity growth, economic efficiency, social support and recognition, brand awareness and reputation and

[1] Organization for Economic Co-operation and Development (2015). *An introduction to energy management system: energy savings and increased industrial productivity for the iron and steel sector.* <https://www.oecd.org/sti/ind/DSTI-SU-SC(2014)14-FINAL-ENG.pdf>.

[2] International Energy Agency (2013). *Tracking Clean Energy Progress 2013 – IEA Input to the Clean Energy Ministerial.* <http://www.iea.org/publications/freepublications/publication/ TCEP_web.pdf>.

[3] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2012). *Energy Management Systems in Practice*. <https://www.adelphi.de/en/system/files/mediathek/bilder/ energy-management-systems-in-practice_bmub-uba-adelphi.pdf>.

[4] Golušin, M., Munitlak Ivanovic, O., Vucenov, S. (2012). Sustainable energy management – a prerequisite for the realization Kyoto Protocol. *Journal of Economic Development, Environment and People, Vol. 1, 2,* 26.

[5] Gehani, A. (2012). The Future of Energy Management. *Cognizant.* <https://www.cognizant.com/whitepapers/The-Future-of-Energy-Management.pdf>.

[6] Turner, Wayne C. (2007). *Energy Management* Handbook. The Fairmont Press Inc., 3.

so on. However, all these factors are inextricably linked to general company performance, which is a complex indicator of current achievements and potential of the company under consideration.

It should be stated that customers' needs as well as expectations are changing. The findings of the research conducted within the *Carbon Trust* framework reveal the following patterns:

- 70% of people want businesses to mandatorily disclose their carbon emissions;
- 66% of the public question authenticity of company climate change claims;
- the majority of consumers (60%) need third party evidence of action from a respected climate change body before believing corporate claims;
- just 7% believe the word of companies on their climate change responsibilities and actions to reduce their impacts.

That is why there is a distinct correlation between the strongest, most successful brands and those brands which score highly on the categories of Corporate Reputation, Leadership and Innovation. Environmental responsibility is one of the top characteristics of leading companies[1].

Despite social pressure and corporate obligations, for many companies the energy management issue is still of great concern. It is so because of the lack of continuing governmental support and CEOs' fears about future investments in less productive processes. The necessity to transform the already established operations within the production facilities may be considered as risky and not promising one.

However, due to the Report by the *Economist Intelligence Unit*, energy efficiency management is critical to businesses because they need to be seen to be[2]:

- keeping costs under control during economic recession;
- positioning themselves and their brands as green product providers;
- meeting increasingly stringent compliance requirements;
- improving the environmental footprint of their products/services;
- implementing stronger controls over suppliers of environmental standard.

Following the international recommendations and outcomes of scientific research conducted by outstanding economists, energy management – is the most efficient and adequate way to address new requirements imposed by modern society concerning company activities and social responsibility. Energy consumption is about delivering safety and quality. It is also about protecting the interests of all possible stakeholders, following the principle of '*leaving no one behind*'. Moreover, it presupposes not only corporate practices, but also a substantial inclusion of governmental bodies and non-governmental organizations.

In scope of business activities, energy management is a complex notion. It should be considered as a combination of techniques and approaches within the company to cope with non-effective energy loss and maintain green activities as much as possible. However, the targeted elements for future changes could vary. It depends not only on industry or business operations, but also on the vision of corporate executives, energy managers or external consultants.

For example, many companies prefer the departmental classification, as it provides a focus on the administrative area within their organization where effort is needed to achieve specific energy efficiency improvements. The time frame classification, on the other hand, is helpful in deciding the order in which opportunities should be addressed. Finally, the equipment and systems classification highlights the physical facilities, software, and human resources that are needed to identify, develop, and implement each type of energy-efficiency activity, program, or project[3].

In general, several comprehensive programs were established within the global framework. Every country has its own opportunities and downsides in terms of energy independence and efficient consumption. That is why regional and local policies may become different to some extent. However, when speaking about global issues, i.e. greenhouse gas emissions or deforestation, some key principles and standards are needed in order to set the basis for implementing energy programs and reaching further improvement. International Organization by means of particular standard (ISO 50001:2011) specified the most important requirements for companies to contribute consistently and effectively to energy performance and sustainable energy management.

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[1] Huang, E.G.T. (2011). Understanding the requirements of the energy management system certification. *SGS*. <http://www.sgs.com/~/media/Global/Documents/White%20Papers/sgs-energy-management-whitepaper-en-11.ashx>.

