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# Green Bonds like the Incentive Instrument for Cleaner Production at the Government and Corporate Levels: Experience from EU to Ukraine

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**Abstract**

The paper deals with analysis of the main features and perspectives of green bonds development. Under the investigation the European Union experience of developing and functioning the green bonds market were analysed by the authors. The authors systematised the main approaches to define green bonds. Thus, the green bonds were defined as the debt investment in which an investor loans money which borrows the funds for a defined period at a variable or fixed interest rate with purpose to raise money and finance the variety of green projects and activities. In this direction, green projects mean the all activities which connected with resources saving and environmental protection activities. According to this result, the main features, parameters and principles of green bonds were indicated by the authors. Besides, based on the European Union experience the authors allocated the main pre-requisites of developing the green bonds market in Ukraine. Moreover, the authors allocated the main players at the green bonds market. According to the European Union experience and Ukraine conditions, the attractive directions of green bonds market for investors were identified by the authors. With this purpose the authors tried to consolidate the main advantages and disadvantages of green bonds for investors. According to the results, in conclusion, the authors allocated the possible economic, social, political and environmental benefits of green bonds market for issuers with purpose to attract their attention and to develop the green bonds market in Ukraine.

**Keywords:** bond; benefit; financial market; green bond; investor; issuer; stock index.

**JEL Classification:** Q50; O13; O44; D53; G11; G24; G15.

## Introduction

The snowballing effect of the environmental problems in the world, dependence from the gas and others fuel resources are contributed providing and developing new green approaches and technologies which help to solve above-mentioned problems which corresponds with Sustainable Development Goals 2030. On the other side, such activities require the additional financial resources. Thus, lack of financing the most of country retard the process to develop and implement green technologies, and as a result to increase the number of ecological problems. According to the databases World Development (2017) the countries such as China, the USA, India, Russian Federation and Japan occupied the first five places in CO2 emissions in the world. Ukraine occupied the 26th place of CO2 emission in the world. Therefore, China generates only 14.84% of the world GDP, but it produces 29.51% of CO2 emission in the world. The same situation in India and Russia. Theirs CO2 emission in percentage in twice higher than theirs share of GDP in the world. Unfortunately, the same situation in Ukraine. In this case, it is necessary to develop new market instruments that will motivate the countries-polluters to provide sustainable development with decreasing of air pollution without decreasing their economic growth. Moreover, such new instruments must correspond to the ongoing situation in the modern market economy. In such direction, it is necessary to develop and implement the modern financial instruments such as green bonds in the Ukrainian investment practice.

## 1. Literature review

In the work (Vasylyeva *et al.* 2014; Leonov *et al.* 2014; Kozmenko *et al*. 2011) indicated that after financial crisis in 2008-2009 the Ukrainian financial market needs new mechanisms to achieve stability. In the work (Leonov *et al.* 2012) the authors paid attention to the main direction to develop the finance market through the co-investment's funds (including green co-investments funds). Furthermore, the authors approved correlation between tendency of stock market development and countries welfare (Khan *et al.* 2017). Besides, the authors (Vasylieva *et al*. 2018; Mohamad *et al.* 2017; Chirichenko and Fisunenko 2018) proved that ecological factors (volume of green investing; green energy; CO2 emissions and etc.) influence on the country's macroeconomic stability, innovation development and welfare.

The results of analysis showed, that scientists paid a huge attention to the development of the modern financial market instruments using which could achieve stability at the financial market (Dovhan *et al.* 2017). Besides, the scientists analysed and summarised the perspectives and challenges of new ecological and finance instruments to stimulate sustainable development in all sectors and at all levels; at the local level (Lyulyov *et al*. 2015) in the corporate sector (Celik *et al.* 2017; Chigrin and Pimonenko 2014; Halim *et al.* 2017) and in the social sphere (Vasilyeva *et al.* 2018; Kubatko *et al*. 2018), enhancing resources saving activities (Chygryn 2016), spreading the alternative energy (Prokopenko *et al.* 2017; Dado *et al.* 2017; Cebula 2015; Simionescu *et al*. 2017; Pimonenko 2017), cleaning production, sustainable agricultural development (Smith 2018; Aliyas *et al.* 2018; Mikalauskiene *et al.* 2018; Nagyová *et al*. 2016). It should be noticed that some scientists proved that stability of financial market and countries sustainable development couldn't be archived without stable and effective economic, fiscal and ecological polices (Us and Malyarets 2018; Melnyk *et al.* 2018; Chygryn *et al.* 2018, Kubatko *et al.* 2018; Abaas *et al*. 2018). At the same time, all abovementioned scientists allocated the green financing (including green bonds) as new perspective direction to develop financial market.

It should be underlined, that the scientists which analysed the development perspectives of corporate sector highlighted the necessity of transparency in financing of companies' green activities to increase the companies' image and value at the market (Chygryn 2016; Mačaitytė *et al.* 2018; Kiss 2018; Chigrin and Pimonenko 2014).

From the other side, the authors in the work (Yao Wang and Qiang Zh 2016) proved that green finance (including green bonds) is a key element in the environmental protection of country. The authors in (Vasylyeva and Pryymenko 2014; Tvaronavičienė *et al.* 2018) indicated that green financial instruments are the main recourse to guarantee the country's energy security.

At the same time the scientists in the paper (Craig *et al*. 2013) assumed that green bonds are new perspective instrument at the financial market for financing green projects. Thus, the main definitions, principles and features of the green bond market from the different point of views are explained in the scientific works of the huge range of scientists.

It should be underlined, that spreading of green bonds is restricted by the stereotypes of non-efficiency of green bonds compare with the traditional securities. From the other side, the experts from the Triodos Bank identified, that green bonds as a type of green investments with the is the financial products which guarantee not only financial benefit but also environmental and social effects (Triodos 2018).

However, in the above-mentioned scientific works and manuscripts of other scientists no proper attention is paid to the benefits and opportunities of functioning green bonds market. Also, necessary to develop instruments according to the Ukrainian conditions and features.

The main purpose of this article is to analyse the world and EU experiences of green bonds market efficiency; indicate the main features of green bonds, the approaches to classify green bonds, allocate the parameters, players and principles of the green bonds market with purpose to show benefits under the economic, social, political and environmental directions among investors in Ukrainian conditions.

## 2. Methodology

Under this research the authors combined the traditional and modern scientific methods of the investigation as follows: synthesis and analysis under the allocating the main approaches to define term "green bonds"; comparison and generalising – to identify the main parameters, features of green bonds; the statistical analysis – due to the allocating the main trend of green development market development in the EU and Ukraine; the scientific compilation – to systemise and to formulate conclusions on social, economic, political and ecological benefits from developing green bonds market for issuers. Therefore, such methods allow allocating the challenges and advantages for Ukrainian investors to develop green bonds market. In addition, it allows considering the best EU practice on enhancing and stimulating the green bonds as alternative financial instruments to finance the achieving of Sustainable Development Goals 2030. The main goals of the paper are identifying the main features, parameters of green bonds, allocate the main players of green bonds market, develop the functioning the mechanism of green bond market. Therefore, the main idea is summarising and allocate the main perspectives, advantages of green bonds market with purpose to attract the investors to finance achieving of Sustainable Development Goals 2030.

