ЕНЕРГЕТИКА ТА ЕНЕРГОЗБЕРЕЖЕННЯ

УДК 621.59

Energy Efficiency Projects

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Answers to the question "what should we do to improve energy efficiency?" will have to advance beyond the notion of simply 'saving energy' to an enhanced paradigm of policy options as cross-sectoral issue. In this paper we propose to improve rate of successfully performed energy efficiency project. In order to reach target, we need to study and summarize the best practices of improving the energy efficiency level within the economy for developing recommendations, to create risk model for modifying energy policy approaches and working processes with an abstraction level increase for the successful energy efficiency projects realization. Two issues have been addressed in this paper. The links between sustainable development concept analysis and "Green Economy" are defined. The key factors for the sustainable development of energy policy intended for the development of successful energy efficient projects while improving energy efficiency and environmental safety are identified.

Keywords: *Sustainable Development, Green Economy, Energy Policy, Energy Efficiency Projects, Regulatory Framework, Profits Formation, Financial-Economic System, Cross-Sectoral Governance and Finance, Economic-Social-Ecological Analysis*

Енергоефективні проекти

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Відповіді на питання "що ми повинні робити для покращення енергоефективності?" повинні вийти за межі простого "економії енергії" до посиленої парадигми варіантів політики як міжгалузевої проблеми. У цьому документі ми пропонуємо покращити кількість успішно реалізованих проектів з енергоефективності. Щоб досягти мети, нам необхідно вивчити та підвести підсумки найкращих практик підвищення рівня енергоефективності в економіці для розробки рекомендацій, створення моделі ризику для зміни енергетичної політики та робочих процесів з підвищенням рівня абстрагування для реалізації успішних проектів з енергоефективності. У цьому документі були розглянуті два питання. Визначено зв'язки під час аналізу концепції сталого розвитку та "зеленої" економіки. Визначені ключові фактори для сталого розвитку енергетичної політики, призначені для розробки успішних енергоефективних проектів, одночасно підвищуючи енергоефективність та екологічну безпеку.

Ключові слова: *Сталий Розвиток, "Зелена" Економіка, Енергетична Політика, Проекти з Енергоефективності, Нормативна база, Формування Прибутків, Фінансово-Економічна Система, Міжгалузеве Управління та Фінанси, Економіко-Соціально-Екологічний аналіз*

Nomenclature

UNO	United Nations Organization	MEPS	Minimum energy performance standard
EEP	Energy efficiency project	SME	Small and medium enterprises
HVAC&R	Heat, ventilation, air conditioning and refrigeration	ESCO	Energy services company organization

1. Introduction

With assigning, the highest priority to energy factors in the system of Macroeconomic Assessments is a global trend in the Economic System Development. The Sustainable Development concept is connected with the "Green" Economy, where the key elements are both Energy Efficiency improving and Environmental Impact reducing. The

experience of implementing Energy Efficiency Policies on a global scale is the trend of the last decades for social development. Europe and North America are working with development national strategies, based on energy efficiency improving.

The Energy Strategy for each country's energy policy is developing, taking into account its national characteristics and established priorities, using advanced international experience and innovative technologies. The Energy Strategy is in use for projects development in the research activities framework of key international organizations, the United Nations Organization, the International Energy Agency, the World Bank, and others.

One of the goals for Energy Management System in accordance with ISO 50001 is to help organizations to apply systems and processes in order to improve the Energy Efficiency level, taking into account the nature of energy use and the amount of energy consumed.

To improve the efficiency of fuel and energy resources use, both from industry and science side as well as from the legislative framework side, it is necessary to provide an environment with the appropriate conditions that can determine investment opportunities, which can be favorable for the implementation of a stable energy policy. At the same time, when we considering Energy Projects from the Project Management area, it should be noted if the resources (budget, qualification specialists, funds) is a critical value, the content issues, the project core (features and functionalities), and the time schedule (time management) loose priority. According to the last two issues, the desired rate, which is satisfaction of the end user (customer) is reached, taking into account the required quality of the product.

This goal cannot be achieved without an effective communication – a high level negotiating between the client, project team and stakeholders (experts, investors, administration from the ministry).
The visible factors of the required environment for "Sustainable" Investment are opened up new opportunities both for Direct Investment and for using Indirect Investment support for Energy Efficiency Projects, as well as created conditions, which highlight unprofitability of fuel and energy resources wasteful use. The approaches and activities implementation, aimed at the rational use of fuel and energy resources, should be Investment Attractive, in accordance with alternative options of the proposed Cost-Effective Energy Efficiency Projects.

