ENERGY EFFICIENCY FINANCING: INNOVATIVE MODELS AND STRATEGIES

Juliia Gernego
PhD, SHEI "Kyiv National Economic University named after Vadym Hetman",
e-mail: IuliiaGern@ukr.net, Ukraine
Oleksandr Dyba
PhD, SHEI "Kyiv National Economic University named after Vadym Hetman",
e-mail: dyba_m@ukr.net, Ukraine

Abstract. The article deals with the questions of energy efficiency financing. Particularly, the attention is paid to the role of energy efficiency financing within an innovative economy. It is proved that a financial aspect plays an important role in models and strategies of national innovative development implementation. The authorsdescribe new approaches to the solution of problems of energy efficiency financing as well as to the possibilities for its increase in Ukraine.

Keywords: energy efficiency, financing, social investment, innovative economy, innovative strategies

DOI: http://dx.doi.org/10.23856/1809

Introduction

The world economy has benefited from widespread innovative developmentand global growth,on the one hand, and requires regular progressive changes and increased competition in main branches of industry within both developing and the most developed countries, on the other hand. One of the most important and largest opportunities for national economies innovative growth is represented by energy efficiency increasing. Despite energy costs reduce, households and businesses get the possibility to increase levels of their income. The economic growth is expanded. Moreover, such progressive changes enable more distributed jobs creation, domestic security enhancement and air pollution cutting.

Innovative enterprises experience shows that one of the major barriers to energy efficiency projects implementing is lack of their own financial resources. The financing policy becomes an important imperative to overcome financial barriers and to improve energy efficiency. Besides innovative entrepreneurs, public and private financial institutions, industry, banking and SME associations, energy efficiency industry experts and services representatives are among participants within innovative economies. In other words, innovative society requires additional investmentsthat provide more resources directly to promote energy efficiency. In particular, an important step to close the energy gap is to develop energy financing strategies and models both on the national and entrepreneurs levels.

A variety of researchers estimatepotential and factors forenergy efficiency increase. For instance, theoretical basis of unrealized energy efficiency potential is connected with research of Brown (2001), Bresssand (2007), Jackson (2009), Hynek (2005) as well asAnsar and Sparks (2009). The methodology of this paper is built on Kats, Menkin, Dommu and DeBold (2012) and Antonini, Longo, Gianfrate and Copiello's (2016) vision of models and strategies of energy efficiency financing in the USA and Italy. The questions of energy efficiency

mobilising are also among the objects of international organizations' applied research.A wide variety of factors, influencing energy efficiency and possibilities for its financing, are well researched and documented within the framework of the Organisation for Economic Co-operation and Development (OECD), The International Energy Agency (IEA) and the Energy Efficiency Financial Institutions Group activities.

The objective of current study is to consider different financing models and strategies as a factor in explaining the energy efficiency. We reviewthe practical energy efficiency financing experience within different economies. The study provides different kinds of measures and activities which, when implemented, are able to reduce the financial barriers to energy efficiency.

Energy efficiency financing within innovative economy

Russell (2005), Naumoff and Shipley (2007) promote energy efficiency as a risk management tool because of the possibility of energy costs reduces due to the energy price volatility. Mills (2003) defines energy-savings insurance as amanagement tool and one among the risk transfer means. Goldman (2005) estimates the importance of energy service contracts as an instrument for further risk transfer in accordance with cooperation between producers and energy service companies.In spite of above represented researchers, from economic point of view, we define energy efficiency as one among the national strategies' instruments for further innovative development. It includes knowledge and technologies financial support, encouraging less energy use to provide the same service.

As a result, social investment in energy efficiency provides both social outcome and financial return, boosts the economy in part of its sustainable and innovative development (Figure 1).