## 3. Results

Noticed, that using bond to finance large scale the low-carbon and climate-resilient (LCR) infrastructure directly or to fund lending is not new. However, since 2007 a market for bonds specifically "self-labelled" or named as "green" (hereafter "green bonds") has emerged (Green Bonds 2015).

Noticed, that at COP22 the Green Bond Directions report were released by the Climate Bonds Initiative (Green Finance 2016). According to this report Green Bonds are now being a capital raising tool to meet mitigation and adaptation targets set out in the Nationally Determined Contributions (Green Finance, 2016).

In spite of spreading of green bonds as a financial instrument, the universal definition does not exist. Thus, the scientists and world organizations name green bond as a climate bond.

The International Capital Market Association gives the following definition: green bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or re-finance in part or in full new and/or existing eligible Green Projects and which are aligned with the four core components of the Green Bond Principles (GBP). The GBP have four core components:

1.Use of Proceeds

2.Process for Project Evaluation and Selection

3.Management of Proceeds

4.Reporting (Green Bond Principles, 2016).

The OECD has not defined what constitutes a green bond, it has discussed in its work definitions for "green infrastructure" and for "green investments" (Green Bonds, 2015) and has provided a general quantitative basis for assessing to what extent infrastructure systems can be considered "low-carbon and climate-resilient (LCR)" (Green Bonds, 2015). The OECD's forthcoming bond modelling scenarios and annual investment needs in this analysis are limited to the renewable energy, energy efficiency and low-emissions vehicle sectors as estimated by the IEA (2014) to be consistent with a 2°C emissions path (Green Bonds, 2015; Kennedy and Corfee-Morlot 2012).

The Climate Bond Initiative gives the following definition: climate bonds are fixed-income financial instruments (bonds) linked in some way to climate change solutions. They are issued to raise finance for climate change solutions, for example mitigation or adaptation related projects. These might be greenhouse gas emission reduction projects ranging from clean energy to energy efficiency, or climate change adaptation projects ranging from building Nile delta flood defences to helping the Great Barrier Reef adapt to warming waters.

Like normal bonds, climate bonds can be issued by governments, multi-national banks or corporations. The issuing entity guarantees to repay the bond over a certain period, plus either a fixed or variable rate of return (Green Finance, 2016). The results of analysis of the Ukraine experience in green bonds showed that the most Ukrainian scientists give the same definition as the Climate Bond Initiative.

Summarising the following assumption could be made that in definition green bonds combine two directions and functions: as an ordinary bond (first) with ecological features (second).

The results of analysis of the economics' literature showed that traditional bonds are defined as a debt investment in which an investor loans money to an entity (typically corporate or governmental) which borrows the funds for a defined period of time at a variable or fixed interest rate. Besides, bonds are used by companies, municipalities, states and sovereign governments to raise money and finance a variety of projects and activities (Bond 2017). The adding of the ecological features allows allocating the differences from the traditional definition. As a result, the green bonds are the debt investment in which an investor loans money which borrows the funds for a defined period at a variable or fixed interest rate with purpose to raise money and finance a variety of green projects and activities. In this direction, green projects mean the all activities which connected with resources saving and environmental protection activities.

Thus, if companies or other entities need to raise money to finance green projects (biogas installation, solar panel, etc.), maintain ongoing green operations (researching the new type of air filter) they may issue green bonds directly to investors instead of obtaining loans from a bank.

The indebted entity (issuer) issues a green bond that contractually states the interest rate (coupon) that will be paid and the time at which the loaned funds (bond principal) must be returned (maturity date).

According to the definition the main three actors at the green bonds market could be allocated,

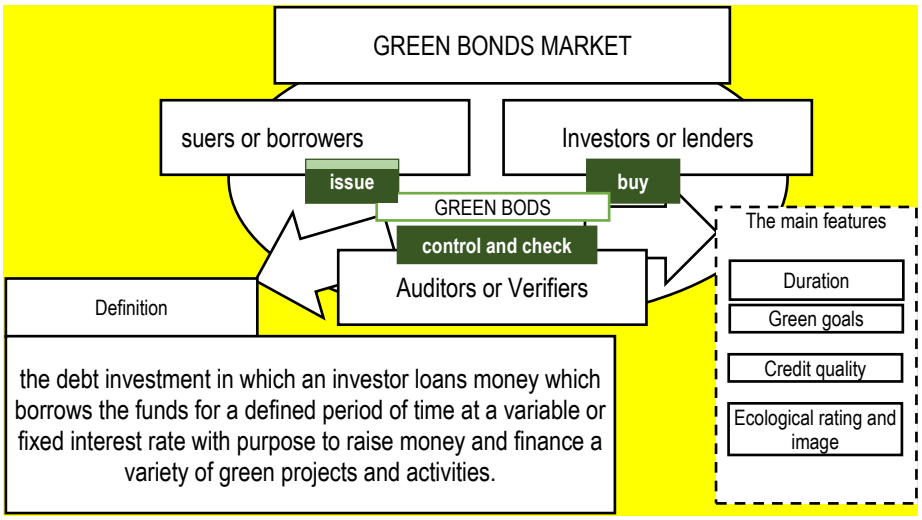
1.Issuers or borrowers – the institutions that issue the green bonds to the public with a promise to pay the value back in full, plus a rate of interest, by a certain date (maturity). Issuers use the proceeds of the green bonds to exclusively support environmental projects. Examples include international financing institutions, governments, private corporations and commercial banks.

2.Investors or lenders – they buy the green bonds of the issuer. Investors loan funds to borrowers, which is repaid with interest, later. According to the Special Report TD Economics (Craig 2013) the institutional investors (pension funds, mutual funds, insurance companies and sovereign wealth funds) make a greater contribution in the green bonds market. Households also invest in green bonds, but on a relatively smaller scale.

3.Auditors or Verifiers – specialists which monitor the use of the proceeds from the green bonds. Finance and accounting specialists ensure that funds are used exclusively to support environmental projects, while environmental specialists verify that projects are delivering the promised environmental benefits. Monitoring and verification of projects can be done by an external third-party or by the issuing institution if it possesses the technical capabilities and expertise (Craig 2013).

In this way, the mechanism of green bonds market functioning is shown in the figure 1.

Figure 1. The mechanism of green bonds market




*Source:* created by the authors on the basis of Chigrin and Pimonenko, 2014.

It should be noticed, that providing financial services such as guidance, training and tools for investors, stock exchanges can play an important role in facilitating investment in the green projects. Thus, exchanges provide issuers access to a large potential investor base for the green bond market, including large institutional investors. The results of analysis allow allocating and generalizing the main ways how stock exchanges would promote green bonds. It would be done by:

- promotion green bond transparency;
- developing green bond guidelines;
- establishing green bond listing;
- supporting green bond indices;
- implementation market education and foster dialogue between investors and issuers.

In the world practice are successfully working Oslo Stock Exchange, Stockholm Stock Exchange, London Stock Exchange, Mexico Stock Exchange, Luxembourg Stock Exchange, Borsa Italiana. They are using dedicated green bond list in their financial practice. Such guidance can not only help issuers, but also provide assurance for investors and encourage them to put up the capital in projects with climate solutions.

It should be noticed, that the ordinary bond's interest rate is determined not only by credit quality and duration. Further, green bonds also have four main characteristics are the principal determinants of a green bond's interest rate, such as: Credit quality; Ecological rating and image; Green goals; Duration.

