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L. M. Logachova, O. V. Logachova*

Institute of Industrial Economics of NAS of Ukraine, Donetsk,
*Donetsk National University,
Management Department

STRATEGIC DIRECTIONS FOR SUSTAINABLE DEVELOPMENT OF UKRAINE

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The article investigates the European Union's ten-year growth strategy named Europe 2020. Attention is focused on the key indicators of climate change and power engineering. The current state and dynamics of greenhouse gases emissions indicators in Ukraine are compared with those in EU countries. The specific recommendations for the implementation of environmental policies at the regional level are proposed.

Key words: strategy, sustainable growth, climate change, renewable energy, environmental policy.

Л. М. Логачова, О. В. Логачова*

Інститут економіки промисловості НАН України, м. Донецьк,
*Донецький національний університет,
кафедра менеджменту

СТРАТЕГІЧНІ ОРІЄНТИРИ СТАЛОГО РОЗВИТКУ УКРАЇНИ

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Розглянуто економічну стратегію європейського розвитку "Європа 2020". Акцент зроблено на ключових індикаторах у сфері зміни клімату та енергетики. Проаналізовано сучасний стан та динаміку показників емісії парникових газів в Україні порівняно з країнами Європейського Союзу. Запропоновано комплекс заходів з реалізації екологічної політики на регіональному рівні.

Ключові слова: стратегія, сталий розвиток, зміна клімату, відновлювані джерела енергії, екологічна політика.

Statement of the problem

At the beginning of XXI century there was specific conception formed, which contains the modern idea of the international community on ways about delivering sustainable growth. Most of these priorities have been formulated and made by public and politicians, environmentalists, economists, sociologists, biologists, and other professionals, proving comprehensive nature of the problem and its importance to society.

An essential condition for sustainable economic and social development of Ukraine is the environmental protection, efficient use of natural resources, environmental safety of human life. However, as a result of anthropogenic impact on the environment present environmental situation in the country remains very difficult.

In Ukraine in 2012 there were 8434 companies that have pollution emissions into the atmosphere. Given the emission of pollutants and greenhouse gases from mobile sources into account it was released into the atmosphere 150 kg of pollutants per 1 person as well as 5.1 tons of carbon dioxide [1].

The density of emissions from stationary sources per 1 km² of the country amounted to 7.2 tons of hazardous substances, and per capita – 95.1 kg. However, in some regions, these figures are much higher than the average for the country. In the Donetsk region density per 1 km² was more in 8.0 times, and per person – in 3.6 times, Dnipropetrovsk – respectively in 4.2 and in 3.1 times, Luhansk – 2.3 and 2.1, Ivano-Frankivsk region – 2.0 and 1.5 times more. In the city of Kyiv per 1 km² of its area were released 39.4 tons of pollutants that exceeded the national average level of pollutants in 5.5 times.

More than two – thirds of the air pollutions from stationary sources made by only three regions of Ukraine: Donetsk, Dnepropetrovsk and Lugansk.

The greatest anthropogenic impact from stationary sources committed in 15 settlements where the amount of pollutions exceeds 100 thousand tons. In the cities of Krivoy Rog and Mariupol pollutant emissions exceed 330 thousand tons.

Communities, especially industrial cities as well as industrial regions become centers of environmental issues and factors of influence on climate change. With the help of Global 2011 report on human settlements, cities and climate change (UN-HABITAT 2010) it is determined that the share of urban areas is up to 70 % of harmful gases emissions. Although the cities are occupied by only 2 % of the planet, there are 51 % of the resident populations.

A characteristic feature of Ukraine is a high population density and urbanization of the territory, evidenced by the high proportion of urban housing. In general, Ukraine proportion of urban housing more than 64 %. In the most urbanized Donetsk region this indicator equals to 89.5 %, Luhansk region – 86 %, Dnipropetrovsk and Zaporizhia regions the proportion of urban housing is respectively 83.4 % and 73.1 %.

The modern city with its powerful engineering and technical infrastructure is the source of civilization growth and at the same time the cities became one of the main reasons of environmental degradation. On the one hand, the cities consist of the main technical facilities, scientific, educational and cultural centers, and on the other – industrial production, landfills, advanced transportation networks and permanent ones growing number of transport units.