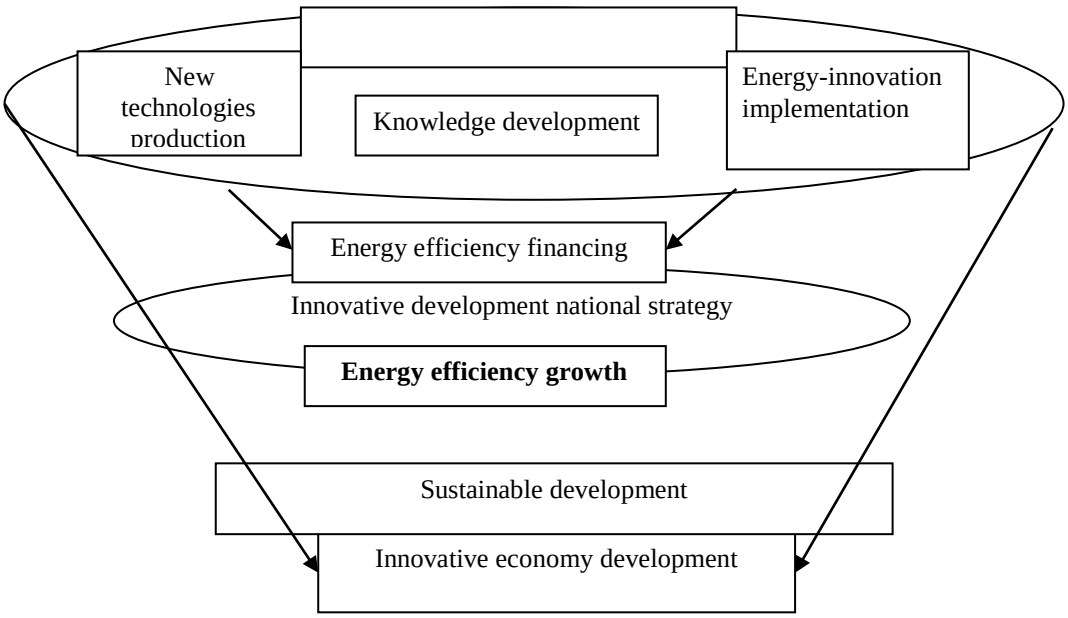


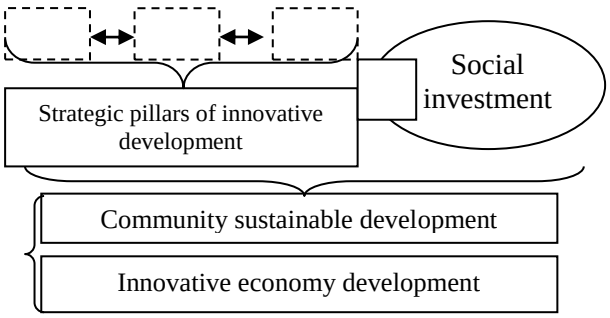
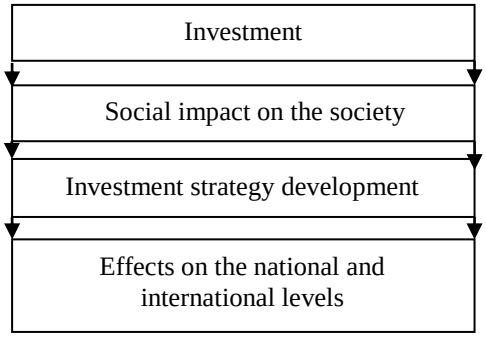
Fig. 1. Energy efficiency as innovative development boost*

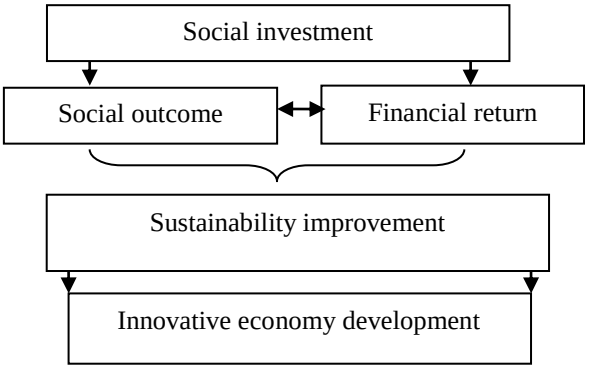
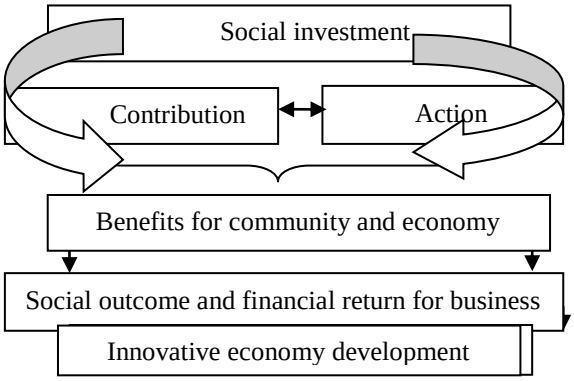
* Source: compared by author

Traditionally, investor seeks all possible ways to maximize the returns on their invested capital. However, in recent years, we observe a new trend, which shows, that the innovative development depends both on commercial and social impact.