If the issuer has a poor credit rating, the risk of default is greater and as the ordinary these green bonds will tend to trade a discount. Noticed, that credit ratings are calculated and issued by the credit rating agencies such as Standard & Poor's (S&P), Moody's (Moody's Green Bond Assessment Framework), and Fitch Group, etc. In addition, above-mentioned agencies are considering ecological aspect in their rating systems and stock indexes (table 1).

Table 1. The systematising of stock indexes which consider the ecological aspects

| Stock Indexes | Characteristics |
|---|---|
| KLD's Domini 400 Social Index | a float-adjusted market capitalization weighted common stock index; the first benchmark for equity portfolios subject to multiple social and environmental screens |
| FTSE4Good Index Series | a tool to measure the performance of companies that meet globally recognized corporate responsibility standards, and to facilitate investment in those companies |
| Dow Jones Sustainability Index Series | an integrated assessment of economic, environmental and social criteria with a strong focus on long-term shareholder value |
| ESG India Index | provides investors with an instrument to incorporate sustainability measures into their investment decisions and will provide a model for the launch of similar indices in other emerging markets |
| Barclays MSCI | using the ESG approach. "ESG" is an investment approach that takes into account the Environmental, Social and Governance impact of investment decisions. ESG approaches range from screening out companies involved in specific restricted business activities to a more rigorous approach where investors incorporate ESG data as an integral component of their investment analysis, allocation, risk measurement, security selection, and performance attribution process |

*Source*: created by the authors on the basis of Barclays, 2013; Chigrin, 2014

Besides, the green bonds' issuer has been already listed by the environmental stock indexes are more attractive for investors than companies haven't been listed yet. The results of analysing of the green bonds market showed that the following green bonds indexes: Barclays MSCI; Bank of America Merrill Lynch; S&P Dow Jones; Solactive.

Besides, the following Stock Exchange green bonds lists are in:

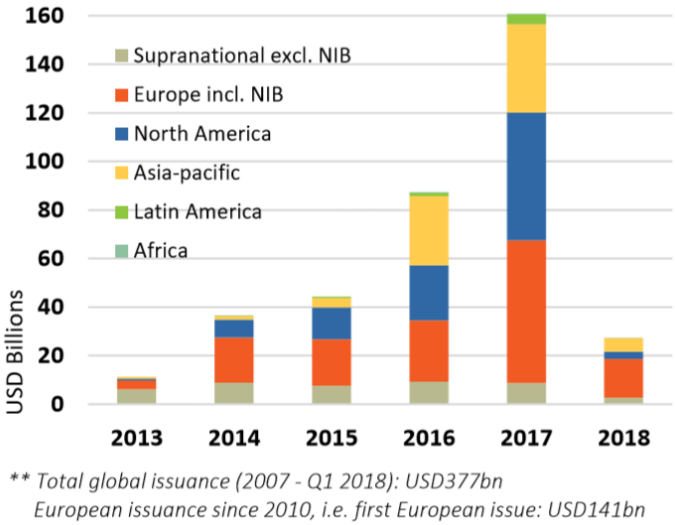
1.Oslo.
2.Stockholm.
3.Luxembourg.
4.London SE's.
5.Mexico.
6.Shanghai.

According to the report of Climate Bonds Initiative to qualify for the Barclays MSCI Index, at least 90% of proceeds must be used for either new or existing environmental projects in five broad categories: alternative energy, energy efficiency, green building, pollution prevention and control, and sustainable water (Green Bonds 2015).

As of June 30, 2016, the World Bank (International Bank for Reconstruction and Development, IBRD) has issued 125 Green Bonds in 18 currencies raising the equivalent of US$9.1 billion of funding supporting the transition to low-carbon and climate resilient growth. 25 green bonds totalling US$ 2.9 billion had matured by Jun 30, 2016 of which US$1.6 billion has been replaced with new green bonds. In addition, US$0.3 billion of green bonds have been repurchased or called and these amounts have also been rolled-over. World Bank Green Bonds totalling US$5.7 billion were outstanding as of June 30, 2016. The total amount of matured green bonds that may be replaced with new green bonds in future is US$1.3 billion (Green Bond, 2016).

The analysing results showed, that green bonds market is rapidly growth from year to year (figure 2). According to the official report of CBI, 2016 was success year for green bonds market. Thus, 2016 was a record-breaking year by all metrics – the largest year of issuance to date, the largest single month, the largest number of new issue (Bonds 2016).

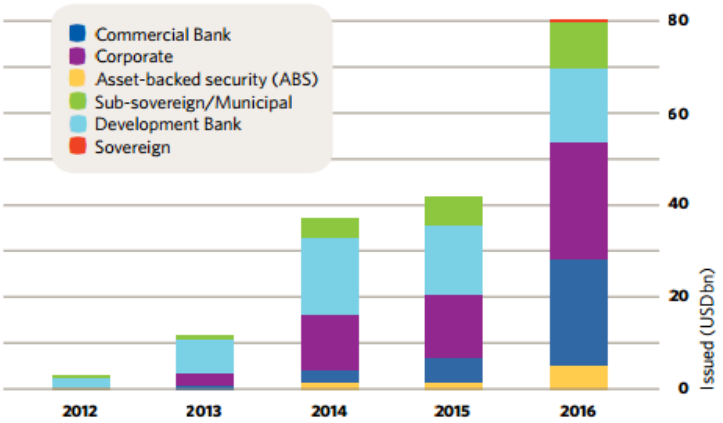
Figure 2. Dynamic of green bond market in the world




*Sources:* The green bond, 2018

More than $ 80 bn. were spent for green bonds (figure 3). In this case, should underline, that in 2016 the biggest share of green bonds was issued by the corporates, then by the development banks.

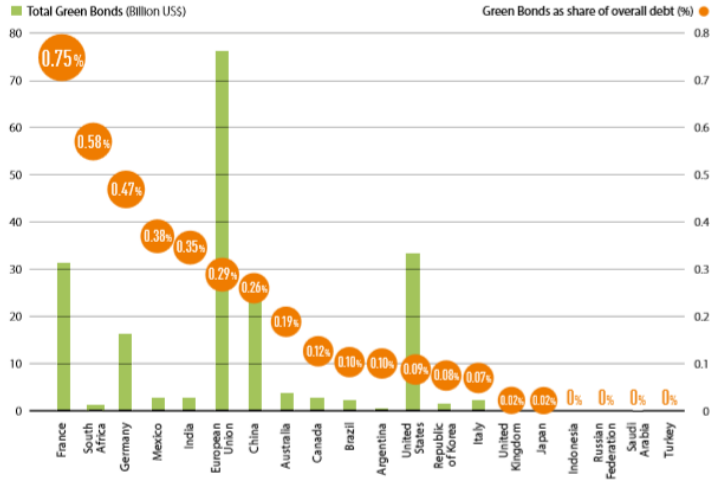
Figure 3. The dynamics of green bonds by the type of issuer




*Sources:* Bonds, 2016

According to the official dataset (figure 4) in 2016 the biggest progress at the green bond market had the following countries: France, Germany, Mexico and South Africa. France issued its first green sovereign bond in early 2017 – the largest green bond issued to date at EUR 7 billion – increasing the overall French green bond market by approximately 25% (Climate 2017). China is just behind the EU with regard to market penetration. The first Chinese green bonds were issued in late 2015, but substantial growth has since made China 2016's largest single green bond issuing country (Climate 2017).