A great variety of cities – from small villages to big cities of the XXI century causes a wide range of environmental problems. Generally, large cities – a city overloaded with production structure and critical ecological problems. Complicated utilities are focused on centralized systems, and in many big cities of Ukraine communal systems are on the limits of the estimated timing of the operation, that exacerbates the environmental situation and require considerable financial expenses on maintenance and repairs. In small towns and rural areas, the problem is not so acute due to the underdevelopment of engineering networks and communications.

At the end of the XX century in Ukraine there was approved the state “concept of sustainable human settlements development”. This paper consist of particular definition of sustainable (balanced) development of settlements, which should be understood as “social, economic and environmental sustainable development of urban and rural settlements, which is aimed to create their economic potential, complete living environment for present and future generations from the rational use of resources” [2]. This concept is designed for long-term implementation (15–20 years) and involves the development of strategies for sustainable growth for specific localities, especially cities.

Reconciliation of the cities’ socio – economic development tasks with the environmental safety and comfort of residents living in urban areas is based on the recognition of the equality of the three components of sustainable development: economic, environmental and social.

The shift in priorities for the sustainable development of human settlements and the whole country should be given counting on Europe sustainable development targets. This became agent for necessity in

researching the issues and prospects for key indicators of sustainable growth by finding ways and measures which are closer to solve this problem.

Analysis of recent research and publications

The problems of settlements development management at the international level were considered at the Global Forum of UN urban development issues, named HABITA-II (Istanbul, 1996) [3], at the international conference in Minsk, where the Charter of CIS' urban planning the was signed, and other forums, meetings and seminars.

At the national level, the attempts to solve the problem of getting to sustainable human settlements development is reflected in the Ukrainian legislation by developing strategies for sustainable development of individual cities and a wide range of publications devoted to analysis of settlements networks and the development of theoretical and practical aspects of the diversified urban economy operation.

The latest publications devoted to regional aspects of sustainable development issued by Alexandrov I.A. [4], Burkyns'kyi B.V., Kuhar V.P. [5], Zgurovsky M. Z. [6, 7], Melnick L. H. [8] and others. Social aspects of industrial regions sustainable development discussed in the monograph [9].

However, there are white spots in the analysis of adoption of European standards problems as well as international and domestic experience in order to get the balance in economic, social and environmental development of urban settlements of Ukraine.

The formulation of objectives

Research of sustainable growth of Ukraine determines the setting of the following purposes:

- to analyze the environmental component of sustainable growth and trends of greenhouse gases emissions;
- to identify the problems and assess the possible prospects in European guidelines for sustainable growth for Ukraine;
- to develop proposals about implementation of environmental policies at the regional level.

Presentation of main materials

The necessity in overcoming the economic crisis and further development of the European Community raised the need to develop a strategic vision and concerted practices of EU member states.

European governments have developed a new EU's growth strategy for the coming decade. It is about more than just overcoming the crisis which continues to afflict many of EU's economies. This document is called "Europe 2020: a strategy for smart, sustainable and inclusive growth." These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Union has set five ambitious objectives – on employment, innovation, education, social inclusion and climate/energy – to be reached by 2020. Each Member State has adopted its own national targets in each of these areas [10].

For each of the five priority areas set targets and identified 8 indicators. The 5 targets for the EU in 2020.

1. Employment – 75 % of the 20–64 year-olds to be employed.
2. R&D – 3 % of the EU's GDP to be invested in R&D.
3. Climate change and energy sustainability greenhouse gas emissions – 20 % (or even 30 %, if the conditions are right) lower than 1990 20 % of energy from renewables 20 % increase in energy efficiency.
4. Education – Reducing the rates of early school leaving below 10 % at least 40 % of 30-34-year-olds completing third level education.
5. Fighting poverty and social exclusion – at least 20 million fewer people in or at risk of poverty and social exclusion.

For advancement of the economy in line with the Europe 2020 strategy, the main factors are the followings:

- Smart growth means improving the EU's performance in education (encouraging people to learn, study and update their skills), research/innovation (creating new products/services that generate growth and jobs and help address social challenges), digital society (using information and communication technologies).

- Sustainable growth means building a more competitive low-carbon economy that makes efficient, sustainable use of resources; protecting the environment, reducing emissions and preventing biodiversity loss; capitalising on Europe’s leadership in developing new green technologies and production methods.