Table 1

Social investments within the innovative economy based on energy efficiency (EE) development*

Explanation	Source	Innovative model
Social investments are built on the strategic pillars (community health, education/workforce development, energy efficiency, local environmental efforts) … The adoption of best practices in this area and their implementation support further achievement of results that benefit both communities and the energy industry.	Noble Energy. Sustainability report (2015)	
Social impact investment means an investment strategy that is gaining global traction.	Bertelsmann Stiftung (2016)	

Social investment is any investment activity which has an expectation of both a social outcome and a financial return, which would usually be below market rate. It represents a form of repayable finance that can be used for capital investment, revenue funding development, capacity building, or other ways of improving their sustainability.	Knowhow Nonprofit (2016)	
Social investment is defined as contributions or actions, which can be taken to bring further benefits to communities and economies. Through this, it is important to create the possibility to deliver returns for such business and communities.	Cairn (2016)	

* Source: compared by the author

The energy potential for further innovative economy development is hindered by barriers, including lackof available financial resources (Brown, 2001, Sorrell, 2004). Therefore, energy efficiency requires new forms of financial resources involvement, emergence of new financial resources combinations.

Social investmentscan take differentforms to achieve the goals of particular types of sectors and organizations (Knowhow Nonprofit, 2016), particularly:

- in the form of a secured loan;
- traditional equities for organizationwith a share-holding structure;
- quasi-equities, which create the possibility for lenders to take their returns as a part of the organization's future revenue;
- facilities in the form of overdraft;

- social impact bonds, which are represented by investors, who put forward the capital required for project implementation, and are repaid by the commissioner (government) and are based on the social results of delivery organizations (mainly a charity);
- crowdfunding, which is represented by a large amount of investors, who are ready to invest money through online platforms;
- social investment tax relief, which is developed to support charities and social enterprises investment.

The energy efficiency innovative market requires more and more investment. At the same time, main economic and social goals will be achievedonly in case of financial, particularly innovative, resources optimal combinations. Therefore, there are different kinds of energy efficiency financing models and strategies in separate countries.

Energy efficiency financial support in different countries

According to the Bertelsmann Stiftung (2016) research, the global social impact on investment market volume is nearly 11 billion euro, during the timeframe between 2012 and 2014 its volume is increased by more than 30 percent. Particularly, the priority areas for social investing within developing countries are micro-finance, financial services and energy.Therefore, attention should be paid to the fact that both the developing and the developed societies face problems finding new funding sources to meet basic economic and social objectives.

The United States economy is one of the most innovative active economies in the world. At the same time, the research shows that the national potential for cost-effective energy efficiency investments is nearly 150 billion USD a year. Furthermore, there is a possibility to save annually 200 billion USD for USA businesses and households representatives in case of energy efficiency investing activation. However, current level of energy efficiency financing is only about 20 billion USD per year that makes less than one-fifth its cost effective potential (Kats, Menkin, Dommu and DeBold, 2012).

Therefore, despite the progressive trends of national innovative development, there is so-called investment gap. We are able to describe energy efficiency financing as one among the most important and largest opportunities to expand USA economic growth and innovative development. The social investments concerning energy efficiency growth create the opportunity to strengthen the economy, increase the innovativeness, social responsibility and competitiveness of national businesses.

The achievement of the above mentioned goals is possible in case of state and private entities representatives' common involvement in the process of already existing possibilities for energy efficiency financing analysis and potential models and strategies understanding. For instance, Federal level energy efficiency activity includes a wide range of economic and tax incentives, including tax credits; granting approval to philanthropic and non-profit foundations; allowing non-profit organizations to develop income sources; Federal direct investments programsactivation to encourage social investments in accordance with the main social objectives. Moreover, the energy efficiency policy depends also on the region (Lachman-Messer D., Katz E, 2012). In late 2010, the energy efficiency financing policy was also held by the Energy Foundation and Capital E, which has been cooperated with more than 30 private partners. The goal was to identify and develop mechanisms of energy efficiency financing for next three to five years (Figure 2).