Investment attraction is what often thought of as the primary economic development activity. It requires strategic determination of best from proposed potential investment targets and then seeks to get their attention by a lot direct and indirect ways. Due to advances in Information and Communications Technology as well as media, many businesses and investors are less location sensitive and decision makers may be more prone to consider quality of life variables for labour attraction and retention purposes.

Ukraine has some experience of Investments Attraction for Energy Efficiency Projects (EEP). Although, for the implementation process of the large and small EEP investment, it is necessary to introduce investment instruments that can produce the desired results, i.e. executed tasks within the specified period of time for regulated resources attendance within the established budget and the funds involved, taking into account the quality that meets the standards within real economic conditions. However, there is an investment opportunities deficit for the subjects of the investment market. The existing conditions make it possible to do problem statement of approaches improving for EEP investing with transparency of financial activities, which gives an opportunity to attract both private and foreign capital for joint investment in Energy Efficiency Projects. At the same time, using the tools of economic incentives to improve Energy Efficiency at the state level, it is a basis for the reliability and long-term investment in the Ukrainian energy policy, therefore, in EEPs.

The development of the recommendations system for improving the investment flows management of EEPs assumes to lay the methodological basis for the Project Management Theory. That allows to use the System Approach when investing in Energy Efficiency Projects. Both Ukrainian and foreign authors carry out a lot of research work in this area. They have considered the problem, but the investment features definition in energy efficient projects in accordance with both sources and methods of investing with the development of a model of risk factors and their effects on the success of projects in the current economic situation requires refinement.

2. How to succeed with energy efficiency project from scratch to realization for any type of business

The target is to study and summarize the global experience of improving the level of energy efficiency within the economy for developing recommendations, to offer a risk model for modifying energy policy approaches and working processes with an increase in the abstraction level for the successful energy efficiency projects realization.

We set the number of tasks to achieve the goal:

1. To analyze the concept of Sustainable Development and its relationship with the "Green" Economy.
2. To identify the key factors for the Sustainable Development of Energy Policy intended for the development of successful Energy Efficiency Projects while improving Energy Efficiency and Environmental Safety.

3. To evaluate key problems and programs of the countries at global scale in the field of Energy Efficiency Management.

4. To investigate the Methodological Framework aimed at working with "Green" Investments and to identify the role of the Energy-Efficiency Factor in Energy Efficiency Projects for the system indicators of Sustainable Development.

5. To identify critical Risk Factors for the process of energy demand reduction and the energy efficiency improvement for the Ukrainian economy and to classify functions in the Energy Policy Development and to create a Numerical Risk Model.

6. To develop a measurement system for assessing the "Success" of Energy Efficiency Projects.

7. To develop recommendations on the Energy and Environmental Efficiency promotion in Ukraine for the development of Successful Energy Efficiency Projects.

8. To use System Analysis for Abstraction Level increasing in order to reduce the complexity and the amount

of data on recommendations development stage and a Risk Model construction.

9. To identify High-level constructive elements and key components of their tasks scope.

10. To develop Architectural Mechanisms for common problems solutions in order to obtain the possibility of adequate architecture developing at an Early Stage of Energy Efficiency Projects development. As a result – reduction of the expanding EEP complexity and addition of the new resources (executors, experts, stakeholders, ministry administration) as well as the ability to divide components development into those, which require development from scratch or the attraction of Ready-Made Solutions.