- Inclusive growth means raising Europe’s employment rate – more and better jobs, especially for women, young people and older workers; helping people of all ages anticipate and manage change through investment in skills & training; modernising labour markets and welfare systems; ensuring the benefits of growth reach all parts of the EU [10].

All of these factors will be the basis for more in-depth economic, social and territorial cohesion of the EU nations. The prior activity is efficient use of resources in Europe. The objective of this component is to support the movement towards efficient use of resources and energy, the transition to low-carbon economy, increasing the use of renewable energy sources to reduce dependence on economic growth on the amount of consumed resources.

Trends in prior indicators behavior by “Climate Change and Energy” reflects the focus of the efforts of European countries to reduce greenhouse gas emissions and wider use of renewable energy sources (see table 1).

Table 1

Headline indicators *

(%)

| Countries | Greenhouse gases emissions, base year 1990 | | | Share of renewable energy in gross final energy consumption | |
|-------------------|---|--------|--------|--|------|
| | 1991 | 2001 | 2011 | 2004 | 2011 |
| EU (27 countries) | 98,26 | 92,66 | 83,03 | 8,1 | 13,0 |
| Belgium | 101,02 | 102,34 | 85,12 | 1,9 | 4,1 |
| Bulgaria | 79,10 | 57,12 | 60,45 | 9,2 | 13,8 |
| Czech Republic | 92,88 | 74,44 | 68,42 | 6,0 | 9,4 |
| Denmark | 114,81 | 102,55 | 83,39 | 14,9 | 23,1 |
| Germany | 96,27 | 85,13 | 74,48 | 5,2 | 12,3 |
| Estonia | 92,20 | 43,25 | 51,81 | 18,4 | 25,9 |
| Ireland | 101,33 | 128,50 | 105,82 | 2,4 | 6,7 |
| Greece | 99,3 | 121,03 | 109,61 | 7,1 | 11,6 |
| Spain | 102,57 | 135,00 | 126,43 | 8,3 | 15,1 |
| France | 104,12 | 101,07 | 88,9 | 9,3 | 11,5 |
| Croatia | 78,14 | 86,35 | 89,12 | 15,2 | 15,7 |
| Italy | 100,45 | 108,05 | 95,3 | 5,1 | 11,5 |
| Cyprus | 105,91 | 138,41 | 147,47 | 2,7 | 5,4 |
| Latvia | 93,13 | 40,58 | 44,67 | 32,8 | 33,1 |
| Lithuania | 102,95 | 42,34 | 44,31 | 17,3 | 20,3 |
| Luxembourg | 104,24 | 85,03 | 100,22 | 0,9 | 2,9 |
| Hungary | 92,43 | 81,20 | 67,19 | 4,4 | 9,1 |
| Malta | 107,58 | 133,48 | 151,27 | 0,0 | 0,4 |
| Netherlands | 102,25 | 103,56 | 94,67 | 1,8 | 4,3 |
| Austria | 105,25 | 108,60 | 107,57 | 22,8 | 30,9 |
| Poland | 97,87 | 83,66 | 87,56 | 7,0 | 10,4 |
| Portugal | 103,21 | 137,87 | 116,49 | 19,3 | 24,9 |
| Romania | 81,6 | 55,73 | 50,46 | 17,0 | 21,4 |
| Slovenia | 93,76 | 107,40 | 105,88 | 16,1 | 18,8 |
| Slovakia | 88,81 | 72,93 | 63,19 | 6,7 | 9,7 |
| Finland | 96,85 | 105,88 | 96,56 | 29,0 | 31,8 |
| Sweden | 99,9 | 96,58 | 86,03 | 38,7 | 46,8 |
| United Kingdom | 100,82 | 90,34 | 74,81 | 1,2 | 3,8 |
| Ukraine | 52,3* | 40,1** | 45,8 | | |

* 1995 – year data. **2000 – year data.

Source: composed by http://www.epp.eurostat.ec.europa.eu/portal/page/europa_2020_headline_indicators

The flagship initiative for a resource-efficient Europe provides a long-term framework for actions in many policy areas, supporting policy agendas for climate change, energy, transport, industry, raw materials, agriculture, fisheries, biodiversity and regional development. This is to increase certainty for investment and innovation and to ensure that all relevant policies factor in resource efficiency in a balanced manner.