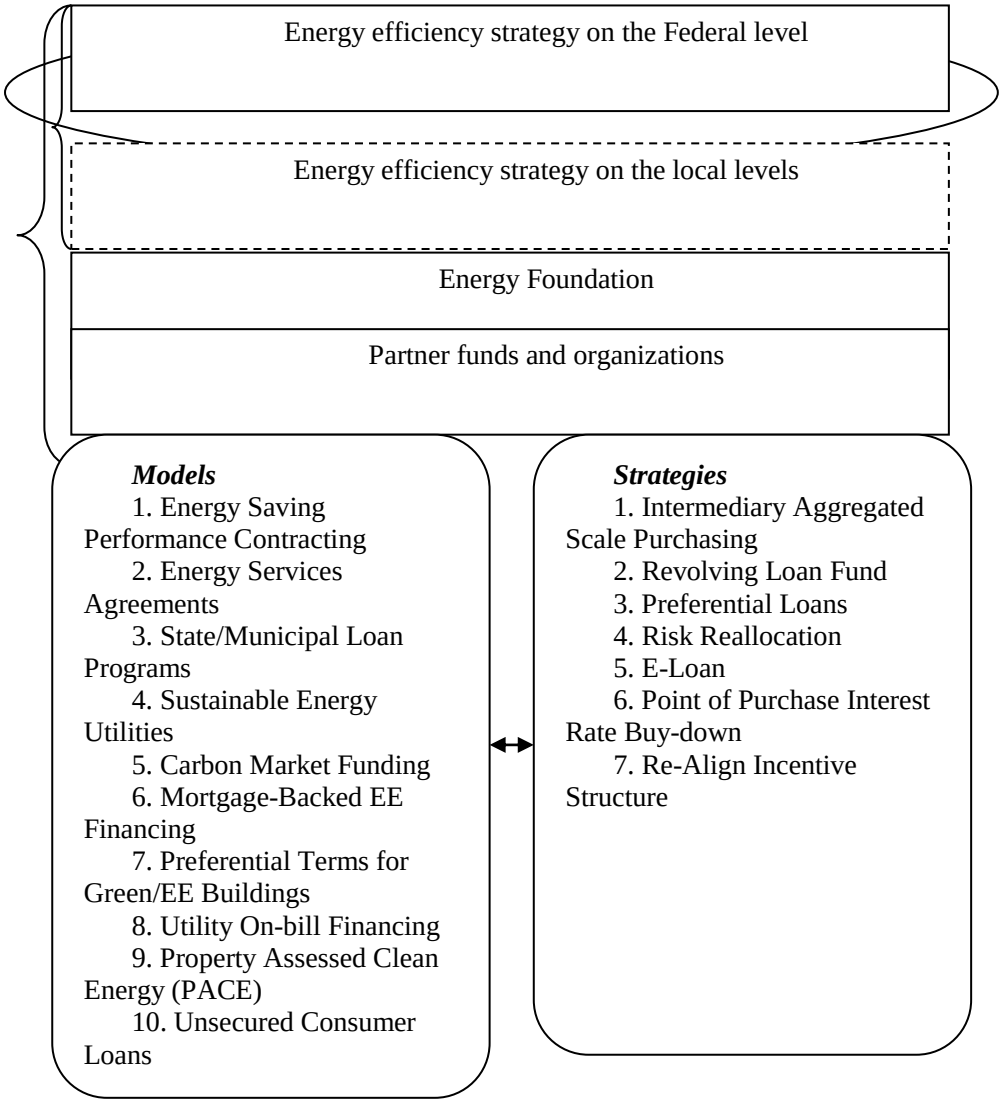


Fig. 2. Energy efficiency models and strategies in USA*

* Source: compared by author based on (Kats, Menkin, Dommu and DeBold, 2012)

One of the most innovative economies in Europe is market economy in Germany. The main co-financing programs in energy efficiency sectors are held with participation of the KreditanstaltfürWiederaufbau (KfW). Moreover, the social investment market in Germany is deeply influenced by the activities of the two prominent social venture capital funds (BonVenture and Ananda Ventures). At the same time, the main actor of energy efficiency financing is the state, because it is able to use required financial resources in order to achieve social goals. Nowadays, the existing state programs, which are developed by the Federal Ministry for Economic Affairs and Energy, support energy efficiency activity of business start-ups and social enterprises.The total annual social investment volume is growing. For

instance, the total increase of such kind of investment is about 60 percent in 2016 compared to 2015 (Country Report. Germany, 2016).