Figure 4. Green bonds market among G20 countries in 2016




*Source:* Climate 2017

Furthermore, in 2016 Poland became the first issuer of a sovereign green bonds. Poland issued green sovereign bond of € 750 m in December 2016. France has already issued an impressive € 7 bn. green sovereign bond in January 2017. There are also plans for green sovereign bonds from Morocco and Nigeria. As governments seek to implement Nationally Determined Contributions (NDCs), sovereign green bonds are a logical financing option (Bonds 2016).

Table 2. Green bonds issuer as of March 2017

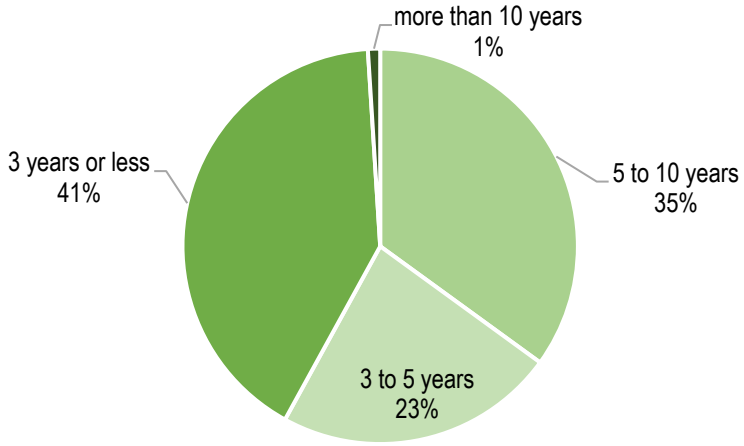
| Issuer | Dollar value (M) | Settlement date | Maturity date |
|---|---|---|---|
| Engie | 1 609.6 | Mar. 17, 2017 | Mar. 27, 2024–2028 |
| Iberdrola | 1 052.5 | Mar. 7, 2017 | Mar. 7, 2025 |
| Fannie Mae | 611.7 | Febr. 28, 2017 | Febr. 28, 2023–2037 |
| Government of Ontario | 609.6 | Febr. 2, 2017 | January 27, 2023 |
| Queensland Treasury Corporation | 576.5 | Mar. 22, 2017 | March 22, 2024 |
| European Investment Bank | 537.6 | Mar. 21, 2017 | Nov. 13, 2037 |
| SEB | 534.0 | Febr. 17, 2017 | Febr. 17, 2022 |
| National Australia Bank | 530.0 | March 7, 2017 | Sept. 7, 2022 |
| Caisse des Dépôts et Consignations | 526.6 | Mar. 1, 2017 | March 1, 2022 |
| Region Ile de France | 431.9 | Mar. 14, 2017 | March 14, 2029 |
| Province de Quebec | 374.1 | Mar. 3, 2017 | March 3, 2022 |
| NY Metropolitan Transportation Authority | 325.6 | Mar. 16, 2017 | Nov. 15, 2017–2057 |
| European Investment Bank | 323.7 | Febr. 3, 2017 | Nov. 13, 2026 |
| NY Metropolitan Transportation Authority | 312.8 | Febr. 23, 2017 | Nov.15, 2018–2047 |
| KfW | 311.1 | Febr. 24, 2017 | June 5, 2020 |
| Province of La Rioja | 200.0 | Febr. 24, 2017 | Febr. 24, 2025 |
| Iberdrola | 106.1 | Febr. 20, 2017 | Febr. 20, 2024 |
| DC Water | 100.0 | Febr. 23, 2017 | Oct. 1, 2047–2052 |
| European Investment Bank | 82.9 | March 2, 2017 | March 2, 2027 |
| Flexigroup | 38.3 | Febr. 17, 2017 | March 8, 2022 |
| Martha's Vineyard Land Bank | 20.1 | Mar. 1, 2017 | May 1, 2017–2036 |
| Vermont Municipal Bond Bank | 6.1 | Mar. 15, 2017 | Dec. 1, 2018–2047 |

*Source:* created by the authors on the basis of Green Finance, 2016.

According to the official databases as of March 2017 the first place in green issuers was occupied by ENGIE, the sum of green bonds is 1 609.6 million USD. ENGIE is a global energy player and an expert operator in the three businesses of electricity, natural gas and energy services. The Group develops its businesses around a model based on responsible growth to take on the major challenges of energy's transition to a low-carbon economy: access to sustainable energy, climate-change mitigation and adaptation, security of supply and the rational use of resources (Official 2017). Should be underlined, that all maturity date of green bonds which indicated in table 2 are more than 10 years. However, according to the Green Bond Impact Report (Green Bond 2016) of the World Bank

the most share of green bonds is occupied by the short-term green projects and only one 1 % received the financing more than 10 years (figure 5).

Figure 5. World Bank Green Bond Issuance by Maturity




*Source:* created by the authors on the basis of Green Bond, 2016

Today, Ukraine, like other signatories of the Paris Agreement, has committed itself to creating favourable conditions for investing in greenhouse gas emission reduction projects. This, in turn, requires effective mechanisms for raising capital in green projects. Therefore, the issue of "green" bonds becomes relevant. However, it should be underlined, that two Ukrainian projects in renewable energy and energy efficiency direction have already included in List of World Bank Green Bond Eligible Projects and received the financial support from the World Bank. Thus, one project is financed by 100%, the second project was supported by 87% (table 3). For Ukraine, it is the first step for the development of green bond market. The general idea of these projects is to mitigate climate change.

Table 3. List of World Bank Green Bond Eligible Projects from Ukraine

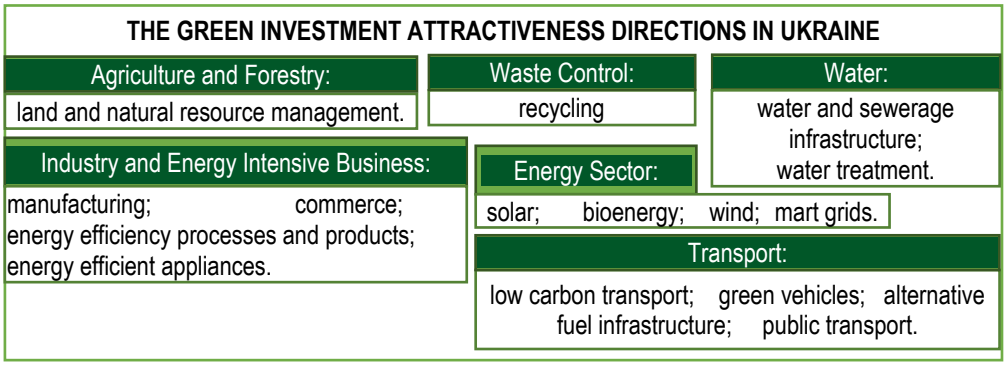
| Indicators/Project name | District Heating Energy Efficiency | Energy Efficiency |
|---|---|---|
| Description | improve energy efficiency and quality of service of District Heating companies | improve energy efficiency in order to meet energy intensity reduction targets, decrease dependence on imported gas, and decrease the cost of energy supply |
| Project life | 20 | 15 |
| Annual energy savings/c MWh | 524 000 | 6 978 000 |
| Annual GHG emissions avoided tons of CO2 eq | 261 800 | 1 000 000 |
| Other results | 721,400 consumers served by the participating companies | Create jobs directly and indirectly through increased cost competitiveness as a result of lower energy intensity |
| Committed US$ mil | 265.5 | 200.0 |
| IBRD share | 87% | 100% |
| Allocated US$ mil | 2.7 | 160.5 |

*Sources:* compiled by the authors on the basis of Green Bond, 2016.