To achieve the key indicators in “Climate Change and Energy” at EU level it is expected to:

- improve the basic principles of market instruments trading in securities, taxes and charges in the energy sector;
- make proposals to reduce transport sector carbon use to support the growing competition in the industry;
- accelerate the implementation of strategic projects to address the major challenges in the EU energy sector;
- complete the construction of a consistent energy market and implement the strategic plan of the energy resources use, which is based on the idea of renewable energy;
- adopt and implement the revised plan on the efficient energy use and implement a program of resources management;
- identify the main activities in the field of structural and technological changes required to achieve a low-carbon, environmentally friendly economics by 2050.

The success of the Europe 2020 strategy crucially depends on the ability of EU Member States to play their part in: implementing the necessary reforms at national level to boost growth – for example to increase research investment and employment levels as well as cooperating with the Commission on the seven flagship initiatives. At national level, Member States will work in the following areas:

- reduction of the use of hazardous substances to the environment gradually by reducing subsidies for harmful production;
- usage of market instruments such as tax mitigation and government procurement to adapt methods of production and consumption;
- smart, innovative transport and energy infrastructure development;
- ensure the coordinated implementation of infrastructure changes.

European strategy “Europe 2020” can also be a guide for candidate countries and neighbor states who can build their policy based on the proposed goals and objectives of Europe.

Ukraine’s prospects in achieving European key indicators in climate change and energy are largely depend on the current state of the environmental problems solution and opportunities to resolve the existing environmental protection problems.

Nowadays, the situation with reduction of greenhouse gas emissions in Ukraine does not look bad. According to the Fifth National Communication on Climate Change, the audit performed by an international team of experts confirmed the base calculation of 1990 for Ukraine in the amount of 920.8 million tones of CO₂ equivalent [11].

The economic downturn in the early years of independence of Ukraine has led to a significant reduction either in energy consumption or in CO₂ emissions. Between 2000 and 2007, CO₂ emissions were stabilized with a slight tendency to increase. The increase of CO₂ emissions in this period was due to economic growth, but had no direct correlation with the trends in economic development. This was due to the restructuring of the economy, significant growth in trade, services and finance sector with no comparing to industrial production, which provided a significant contribution to GDP growth during this period.

Another important factor that significantly affects of CO₂ emissions trend in this period is the modernization of production, which reduced the energy consumption of major products. Trends in CO₂ emissions in 2008-2010 were determined by the global financial – economic crisis, signs of which are evident decline in commodity production major export – oriented industries, including metallurgy and chemical industry.

The upward trend in greenhouse gas emissions are also observed in 2010–2011. In particular, the data presented in the national inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990–2010 years, sent to the UNFCCC in April 2012, total greenhouse gases emissions reported in Ukraine in 2010 amounted to 383.2 million tons of CO₂ eq. The largest share of greenhouse gases emissions in 2010 accounted for carbon dioxide – 75 %. Methane emissions were 17 % and nitrous oxide – 8 % [12].

Greenhouse gases emissions in Ukraine in 2011 decreased up to 45.8 % from the 1990 base year. Emissions per capita are 8.37 tons of CO₂ equivalent per year (for comparison – annual emissions per capita in the U.S. are about 20 tons, Germany – 10 tons, Russia – 12 tons). Today, Ukraine ranks 19th place among the world's biggest emitters of greenhouse gases [13].

Ukraine is a member of the second period of the Kyoto Protocol and has committed itself to reducing greenhouse gases emissions by 20 % compared to emissions in 1990 by 2020. The second commitment period under the Kyoto Protocol started in 2013 and will be completed in 2020. New multilateral international agreement has to be completed by 2015.

Today, Ukraine has managed to reduce greenhouse gases emissions by more than 50 % compared to the 1990 baseline. The logical continuation of environmentally friendly policy is seems to be adopting a more ambitious goals, for instance reducing emissions by 10 % from the level achieved, not on base 1990. Official goal of emission reduction by 20 % (from 1990 level) by 2020, in fact, provides a significant growth of GHG emissions in Ukraine.