Despite the existence of separate funds and organization, the models and strategies of energy efficiency financing are developed within national growth programs at the state level. The energy efficiency policy is basedon improvements in the particular sectors. Particularly, the energy efficiency financing models and strategies are implemented within public, building, industry and transport sectors (Figure 3).

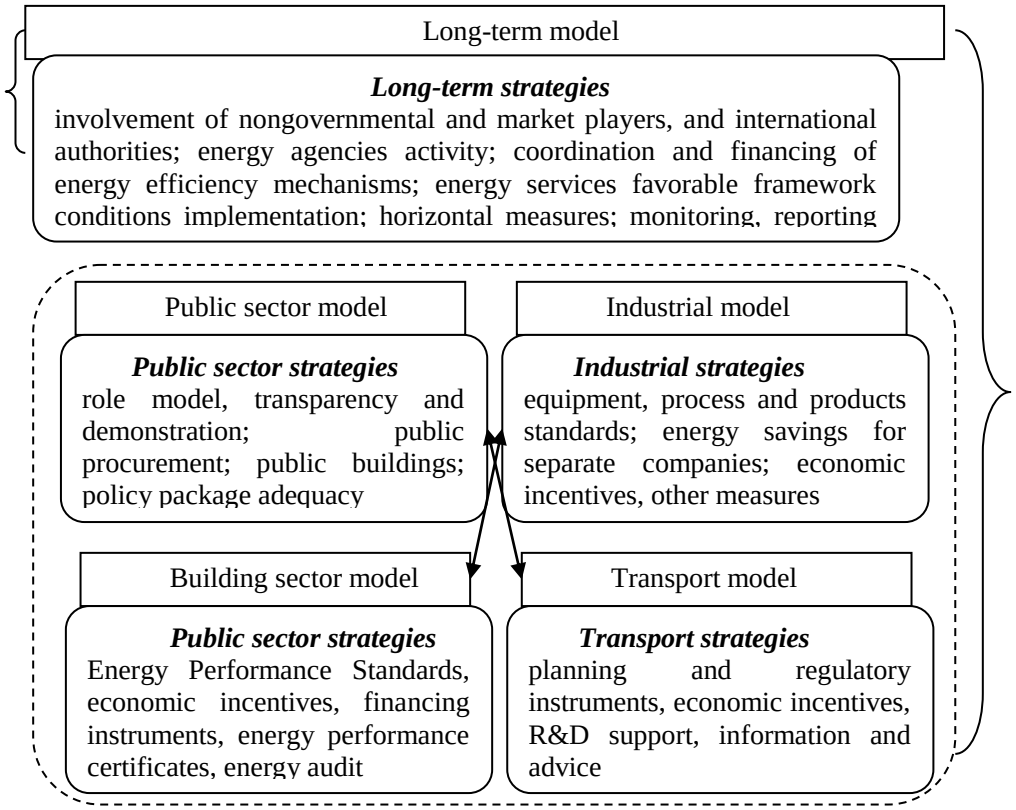


Fig. 3. Energy efficiency models and strategies in Germany*

* Source: compared by the author based on (Country Report. Germany, 2016)

Possibilities of energy efficiency financing in Ukraine

According to the EBRD research, Ukraine still remains among the most energy inefficient countries in the world. Thus, the national energy intensity is three times higher than the average in Europe. The certain amount of energy used to produce each unit of GDP is inordinately high (EBRD, 2015).

At the same time, our country has a great potential for energy efficiency development. We agree with the EBRD experts' recommendations about energy efficiency financingin spite of the separate sector's needs, including possibilities to lower costs in the metallurgy, fuel,

power and chemicals sectors. The national models and strategies should combine the foreign experience with national peculiarities and goals of innovative development in Ukraine (Figure 4).