3. The analysis of sustainable development concept and its interaction with the “Green” economy

The concept of Sustainable Development, as a scientific direction was appeared in the 70s of the last century, the reduction in fuel and energy resources and the growth of environmental impact have reached critical levels, and the problem becomes crucial on a global scale. The concept was agreed and recognized at the UNO Conference in Rio de Janeiro, 1992. The main issues of the Sustainable Development concept are three main elements: Economy, Society, and Ecology. The concept based on three main indicators: economic, social, environmental, with both state, business, and public structures involved in organization and implementation. At the core – improvement of the people's lives quality in socio-economic development, taking into account environmental impact reducing. On the part of the economic indicator - the requirements to reduce resource intensity, the alternative, renewable energy sources use instead of non-renewable, recovery the necessary components from recycled waste, recycling of waste, repeated use of products. In fact, the Sustainability of development for Economic Systems in particular is determined by the result modification dynamics, taking into account the resource consumption, the share of intensive and extensive factors involved in the result achieving. The type of Sustainability for Development Theory is directly related to the type of Economic Development. From this point of view, Sustainable Development can be viewed as a process and as a state. If we analyze the Sustainable Development of Economic Systems, then we can define the following states: Absolutely Stable, Stable, Unstable and Critical. If we consider the statements made by the academician of the Ecological Academy and the employee of the Institute of Systems Analysis R.A. Perellet, then the natural, production and human capital must be reduced with the change of generations. There is either an increase in capital assets or their stock is in an unchanged state, taking into account the Time Factor. For a more accurate understanding of assets, namely Production Capital based on the scientific and technological progress, gathered changes (housing, industrial sector, road economy, goods). To human capital we refer knowledge and acquired skills including health, well, but to natural or environmental capital - all from the air to the functions of the ecological system. Since the 1990s, social capital has been added that summarizes the cultural and legal assets of the society in which actors from both social and production processes interact to find the best way to achieve goals.

In the case of two types of "Stability" for development theory: Weak Stability is considered in the mainstream of the total assets or Social Benefits non-decrease up to time, but in the same time substitution between capital types is expected, namely, Natural Capital is reduced due to Production Capital with the approach to reduce the Environmental Impact, and Strong Sustainability includes Natural Capital and total assets, are not subject to reduction in the timeline. Taking into account the fact that the reduction of fossil fuel resources is accompanied by the deduction of a part from their sales profit in the direction of investing in development both incentives in the Regulatory Framework and the Energy Efficiency Projects development based on renewable energy sources that are part of Natural Capital, it is also necessary to expand the reserves of renewable fuel, transition to the use of new types of fuel and energy resources, namely alternative energy sources.

Ukraine took a step towards integration into the European Community, developed a National Energy Strategy taking into account the concept of Sustainable Development until 2035. It was built on policies in the fields of the Environment, the Economy and the Social scope with the intention of its use optimizing. One of the problems in the Sustainable Development concept is the ability of the return of resources precise assessment, in three main components: ecological, economic, social. One of the solutions was the standard ISO 26000 International Integrated Reporting Framework, six types of capital formed the basis of valuation (financial, production, intellectual, human, social and reputational, natural). The modern development of the economic activity analysis for enterprise where it is necessary to take into account indicators of Sustainable Development led to Economic-Social-Ecological Analysis. Proceeding from the relative novelty of social and ecological factors, it is recommended to assess their impact on financial and economic indicators, on the profit from the Energy-Efficiency Project implementation. It is proposed to develop an algorithm and methodology for analyzing Production Capital with the influence of Socio-Environmental factors on financial and economic indicators, i.e. obtaining Net Profit at the enterprise from Energy Efficiency Projects taking into account the influence of the involved social and environmental factors.

For example, to accurately determine the intensity of use for a certain capital type, it is essential to determine the efficiency of fuel and energy resources use, to determine the place of the factor in the Profit Formation on the Intensity Scale, its specific weight. When considering Sustainable Development, the process takes into account the time interval at which changes in its characteristics are made, namely the specific gravity of the intensive factors in the Profit Formation.

The next problem in the formation of the system indicator for the enterprise Sustainable Development Assessment from the EEPs employing at characteristics analyzing of various aspects for Sustainability in Unified Measurement System, taking into account the influence growth on the intensive type of development for both the Financial-Economic System and for the system from three components: Ecological, Economic, Social. In order to avoid useful information loss in the dynamics of Sustainable Development Analysis, it is proposed to develop a model of Sustainable Development as a result of the implementation of

EEPs at the highest level of the hierarchy, with the possibility of levels reducing for the proposed adaptation to the implemented features and EEP requirements that can take into account the economic entities at various levels functioning. This system indicator for Sustainable Development Assessment includes the development of analytical procedures that enable us to analyze and assess both all types of capital in the system and each of the capitals involved in generating profits separately as well as to assess new system properties which are appeared due to interaction of each type of capital and the ecological and social components influence on financial-economic indicators.

The main problems of Sustainable Development for enterprises will be reflected in both EEP employing and Business Analysis. It is the definition of the relationship between the business development and functioning with their Sustainable Development; inadequate Regulatory Framework and the lack of indicators that can describe both the Company Financial Status and the fuel and energy resources impact on economic activities. And also the influence of inflation processes on the developed reports in the Business Analysis; the lack of system indicators that make it possible to analyze all types of capital as system, as well as for each of the capitals separately in terms of their intensity for participation in the Profits Formation, and the possibility to take into account the new system properties obtained from the interrelated work (in the profits formation) of each type of capital, Social-Environmental Factors impact.