[2] Economist Intelligence Unit Report (2009). *Countdown to Copenhagen: Government, business and the battle against climate change*. <http://graphics.eiu.com/marketing/pdf/ copenhagen/Sustainability_2009.pdf>.

[3] Rossiter, A.P., Jones, B.P. (2015). *E*nergy management and efficiency for the process industries. New Jersey: John Wiley & Sons, Inc., 95-96.

This International Standard − ISO 50001:2011 − is based on the *Plan – Do – Check – Act* (PDCA) continual improvement framework and incorporates energy management into everyday organizational practices. In the context of energy management, the PDCA approach can be outlined as follows:

- Plan: conduct the energy review and establish the baseline, energy performance indicators (EnPIs), objectives, targets and action plans necessary to deliver results that will improve energy performance in accordance with the organization's energy policy;
- Do: implement the energy management action plans;
- Check: monitor and measure processes and the key characteristics of operations that determine energy performance against the energy policy and objectives, and report the results;
- Act: take actions to continually improve energy performance and the energy management system[1].

The aforementioned system of actions is complex and aimed at not only evaluating current situation and visible gaps in energy efficiency program, but also monitoring and modifying the action plan within the company on a constant basis. These actions also set a platform for innovations – both in production process and managerial practice.

In broad sense, energy management system within the company could be implemented in two main directions. The first one is predetermined by current business activities and already existing production capacities. The main aim of saving energy is to reduce production costs and increase profits. The second one is dedicated to non-financial transformations within the company by means of changing attitude of employees towards corporate standards and way of doing business in a particular industry. This one is also important for fulfilling major social projects, as it leads to delivering social commitment and high level of engagement in various spheres: from business operations to employees' daily life.

On the one hand, every company is a complicated mechanism with own processes and specific operations. On the other hand, fundamental patterns and energy management tools are common for all sorts of business activities. In order to cope with resistance to change it is important to highlight main obstacles while establishing new practice for sustainable development and accepting current challenges set by the market (Figure 1).

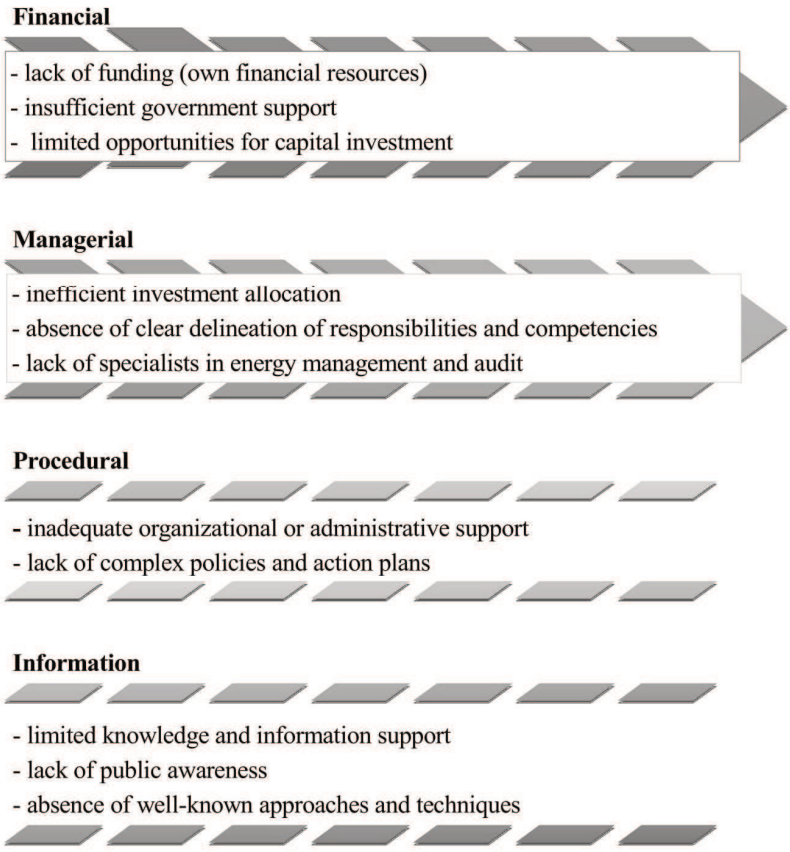

Fig. 1. Main obstacles to implementation of energy management system within the company
Source: own compilation.