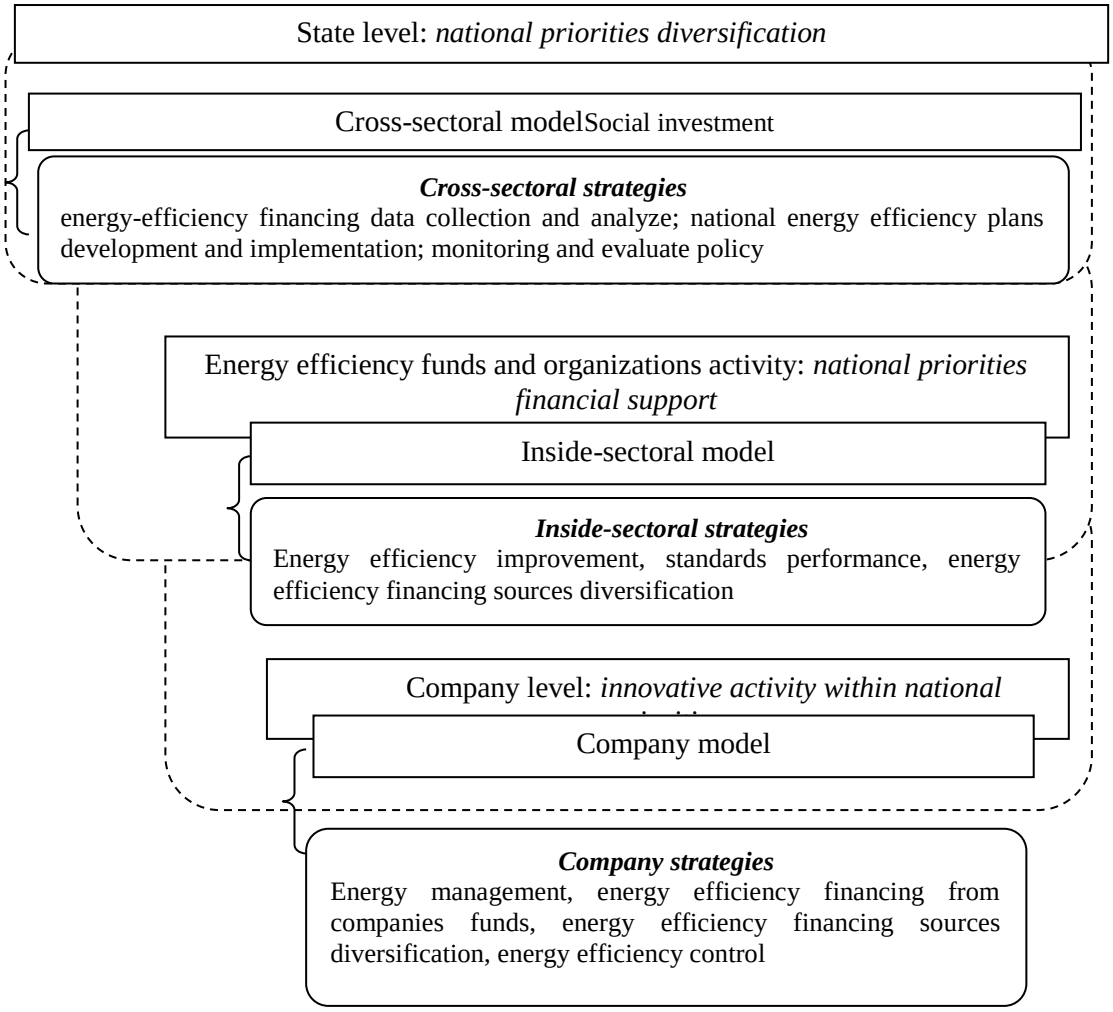


Fig. 4. Energy efficiency models and strategies in Ukraine*

* Source: compared by author based on (EBRD, 2015)

Conclusions and suggestions

According to the current tendencies and research of energy efficiency financing it is possible to make conclusion as to its important role within the innovative economies development. The main goal of energy efficiency financing is to increase both social and economic outcomes, which is possible only using all available sources combinations. The Ukrainian models and strategies should be combined despite the possibilities of sectoral

dialogue policy building, which is developed at the state level and implemented at the level of a separate company.