In determination of the link between Sustainable Development and the “Green” Economy, it must be noted that the “Green” Economy is a tool for achieving goals of Ukraine's sustainable development, inasmuch as tasks to improve Energy Efficiency, the "Green" Technologies Development, alternative energy use were introduced into the state program.

The leader in the race of ”green” technologies is South Korea, which has invested 9 billion euros in the process of their development and 19 billion to provide loans and tax cuts for large, medium and small businesses working on landscaping.

In the framework of the “Green” Economy as itself and transition process to it, it is recommended to improve the efficiency of the fuel and energy resources use, to improve the Ukrainian infrastructure and improve the wellbeing of residents.

The growth of both the exhaustibility factor of non-renewable fuel and energy resources, and Environmental Risk Indicators together with Climate Change is catalyst for the start of work on the “Green” Economy. It is clear that for the strict logical links between the “Green” Economy and Sustainable Development, an integrating process of the development factors (ecological, economic, social, and political) required in order to improve the life quality in Ukraine.

The society should be involved for work on the Sustainable Development Problems Solving and for the Regulatory Framework development, the work of public services by the "cross-functional" method, when achieving Sustainable Development. If the current task is subordinated to a particular service or ministry, then this administration structure become the leading one in the problem solving, and the others work in a consultative mode as an assistant. This makes it possible to increase the efficiency from regulating the fuel and energy resources use through planning to forecasting; improving energy efficiency, increasing the competitiveness of higher education establishments and scientific and R&D institutions in comparison with world experience, improving public health. Such kind of problems are the link between the ”Green” Economy and Sustainable Development, which allows to improve Environmental Safety and to get one of the Sustainable Development components.

Proceeding from the fact that the "Green" Economy is a rather new direction in economic science, the dependence of the classical economy directly on the environment, where it functions, is clearly traced as a part of the whole.

4. The key factors for the sustainable development of energy policy for the development of successful eeps while improving energy efficiency and environmental safety.

Improving Energy Efficiency in order to contribute to Energy Security, Environmental Safety, quality of life as well as economic well-been is supposed to be done. To increase the “first fuel” use or by other words to improve Energy Efficiency is the easy way to get more out from the existing resource base that can maintenance Economic growth together with reducing energy costs.

There is potential for improving energy efficiency but put efforts to improve it run short due to inadequate Ukrainian Policy Framework together with lack of enforcement of appropriate legislation.

From the weaknesses are existing policies, artificially lower prices for energy sources, which inspire its wasteful consumption; subsidies for energy sources production and consumption that distort markets; can be noted poorly managed housing stock; and monopoly, barriers to entry for new market participants.

Even with a lot of benefits, improving process for energy efficiency is quite hard to employ. The internal and external economy state and the energy markets economics have indicated with first priority short-term economic considerations, in the same time geopolitics has relocated energy security to the front position of policy considerations.

To step ahead in overcoming the present inactivity, Ukraine need to develop policies in the private as well as public sectors at the local level in order to define, formulate and present energy efficiency investment projects that are bankable; bring together policy changes and changes within institution for energy efficiency investments supporting. Promising conditions creating for financial institutions and commercial business for energy efficiency projects investing are expected.

From the summary of best practices policies for energy efficiency done by UNO we can offer to review it and step by step can try to employ this model for Ukraine.