[1] ISO 50001 (ISO 50001:2011 «*Energy management systems – Requirements with guidance for use*»). <https://www.iso.org>.

Every challenge presupposes not only barriers, but also advantages and non-visible perspectives. Efficient energy management policy enables companies to get the following benefits as a positive and motivating result of far-reaching transformation of business processes and corporate culture:

- less environmental pollution and carbon footprint;
- contribution to global climate change policies;
- increased productivity;
- cost reduction and production optimization;
- waste management;
- changes in behavioral patterns and social attitude (environmentally friendly and conscious);

It is worth highlighting the fact that the most compelling reason for saving energy is reducing costs. Most organizations can save up to 20% on their fuel bills simply by better managing their energy use and investing in cost-effective measures. The *Carbon Trust*, for example, has seen good energy management result in savings of 5%-25%, with typical payback periods of two years or less, across a diverse range of companies. It is not unusual to save 5%-10% with just minimal capital expenditure[1]. However, the issues of corporate reputation and competitiveness on the market are even more crucial because non-financial benefits bring unpredictable synergies to company performance and its further development.

Current situation in business sector within industries identifies some peculiarities, which give basis for proposing key points to take into account while establishing own business strategy in context of efficient energy management and sustainable development:

- choose goals from the list of 17 proposed *Sustainable Development Goals (SDGs)* of the *2030 Agenda for Sustainable Development* − the most appropriate for industry, business activities or corporate policy;
- provide new policy for developing corporate social responsibility, mainly following the goals of sustainable business development;
- create a proactive and sustainable business vision introducing the principles of sustainability and green business practices;
- reconsider the existing production capacities of an enterprise and decide on the scale of possible replacement of obsolete and outdated equipment in the strategic perspective (up to 3 years);
- outline possible business opportunities, including financial advantages and non-financial benefits, from meeting the cutting-edge technical standards in 5-year perspective;
- identify the main gaps in supply chain and efficiently change the procurement system in order to reduce costs;
- emphasize the importance of energy audit for establishing the new model of energy management and set up suitable practice using internal accounting in scope of existing corporate reporting systems;
- organize constant investment process for innovative development of the company (using company sources and public funding);
- engage all employees (incl. managerial staff) to the process of saving energy by means of regular trainings on corporate green policy in the office and outdoors;
- set up a separate programme in order to support social policies as mutually beneficial and bilateral (‘company – consumer’, ‘company – employee’).

CONCLUSION

This paper shows the main peculiarities of energy management as a modern concept. It highlights the most significant source of innovative development of every company – the right combination of resources consumed and benefits obtained, following the principle of saving as much energy as possible. Environmental strategies are highly crucial, as they contribute to global policies and international standards. The qualitative development is foreseen in sense of improving company performance by means of energy audit, corporate social responsibility and green practices, which will result in higher profits due to higher savings and less production costs.

The already existing business practice all around the world also proves that the key source for innovative sustainable development and business growth within various industries is rather in operational changes than in huge investment in technologies. It is about fundamental changing the way

[1] Energy management: a comprehensive guide to controlling energy use (2011). *Carbon Trust.* <http://www.gbc.ee/710eng.pdf>.

of doing business by managing people and material resources. That is why various programs of mutually beneficial collaboration between business sector and governmental authorities are so needed under the modern conditions.

Climate-change initiatives predetermine the long-lasting impact on carbon footprint reduction and energy sustainability. The majority of saving-energy projects have a short payback period, which is considerably attractive for entrepreneurs in all business sectors. Moreover, voluntary actions cause a great impact on social support in sense of awareness and deliver synergetic effect to company reputation. Notwithstanding significant investment in launching efficient energy system on the enterprise, such a practice enables CEOs to understand possible financial inducements and define a set of key proprieties for future development. By means of initial pure regulatory compliance, energy management approach will also lead to better company reputation, greater customer loyalty and, as a result, higher profitability. In most cases, energy management practice is a low-hanging fruit to pick in the nearest future.

The outcomes of professional corporate transformation will show the customers (B2C) and clients (B2B) that the company has conscious vision about sustainable development in the future. It is reliable and human-oriented. Moreover, such a reputation will serve as a basis for better company performance in the industry (higher effectiveness of internal business processes) and further increasing of the competitiveness on the market. That is why energy sustainability is the key driving force for sustainable development of business all around the world.

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