Due to the limited financial possibilities of separate companies, industrial companies cannot be expected to solve all various forms of access to finance issues on their own. There is a need to establish special energy efficiency funds and organizations, which will be intermediates between innovative development priorities at the national level and energy efficiency practice at the level of a separate company.

References

Ansar, J., Sparks, R. (2009). The experience curve, optionvalue and the energy paradox. Energy Policy 37, 1012–1020.

Antonini, E., Longo, D., Gianfrate, V., Copiello, S. (2016). Challenges for public-private partnerships in improving energy efficiency of building sector. Int. Journal for Housing Science, Vol. 40, No.2 , 99-109.

Bertelsman, Stiftung (2016). Social impact investment in Germany. Market report 2016. [Electronic resource]. Retrieved from https://www.bertelsmann-stiftung.de/fileadmin/files/user_upload/Market_Report_SII_in_Germany_2016.pdf

Bresssand, F., Farrell, D., Hass, P., Mrin, F., Nyquist, S., Remes, J., Rosenfeld, J., Rogers, Matt, (2007). Wasted Energy: How the US Can Reach its Energy Productivity Potential, Mckinsey Global Institute, June 2007.

Brown, M. (2001). Market failures and barriers as a basis for clean energy policies: Energy Policy Vol. 29, Issue 14, Elsevier, Amsterdam, 1197-1207.

Brown, Marilyn A., Levine, Mark D., Short, Walter, Koomey, Jonathan G. (2001). Scenarios for a clean energy future. Energy Policy (also LBNL-48031). 29 (14), 1179–1196.

Cairn. (2016). Social investment. [Electronic resource]. Retrieved from http://www.cairnenergy.com/index.asp?pageid=718

Country report. Germany. (2013). Energy Efficiency in Europe Assessment of Energy Efficiency Action Plans and Policies in EU Member States, 8.

Goldman, Ch., Hopper, N., OsbornJu. (2005). Review of U.S. ESCO industry market trends: an empirical analysis of project data, Lawrence Berkeley National Laboratory, LBNL 52320. Retrieved from http://www.naesco.org/resources/indus try/documents/52320.pdfS.

Hynek, J.,Janecek, V. (2005). Adoption of advanced manufacturing technology – new trends in the Czech republic. In:Proceedings, 2005. IEEE International Conference on Intelligent Engineering Systems, 2005.

Jackson, J. (2008). Energy Budgets at Risk (EbaR)s: A Risk Management Approach to Energy Purchase and Efficiency Choice. John Wiley and Sons, Hoboken, NewJersey.

Jan-Willem van de Ven. (2015). Energy Efficiency in Ukraine: EBRD Experience. European Bank for Reconstruction and Development. [Electronic resource]. Retrieved from http://www.norden.org/en/theme/new-nordic-climate-solutions/cop21/events-1/nordic-financing-for-energy-efficiency-in-ukraine/presentation-jan-willem-van-de-ven-energy-efficiency-in-ukraine

Kats, G., Menkin, A., Dommu, J., DeBold, M. (2012). Energy efficiency financing - models and strategies. Pathways to scaling energy efficiency financing from $20 billion to $150 billion annually. Capital E. USA.

Knowhow, Nonprofit (2016). What is social investment? [Electronic resource]. Retrieved from https://knowhownonprofit.org/funding/social-investment-1/what-is-social-investment

Lachman-Messer D., Katz, E. (2012). A Social Capital Market for Israel. Report of the Working Group for Social Investment. Hebrew.
Mills, E. (2003). Risk transfer via energy-savings insurance. Energy Policy 31 (3), 273–281.
Naumoff, C., Shipley, A.M. (2007). Industrial energy efficiency as a risk management strategy. In: Proceedings of the Industrial Energy Technology Conference, New Orleans.
Noble energy. (2015). Sustainability report. [Electronic resource]. Retrieved from http://responsibility.nobleenergyinc.com/wp-content/uploads/resources/report-archives/NobleEnergy_Sustainability_Report_2015.pdf
Russell, C. (2005). Strategic industrial energy efficiency: reduce expenses, build revenues, and control risk. Energy Engineering: Journal of the Association of Energy Engineering 102, 7–273, 7–27.
Sorrell, S. et al. (eds.) (2004). The economics of energy efficiency, Edward Elgar, Cheltenham.