Target results are expected impacts based on estimates developed at the time of project approval and materializing at the end of the project implementation period (5 years in most cases). Actual impacts may be different from above-mentioned estimates and do not represent the actual results in a specific year. Quantitative estimates are intended to be indicative of the scale of impacts and qualitative results aim to inform about the nature of changes that will be achieved as a result of projects included in the Green Bond program once, they are completed and at full capacity. For these projects, annual energy savings include the reduced energy use for both power and heat, where applicable. The committed amount is the Green Bond eligible portion of the World Bank loan net of cancellations reported in equivalent US$ millions. These projects have already received 2.7 US$ mil (District Heating Energy Efficiency) and 160.5 US$ mil (Energy Efficiency) of Green Bond to support the financing of disbursements to the project. Ukraine has started to move in the right direction, but now its need new financial

instruments for the implementation of the green projects. Therefore, the issue of "green" bonds is a good example of financing clean energy projects. "Green" financial instruments with the correct target use, risk assessment can solve many problems, in particular: expanding funding for energy projects, strengthening the country's economic potential, and further integrating into the global economic environment. Ukraine needs to be developed in different spheres of green economy. According to the obtained results the main relevant spheres of the green investment in Ukraine are generalised (figure 6).

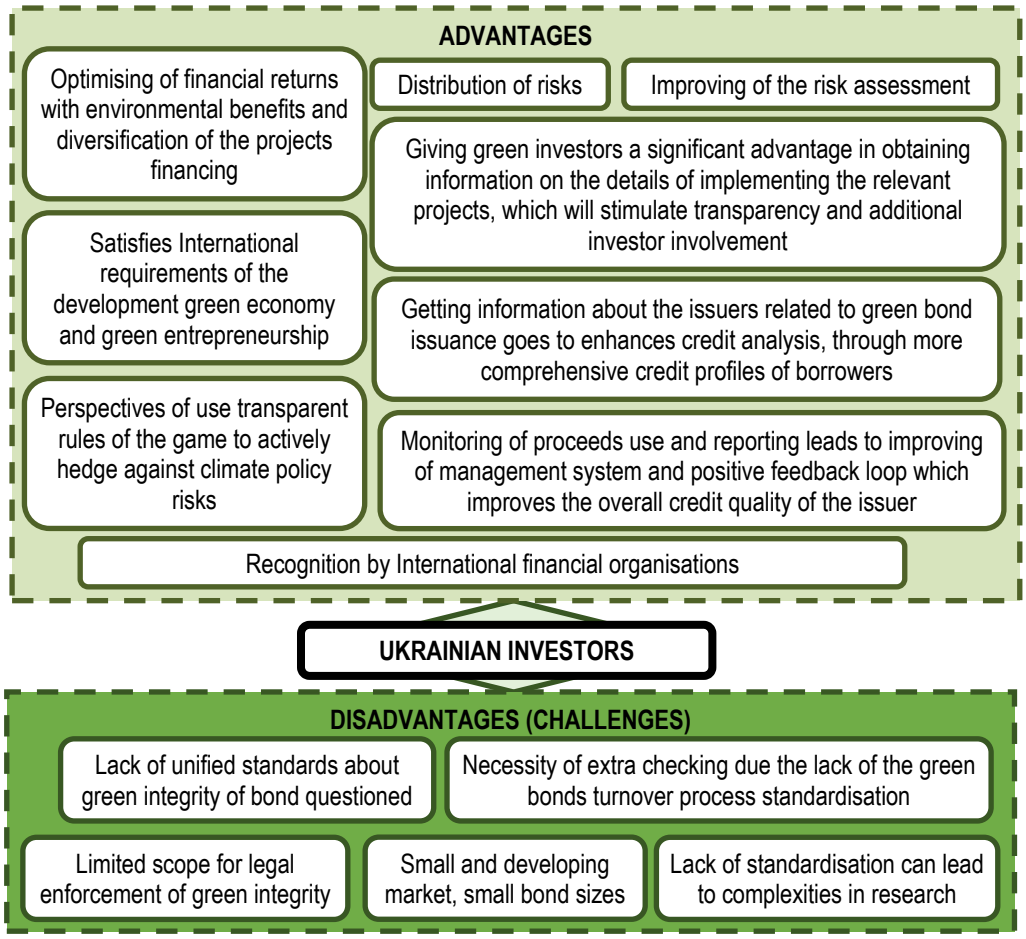
Figure 6. The main directions for green investment in Ukraine




*Source:* compiled by the authors

Evolving green bond market faces a range of specific challenges and barriers to its further evolution and growth. And Ukrainian government should create a suite of options available to overcome these barriers and help to grow a sustainable green bond market with integrity (Figure 7).

Figure 7. Green bonds: advantages and disadvantages for Ukraine's investors




*Source:* compiled by the authors

Also, necessary to define the main players at the green bond market in Ukraine. It is companies (enterprises), financial institutions (banks, insurance), Government in acting through Ministry of Finance, Central Bank, Capital Markets Authority, Municipalities and affiliated entities. Thus, the systematization of the main functions for the green bond market participants presented in figure 8.

Figure 8. The benefits for issuers (who will disburse investment)

**THE MAIN FUNCTIONS FOR THE GREEN BOND MARKET PARTICIPANTS**

**CENTRAL BANK**

1. Allocating reserves to green bonds
2. Exploring liquidity of the green bonds
3. Analysing preferential treatment of green bonds in asset purchasing and collateral programs
4. Introduction of the requirements on environmental performance for all bonds
5. Reducing costs of green bond disclosure and reporting
6. Promotion of the green bond capacity building for investors

**COMPANIES, FINANCIAL INSTITUTIONS**

1. Active participations in Green Bond International Organizations
2. Cooperation with governments and investors to develop pipeline of bankable green projects
3. Development and implementation of green bond standards
4. Strategic green bond issuance
5. Strategic green bond investment
6. Green securitization through
7. Provide credit enhancement for green bonds

**CAPITAL MARKETS AUTHORITY**

1. Promotion and regulation of green securities business in the country
2. Capacity building on green bonds for issuers and investors
3. Diagnostic the processes of adding the green assets to assets allowed as collateral in covered bond frameworks