Growth of economy, in the short term, will inevitably lead to higher levels of environmental pollution. Thus formally the key indicator will be reached. But in fact, can occur a significant increase in greenhouse gases emissions. Moreover, Ukraine may reach the European key indicator of reducing greenhouse gases emissions, so it is more than realistic, but in the same time, the environment state may be worse so it will influence on environmental situation in the country and on global climate change trends.

To avoid this it is possible only by effective environmental policies implementation and its harmonization with industrial policy and energy saving.

According to the pan-European tendencies, in March, 2010 Ukraine approved the State Target Economic Program on Energy Efficiency for 2010–2015, which provides the reduction of GDP energy consumption by 20 % compared to 2008 [14].

The Energy Strategy of Ukraine for the period up to 2030 aims to increase the use of alternative energy sources, from 10.9 Mt (million tones of oil equivalent) in 2005 to 40.4 Mt in 2030. This initiative will require investment of around 7.9 billion euros for the energy sector.

According to various scenarios laid out in the Energy Strategy of Ukraine up to 2030, the share of renewable energy sources (RES) in the overall energy balance varies from 4.1 % to 9.2 %. The Draft of the revised Energy Strategy of Ukraine till 2030 stipulates that the share of RES in the overall energy balance of Ukraine in 2030 will amount only 4.1–4.8 %.

In comparison, the share of RES in some European countries, achieved in 2004 was equal to: Sweden – 38.7 %, Latvia – 32.8 %, Finland – 29 %, Austria – 22.8 % (see table). If you pay attention to the share of RES in electricity production in Ukraine, then according to the baseline draft revised energy strategy up to 2030, it is planned at 4.6 % level [14]. This means that in the total energy balance of Ukraine, this share will be generally miserable.

In December 2010, has been adopted the Act of Ukraine “On the State Environmental Policy Fundamentals (strategy) of Ukraine by 2020” [15]. The purpose of the National Environmental Policy is to stabilize and to improve the state of the environment in Ukraine through the integration of environmental policy into socio-economic development of Ukraine to ensure safety environment for life and health as well as for ecologically balanced environmental management system and conservation of natural ecosystems implementation.

Among the main objectives for the protection of air is to reduce common pollutants emissions by:

- stationary sources for 10 % by 2015 and for 25 % by 2020 of mobile sources baseline by establishing content norms of pollutants in the exhaust gases by 2015, according to the standards of Euro 4, 2020 – Euro-5;
- optimization of the national economy energy sector structure by increasing the use of energy sources with low carbon dioxide emissions by 2015 by 10 percent and by 2020 by 20 percent, and to ensure the reduction of greenhouse gas emissions in accordance with the declared Ukraine’s international obligations under the Kyoto Protocol to the Framework Convention of the United Nations Convention on climate Change.

There are two phases mentioned to achieve the goals of the Strategy. By 2015, it is necessary to stabilize the environmental situation, to slowdown the anthropogenic impact on the environment, to create conditions for improving the public environmental safety, initiating the harmonization the environmental standards with the European Union standards, to develop the relevant legal acts of public activities in the field of environmental protection.

During 2016–2020 Ukraine has to implement the European environmental standards and do the ecosystem planning, to implement mainly economic incentives ecologically oriented structural reforms, to achieve a balance between socio-economic needs and challenges in preserving the environment, to ensure the development of environmentally effective partnership between the government, business and the public, to spread the environmental awareness.

Conclusions

Investigation of the environmental aspects of sustainable development leads to the conclusions that the presence of some progress in reducing greenhouse gas emissions and energy saving policy activation, environmental situation in the country remains difficult. This is especially noticeable in the old industrial areas and industrial cities.

The major energy consumers are industrial areas and industrial settlements. The volume of consumption is constantly increasing, not only because of energy-intensive industries and heavy industries, but also because of the development of transport and urban development, the growing demands for housing and communal services. Total energy consumption of cities in Ukraine is about 80 %. In this case, one of the most pressing problems of urban development is sustainable use and energy savings.