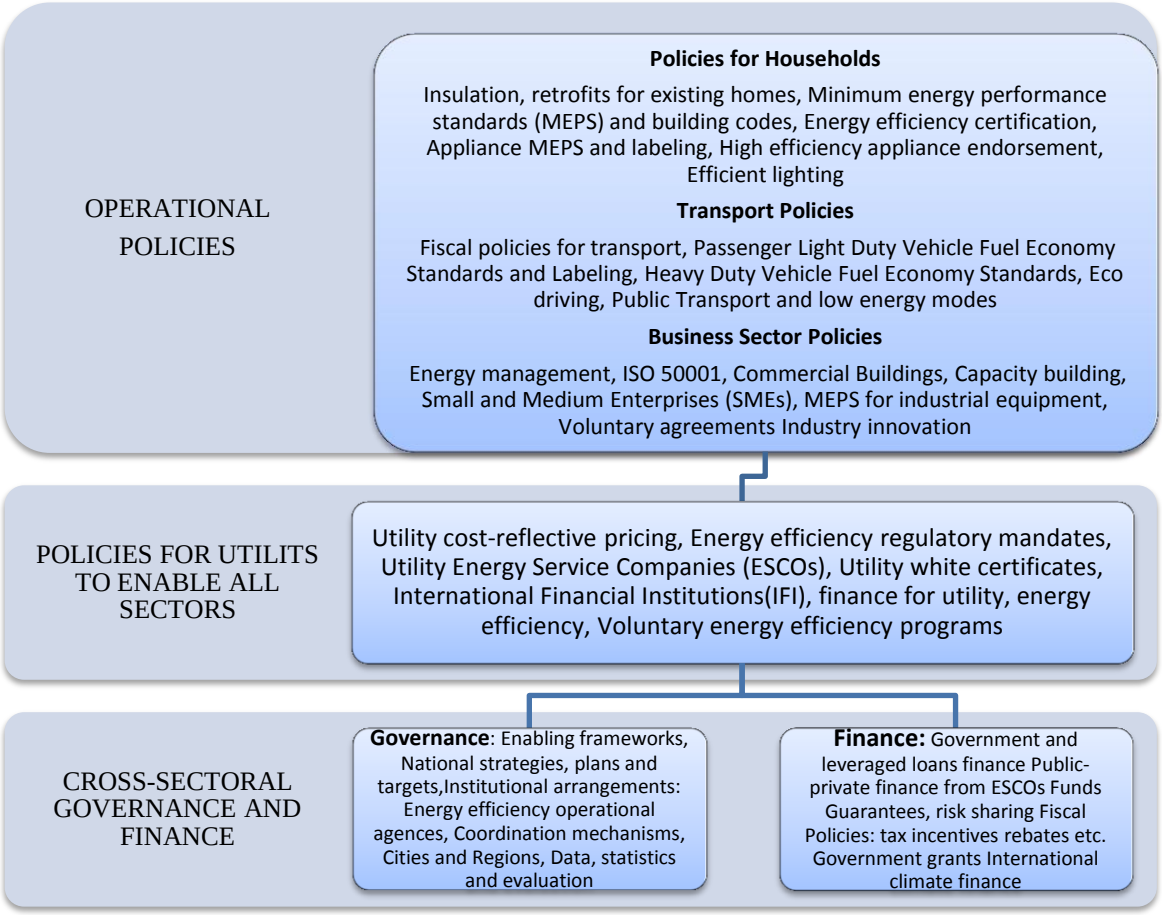

Figure 1 **– The summary of best practices policies for energy efficiency**
(adopted from UNECE Energy Series analysis)

5. Results and discussions

In particular paper we are covered just several point according subject how it is possible to increase rate for successful energy efficiency projects. It is not just you have project framework and some industrial or other guidelines, here it doesn't work well. We propose to create the system which could pass EEPs through and come out with assessment results. This system takes into account everything from energy and ecological policies within governance and finance with each hierarchy level down cover issues about risk factors for the process functions, best practices in particular state-of-the-art, get the mark of possible success during EEP application for business.

For performing such kind of work, we drag in Economics, Ecology, Information Technology, Project Management, Energy Management and Audit, and HVAC&R, Business Modeling. To get financing for EEP is crucial point and shows up issues from clear financing flows for business to theoretical base within methodology use for analysis performing in order to offer best way possible for problem solving and to satisfy customer needs. The EEP with high energy impact or low environmental impact doesn´t mean it is good for customer or stockholders because they have own interest in each type of activity which should be considered during setting project requirements up to project deploying specialist have to able to understand simple business model for proposing programs with clear problem solving formulation.

Conclusions

Energy efficiency project has been considered from the system point of view. In order to improve EEP success rate it's proposed to conduct study and to summary best practices for improving level of energy efficiency within economy for development recommendations with risk model for modifying approaches and working processes for energy policy with the level of abstraction increasing for the realization successful EEPs. We are looked through links in between Sustainable Development and "Green" Economy in order to get clear understanding how it's functioning, that "Green" Economy is a tool for achieving sustainable development goals for Ukraine. It has been proposed for review the summary of best practices policies for energy efficiency that can influence on EEP as well.

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Received 30 January 2018
Approved 06 March 2018
Available in Internet 30 April 2018