**MUNICIPALITIES AND AFFILIATED ENTITIES**

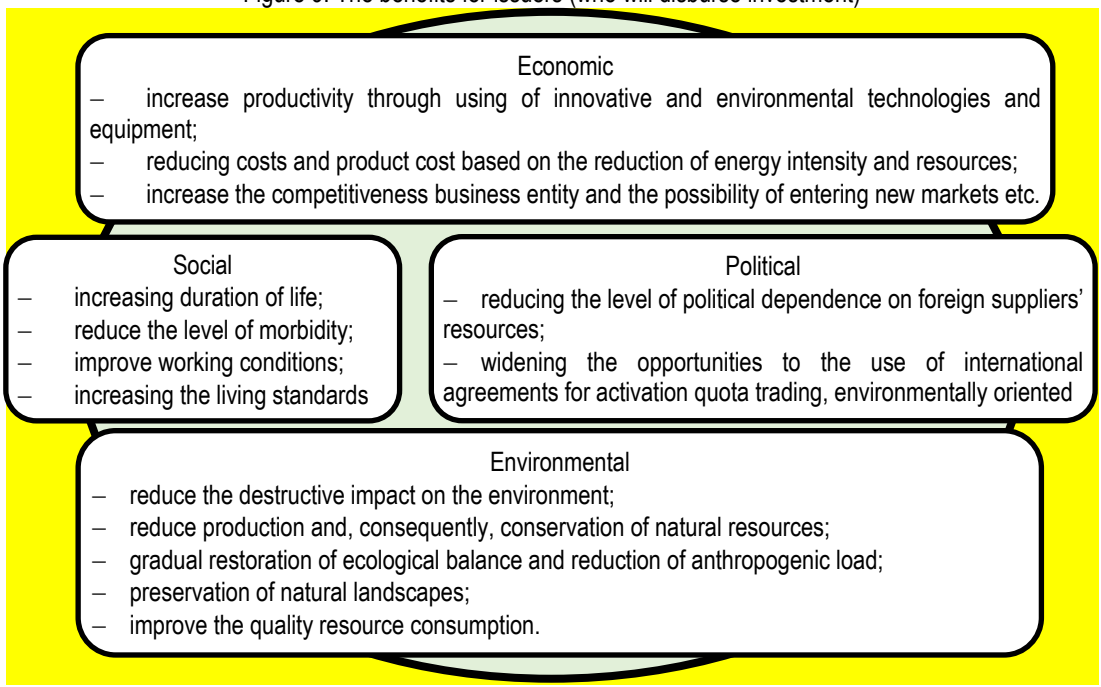
1. Involvement in the realization of the local green projects
2. Promotion of the independent assessment of the environmental projects
3. Issuance of green municipal bonds.

**GOVERNMENT IN ACTING THROUGH MINISTRY OF FINANCE**

1. Integration in international green bond system
2. Formation of the National information system about green projects in different levels of the economy
3. Collaboration with investors and development banks about achievement by environmental strategies concrete bankable investment opportunities.
4. Supporting in the process of forming green banks
5. Allow green banks to capitalise assets via green bond issuance
6. Providing green bond tax incentives
7. Provide credit enhancement for green bonds
8. Encourage public and private funds to invest in green bonds

*Source*: compiled by the authors

Figure 9. The benefits for issuers (who will disburse investment)




*Source:* created by the authors on the basis of Chygryn, 2015

But the modern modelling scenarios suggest that if there is a concerted push by policy makers and market participants to develop it, the green bond market can scale up rapidly to raise and finance the debt capital that will be needed for a transition to a low-carbon economy (Figure 9).

An important aspect of the effective functioning of green bond mechanism is the system of motivation of the investors involvement. The attitude of investors to invest in green projects measures is determined by many motives in their various combinations, which in their turn determine the system of their economic interest

## Conclusion

The results of analyses have told that Ukraine has enormous potential for energy efficiency. Using of the green bond in the financial market will contribute to helping Ukraine achieve its targets to reduce energy intensity. It will also contribute to decreasing Ukraine's dependence on imported gas, hence mitigating energy supply security risks and decreasing the cost of energy supply. In that context Ukraine must take into consideration current experience European financial markets. The best practices which were analysed have given opportunity to confirm the efficiency of using bonds for financing the green projects. The systematized advantages and disadvantages of green bonds using will give the ground for Ukraine's investors for valuation and understanding the necessity of the such processes. Also, were defined the main functions for the green bond market participants such as companies (enterprises), financial institutions (banks, insurance), Government, Central Bank, Capital Markets Authority, Municipalities and affiliated entities. This equates to establish the main players in the green bond market and to establish the responsibility for results. Another focus should attend an issue the motivation and attraction of the investors for green bond issues. Accordingly, it should be understood the main interests for investors. In that behalf the economic, social, political and environmental benefits were generalized.

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## References

[1] Abaas, M. S. M., Chygryn, O., Kubatko, O., and Pimonenko, T. 2018. Social and economic drivers of national economic development: The case of OPEC countries. *Problems and Perspectives in Management*, 16(4): 155-168. doi:10.21511/ppm.16(4).2018.14

[2] Aliyas, I. M., Ismail, E. Y., and Alhadeedy, M. A. H. 2018. Evaluation of Applications of Sustainable Agricultural Development in Iraq. *SocioEconomic Challenges*, 2(2): 75-80. DOI: 10.21272/sec.2(2).75-80.2018

[3] Barclays MSCI ESG. Fixed Income Indices a New Market Standard for Environmental, Social, and Governance Investing. (2013), Available at: https://www.msci.com/documents/10199/248121/Barclays_MSCI_ESG_Fixed_Income_Indices_-_FINAL.pdf/e70bf030-1373-40ad-a725-05bf9005fea8?version=1.0

[4] Bond Definition. Investopedia. Available at: http://www.investopedia.com/terms/b/bond.asp#ixzz4briZMNYp

[5] Bonds and Climate Change the State of the Market in 2016. Climate Bonds Initiative, Available at: https://www.climatebonds.net/resources/publications

[6] Cebula, J., and Pimonenko, T. 2015. Comparison financing conditions of the development biogas sector in poland and ukraine. *International Journal of Ecology and Development*, 30(2): 20-30.

[7] Celik, S., Aktan, B., Tvaronaviciene, M., and Bengitoz, P. 2017. Linkage between company scores and stock returns. *Journal of International Studies*, 10(4): 219-232. doi:10.14254/2071-8330.2017/10-4/17

[8] Chigrin, O., and Pimonenko, T. 2014. The Ways of Corporate Sector Firms Financing for Sustainability of Performance. *International Journal of Ecology & Development*™ 29.3: 1-13.

[9] Chirichenko, Y., and Fisunenko, N. 2018. Marketing determinants of the development of the investment market: innovations in the assessment of demand and supply (case study for the construction industry). *Marketing and Management of Innovations*, (3): 81-94.

[10] Chygryn, O. 2016. The Mechanism of the Resource-Saving Activity at Joint Stock Companies: the Theory and Implementation Features. *International Journal of Ecology & Development*™*,* 31.3: 42-59.

[11] Chygryn, O., Petrushenko, Yu., Vysochyna, A., and Vorontsova, A. 2018. Assessment of Fiscal Decentralization Influence on Social and Economic Development. *Montenegrin Journal of Economics*, 14(4): 69-84. Doi: 10.14254/1800-5845/2018.14-4.5

[12] Chygryn, O.Yu., and Krasniak, V.S. 2015. Theoretical and applied aspects of the development of environmental investment in Ukraine. *Marketing and Management of Innovations*, 3: 226-234.

[13] CO2 time series 1990-2015 per region/country. Available at:http://edgar.jrc.ec.europa.eu/overview.php?v=CO2ts1990-2015&sort=des9

[14] Craig A., Gulati, S., and McDonald, C. 2013. Green Bonds: Victory Bonds for the Environment Special Report TD Economics. Available at: http://www.td.com/document/PDF/economics/special/GreenBonds_Canada.pdf

[15] Dado, J., Prokopenko, O., and Pimonenko, T. 2017. Net zero house: EU experience in ukrainian conditions. *International Journal of Ecological Economics and Statistics*, 38(4): 46-57.