Prospects for European key indicators of climate change and energy efficiency in Ukraine related to national and regional environmental policy. The main tasks which contribute regional progress towards the indicators should be:

- implementation of the environmental component to strategic documents of cities and regions development, review by 2020 main plans for the development of large cities to implement the provisions of international instruments;
 - provision of legislative transition from social and economic planning to the ecological and socio-economic development planning, like sustainable planning for regions and cities by 2015;
 - partnership “public – government – business” development at the regional level to ensure social and environmental standards for ecologically safe living conditions of the population by 2020;
 - introduction of cross-industry (or sector) partnership with involving all sectors of society into the implementation of environmental policies;
 - implementation of resource – and energy-efficient technologies into industrial and public sectors;
 - efforts of local governments and businesses must be integrated to take account the environmental, economic, social and demographic aspects of sustainable development of urban areas;
- international cooperation development, foreign investment, positive experiences and best practices in environmental policy of urban environment attracting.

Prospects for further research

Prospects for further research is to find tools for sustainable development components of urban areas combination in the context of the Europe 2020 strategy identified priorities.

1. Довкілля України у 2012 р. Доповідь Державної служби статистики. [Електронний ресурс]. – Режим доступу: www.ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/dop_dov_12.zip.

2. Постанова Верховної Ради України № 1359-XIV від 24.12.1999 р. «Про Концепцію сталого розвитку населених пунктів» [Електронний ресурс]. – Режим доступу: <http://zakon1.rada.gov.ua/laws/show/1359-xiv>.

3. Стамбульська декларація по населених пунктах. Прийнята на Конференції ООН по населених пунктах (Хабітат II), Стамбул, 3–14 червня 1996 р. [Електронний ресурс]. – Режим доступу: http://www.un.org/ru/documents/decl_conv/declarations/habdecl.shtml

4. Александров І.О. Стратегія сталого розвитку регіону: монографія / І.О. Александров, О.В. Половян, О.Ф. Коновалов, О.В. Логачова, М.Ю. Тарасова; за заг. ред. д.е.н. І.О. Александрова / НАН України, Ін-т економіки пром-ті. – Донецьк: Ноулідж, 2010. – 203 с.

5. Кухар В.П. Концепція переходу України до сталого розвитку / В.П. Кухар, Б.В. Буркинський, М.А. Голубець та ін. // Вісник НАН України. – 2007. № 2. – С.14–44.

6. Аналіз сталого розвитку – глобальний і регіональний контекст: моногр. / Між нар. Рада з науки (ICSU) [та ін.]; наук. кер. М.З.Згуровський. – К.: НТУУ «КПІ», 2010. – Ч.2. Україна в індикаторах сталого розвитку. – 359 с.

7. Сталій розвиток регіонів України [Текст] / М.З.Згуровський. – К.: НТУУ «КПІ», 2009. – 687 с.

8. Соціально-економічний потенціал устійчивого розвитку: учебник / под ред. проф. Л.Г. Мельника (Україна) и проф. Л.Хенса (Бельгія). – Сумы: ИТД «Университетская книга», 2007. – 1120 с.

9. Сталій розвиток промислового регіону: соціальні аспекти: монографія / О.Ф. Новікова, О.І. Амоша, В.П. Антонюк та ін.; НАН України, Ін-т економіки пром-ті. – Донецьк, 2012. – 534 с.

10. Новая европейская стратегия "Европа 2020". [Електронний ресурс]. – Режим доступу: <http://eulaw.ru/content/307>.

11. П'яте національне повідомлення з питань зміни клімату [Електронний ресурс]. – Режим доступу: www.pesci.org.ua/wp-content/.../ghg-potential_summary_ukr_101122.p

12. Национальный кадастр антропогенных выбросов из источников и абсорбции поглотителями парниковых газов в Украине за 1990–2011 гг. Государственное агентство экологических инвестиций Украины. Киев, 2013. – 642 с.

13. Національна доповідь України про стан виконання положень «Порядку денного на XXI століття» за десятирічний період [Електронний ресурс]. – Режим доступу: www.menr.gov.ua/docs/activity-ecopolit/Nacdorovid2012.

14. Енергетична стратегія України на період до 2030 року [Електронний ресурс]. – Режим доступу: www.mre.kmi.gov.ua/fuel/docscatalog/document?id.

15. Закон України «Про основні засади (стратегію) державної екологічної політики України на період до 2020 року» від 21.12. 2010 р. № 2818-VI. [Електронний ресурс]. – Режим доступу: <http://zakon2.rada.gov.ua/laws/show/2818-17/page2>.