[16] Dovhan, Z., Kravchuk, I., and Karas, P. 2017. The financial instruments market–an institutional approach. *Financial Markets, Institutions and Risks*. 1(1): 22-28. DOI: 10.21272/fmir.1(1).22-28.2017

[17] Explaining green bonds. Climate Bonds Initiative. Available at: https://www.climatebonds.net/market/explaining-green-bonds

[18] Fernandes, A. J. L. 2018. Transnational banks' influence on the development of the economy and the financial sector of developing countries (on the example of Poland, Brazil, Turkey). *Marketing and Management of Innovations*, (3): 253-259.

[19] Flaherty, M., *et al*. 2016. Financing climate policies through climate bonds – A three stage model and empirics. *Res. Int. Business Finance*, 42: 468-479. http://dx.doi.org/10.1016/j.ribaf.2016.06.001

[20] Green Bond Principles. Voluntary Process Guidelines for Issuing Green Bonds. (2016). International Capital Market Association. Available at: https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-social-and-sustainability-bonds/green-bond-principles-gbp/

[21] Green Bond. Impact report. The World Bank, June 2016. Available at: http://treasury.worldbank.org/cmd/pdf/WorldBankGreenBondImpactReport.pdf

[22] Green bonds as a bridge to the SDGs. (2018). Available at: https://www.climatebonds.net/files/files/CBI%20Briefing%20Green%20Bonds%20Bridge%20to%20SDGs%281%29.pdf

[23] Green Bonds: Mobilising the Debt Capital Markets for a Low-Carbon Transition. (2015). OECD and Bloomberg Philanthropies. Available at: https://www.oecd.org/environment/cc/Green%20bonds%20PP%20[f3]%20[lr].pdf

[24] Green Bonds. Financing a Sustainable Future. Available at: http://www.gogreenbonds.org/faqs/#1

[25] Green Finance: Green Bond Directions. COP22. 2016. Climate Bonds Initiative. Available at: https://www.climatebonds.net/files/files/COP22_Directions_WEB.pdf

[26] Halim, E. H., Mustika, G., Sari, R. N., Anugerah, R., and Mohd-Sanusi, Z. 2017. Corporate governance practices and financial performance: The mediating effect of risk management committee at manufacturing firms. *Journal of International Studies,* 10(4): 272-289. doi:10.14254/2071-8330.2017/10-4/21

[27] ICMA 2015. Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bond, March.

[28] IEA 2012. Energy Technology Perspectives, OECD/IEA Publishing, Paris.

[29] IEA 2014. World Energy Investment Outlook, OECD/IEA Publishing, Paris.

[30] IEA 2015. World Energy Outlook, November, OECD/IEA Publishing, Paris.

[31] Inderst, G. *et al.* 2012. "Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations", OECD Working Papers on Finance, Insurance and Private Pensions, No.24, OECD Publishing, Paris.

[32] India: New stock index to reflect environmental, social and corporate governance issues. Energy Asia, February 4, 2008. Available at: http://energyasia.com/public-stories/india-new-stock-index-to-reflect-environmental-social-and-corporate-governance-issues/

[33] Kennedy, C. and Corfee-Morlot, J. 2012. "Mobilising Investment in Low-carbon, Climate Resilient Infrastructure", OECD Environment Working Papers, No. 46, OECD Publishing, Paris

[34] Khan, K., Qingyang, W., and Khurshid, A. 2017. Causal Relationship between Monetary Policy and the Stock Market: a Bootstrap Rolling Window Approach. *Financial Markets, Institutions and Risks*, 1(4): 5-15. 10.21272/fmir.1(4).5-15.2017

[35] Kiss, L. B. 2018. The Examination of the Appearance of CSR in On-line Scientific Databases. *Business Ethics and Leadership*, 2(2): 56-65. DOI: 10.21272/bel.2(2).56-65.2018

[36] Kozmenko, S. M., Vasilyeva, T. A., and Leonov, S. V. 2011. Ukraine and Germany: Common tendecies of financial market development according to the bank-centered model. *Corporate Ownership and Control*, 9(1 C): 247-273. doi:10.22495/cocv9i1c2art1

[37] Kubatko, O., and Kubatko, O. 2018. Economic estimations of air pollution health nexus. *Environment, Development and Sustainability*, 1-11. doi:10.1007/s10668-018-0252-6

[38] Leonov, S. V., Vasylieva, T. A., and Tsyganyuk, D. L. 2012. Formalization of functional limitations in functioning of co-investment funds basing on comparative analysis of financial markets within FM CEEC. *Actual Problems of Economics*, 134(8): 75-85.

[39] Leonov, S., Frolov, S., and Plastun, V. 2014. Potential of institutional investors and stock market development as an alternative to households' savings allocation in banks. *Economic Annals-XXI*, 11-12: 65-68.

[40] Lyulyov O., and Pimonenko, T. 2017. Lotka-Volterra model as an instrument of the investment and innovative processes stability analysis. *Marketing and Management of Innovations*, 1: 93–102.

[41] Lyulyov, O., Chortok, Y., Pimonenko, T., and Borovik, O. 2015. Ecological and economic evaluation of transport system functioning according to the territory sustainable development. *International Journal of Ecology and Development*, 30(3): 1-10.

[42] Mačaitytė, I., and Virbašiūtė, G. 2018. Volkswagen Emission Scandal and Corporate Social Responsibility – A Case Study. *Business Ethics and Leadership, 2*(1): 6-13. 10.21272/bel.2(1).6-13.2018

[43] Melnyk, L., Sineviciene, L., Lyulyov, O., Pimonenko, T., and Dehtyarova, I. 2018. Fiscal decentralization and macroeconomic stability: The experience of Ukraine's economy. *Problems and Perspectives in Management*, 16(1): 105-114. doi:10.21511/ppm.16(1).2018.10

[44] Mikalauskiene, A., Narutaviciute-Cikanauske, R., Sarkiunaite, I., Streimikiene, D., and Zlateva, R. 2018. Social aspect of sustainable development: Issues of poverty and food shortage. *Montenegrin Journal of Economics*, 14(2): 59-78. doi:10.14254/1800-5845/2018.14-2.4

[45] Mohamad Taghvaee, V., Khodaparast Shirazi, J., Boutabba, M. A., and Seifi Aloo, A. 2017. Economic growth and renewable energy in Iran. *Iranian Economic Review*, 21(4): 789-808. doi:10.22059/ier.2017.64081

[46] Mukhtarova, K., Turekulova, D., Lesbayeva, G., Yesturlieva, A., and Saimagambetova, G. 2018. Analysis and evaluation of environmental management. *Journal of Environmental Management and Tourism*, 9(1): 167-174. doi:10.14505/jemt.v9.1(25).21

[47] Mulyanto, M., Awatara, I. G. P. D., and Gunardi, A. 2018. Enhancing competence, environmental management system, job satisfaction and employee performance. *Journal of Environmental Management and Tourism*, 9(1): 40-45. doi:10.14505/jemt.v9.1(25).06

[48] Nagyová, L. *et al.* 2016. Economic sustainability of primary agricultural production: the Slovak Republic in the EU context. *Journal of Security and Sustainability Issues*, 6(2): 259–274. DOI: http://dx.doi.org/10.9770/jssi.2016.6.2(6)

[49] Official website ENGIE. (2017. Available at: http://www.engie.com/en/

[50] Pimonenko, T., Prokopenko, O., and Dado, J. 2017. Net zero house: EU experience in ukrainian conditions. *International Journal of Ecological Economics and Statistics*, 38(4): 46-57.

[51] Prokopenko, O., Cebula, J., Chayen, S., and Pimonenko, T. 2017. Wind energy in Israel, Poland and Ukraine: Features and opportunities. *International Journal of Ecology and Development*, 32(1): 98-107.

[52] Simionescu, M., Albu, L. L., Raileanu Szeles, M., and Bilan, Y. 2017. The impact of biofuels utilisation in transport on the sustainable development in the European Union. *Technological and Economic Development of Economy*, 23(4): 667-686.

[53] Smith, M. 2018. A Real Options Approach to Evaluating Agricultural Investments under Uncertainty: When to Get in and Out of Sugarcane Production. *SocioEconomic Challenges, 2*(1): 21-34. DOI: 10.21272/sec.2(1).21-34.2018

[54] The green bond market in Europe 2018. 2018. Prepared by the Climate Bonds Initiative. Available at: https://www.climatebonds.net/files/files/The%20Green%20Bond%20Market%20in%20Europe.pdf

[55] Thiam Hee Ng, Jacqueline Yujia Tao 2016. Bond financing for renewable energy in Asia, *Energy Policy*, 95: 509-517.

[56] Triodos Bank. Green investment – what does it actually mean? Available at: https://www.triodos.co.uk/en/personal/ethical-investments/green-investments/

[57] Tvaronavičienė, M., Prakapienė, D., Garškaitė-Milvydienė, K., Prakapas, R., and Nawrot, Ł. 2018. Energy efficiency in the long run in the selected European countries. *Economics and Sociology*, 11(1): 245-254. doi:10.14254/2071-789X.2018/11-1/16

[58] Understanding climate bonds. Climate Bonds Initiative. Available at: https://www.climatebonds.net/resources/understanding

[59] Unlocking the green bond potential in India. Available at: https://archive.nyu.edu/bitstream/2451/42243/2/Unlocking%20the%20Green%20Bond%20Potential%20in%20India.pdf

[60] Us, H., and Malyarets, L. 2018. Multi-criteria optimization of the balanced scorecard for the enterprise's activity evaluation: management tool for business-innovations. *Marketing and Management of Innovations*, (3), 49.

[61] Vasilyeva, T., Lyeonov, S., Adamičková, I., and Bagmet, K. 2018. Institutional quality of social sector: The essence and measurements. *Economics and Sociology*, 11(2): 248-262. doi:10.14254/2071-789X.2018/11-2/17

[62] Vasylieva, T., Lyeonov, S., Lyulyov, O., and Kyrychenko, K. 2018. Macroeconomic stability and its impact on the economic growth of the country. *Montenegrin Journal of Economics*, 14(1): 159-170. doi:10.14254/1800-5845/2018.14-1.12

[63] Vasylyeva, T. A., and Pryymenko, S. A. 2014. Environmental economic assessment of energy resources in the context of Ukraine's energy security. *Actual Problems of Economics*, 160(1): 252-260.

[64] Vasylyeva, T. A., Leonov, S. V., and Lunyakov, O. V. 2014. Countercyclical capital buffer as a macroprudential tool for regulation of the financial sector. *Actual Problems of Economics*, 158(8): 278-283.

[65] What is a green bond and how does it differ from a regular bond? 2017. World Bank Treasury. Available at: http://treasury.worldbank.org/cmd/htm/Chapter-2-Understanding-Green-Bonds.html

[66] World Development Indicators. DataBank. Available at: http://databank.worldbank.org/data/reports.aspx?source=2&series=NY.GDP.MKTP.CD&country=UKR

[67] Yao Wang, and Qiang Zhi. 2016. The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. *Energy Procedia*, 104: 311-316.

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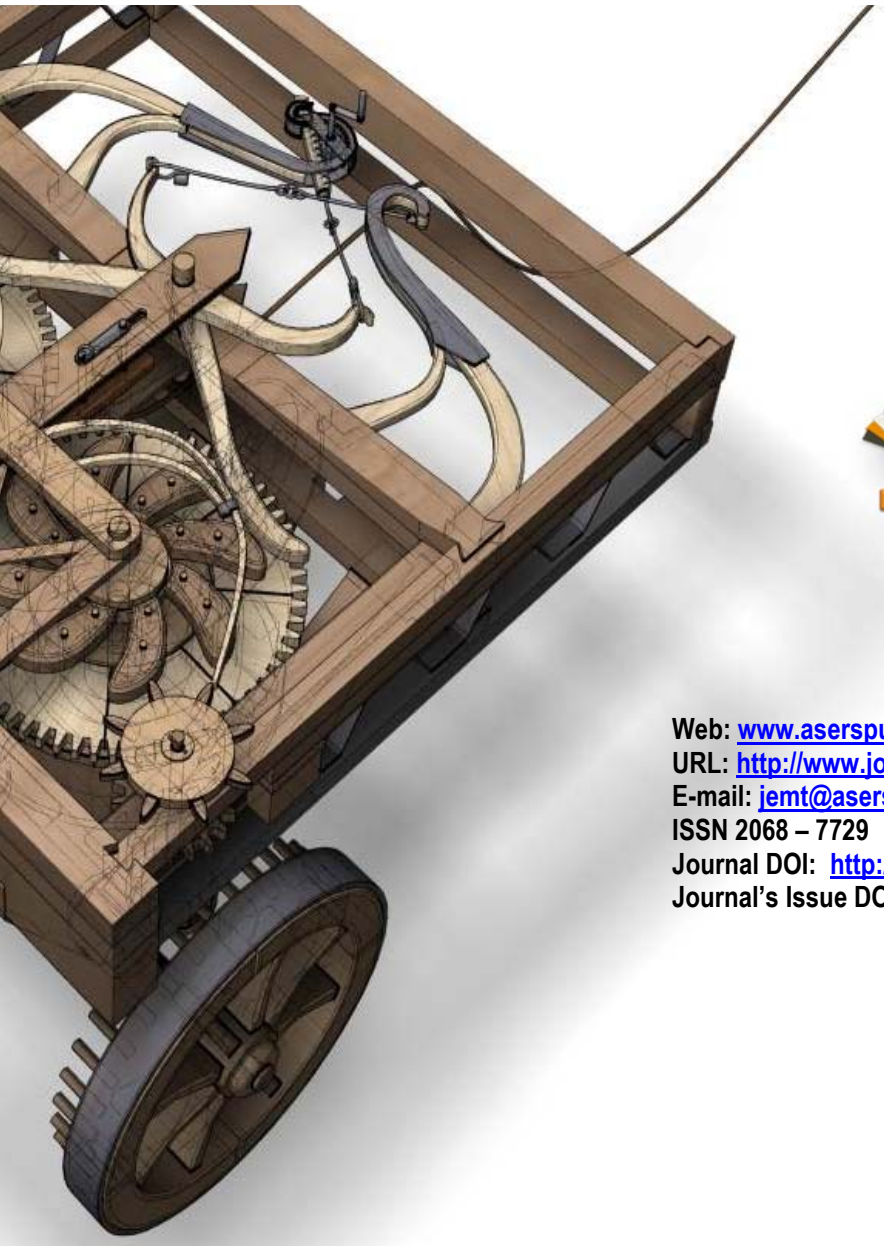

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