

# Sustainability in the Development of the Urban Eco-environment

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**Abstract.** The article considers the main parameters of the sustainable development of the urban environment as a basis for ecological development of the major Bulgarian Black Sea cities - Varna and Burgas. Based on the problems of urbanization in the post-totalitarian transition in Bulgaria, conclusions and findings are made about the nature and characteristics of the formed urban communities in the leading port cities of the Republic of Bulgaria in the Black Sea. The thesis is defended that the future development of our Black Sea cities should be based on environmental friendliness and sustainability. They should strive for a coastal fluidity, with a transition from one urban environment to another, with a panorama of a cultural collage that combines aspects of the ecological urban environment and architecture with the challenges of technology and modern transport and communication infrastructure. An attempt has been made to highlight the positive and negative changes in the development of the Black Sea cities over the last three decades. The main guidelines for the necessary changes in the regulatory aspect are presented. They should ensure the protection of the air, soil, water and nature of the Black Sea region.

## 1 Introduction

Sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is one of the leading paradigms of the present century. This paradigm is based on three "pillars": economic development, social development and environmental protection. Meeting the needs of the future depends on how well we balance social, economic and environmental goals when making business and management decisions today. [1] Along with achieving sustainability, today's generations must work to restore the damaged and damaged environment. This means creating the conditions for the transition from technological industrial growth to "green growth".

Green growth is a concept that was created to complement the concept of sustainable development. Green growth aims to replace the model of conventional industrial economic growth with one that spares nature, ecosystems and non-renewable resources. The concept was first implemented by the Republic of South Korea, which is trying to realize a modern vision of low carbon emissions at the national level. This visionary policy sets a model of green growth for future economic development and prosperity. Currently, the concept is accepted by many countries and promoted by the OECD [2] and the World Bank [3].

Another interesting concept in the context of the implementation of the sustainable development paradigm is that of the green economy. It was developed by the United Nations Environment Program - Green Economy Initiative [4]. The green economy is defined as an economy that leads to improved human well-being and

the reduction of social inequality, while significantly reducing both environmental risks and environmental damage. The expectation of a green economy is that it can be low-carbon, resource-efficient and socially inclusive. Its growth should be driven by public and private investment, which reduces carbon emissions and pollution of air, soil and water, increases energy and resource efficiency and prevents the loss of biodiversity and ecosystem services.

The concept of sustainable development is embedded in the priorities of EU development both as an integration community and as separate state priorities in the member states of the community. Sustainable development is one of the three priority areas in the Europe 2030 Strategy. It has a clear focus on increasing the competitiveness of the EU economy, including focusing on leadership in green technologies, promoting smart grids, improving the business environment, especially for small and medium-sized enterprises. Sustainable development also refers to achieving environmental goals, such as reducing the carbon intensity of the economy, promoting efficient and sustainable use of resources, protecting the environment, reducing emissions and preventing the loss of biodiversity.

An extremely important concept within the sustainable development paradigm is that of the bioeconomy. Its implementation within the EU focuses on maintaining and creating economic growth and jobs in rural, coastal and industrial areas, reducing dependence on fossil fuels and improving the economic and environmental sustainability of primary production and manufacturing industries. The EU Bioeconomy Strategy and its Action Plan aim to pave the way for a more innovative, resource efficient and competitive society that

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equates food safety with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection.

In the National Plan for Sustainability and Development of the Republic of Bulgaria, adopted on October 30, 2020, 37% of the set funds in the amount of BGN 4.499 billion have been allocated to the Green Bulgaria initiative. They will be directed to three priority areas: Circular and Low Carbon Economy; "Sustainable Agriculture" and "Biodiversity". The following projects are planned for implementation: Program for energy efficiency in building stock - BGN 3 billion; Establishment of a decarbonisation fund; Digital transformation of the Electricity System Operator - BGN 511 million; Integrating the ecosystem approach and implementing nature-based solutions in the protection of protected areas; Improvement of the condition and improvement of the hydro-ameliorative infrastructure in the country - BGN 848 million; Digital agriculture. [5]

Specifically for the Republic of Bulgaria, the Black Sea region is extremely important for economic and social development in a number of respects. A significant part of the country's industry is concentrated in this region - shipbuilding and ship repair, machine building and metalworking, energy, heavy and light chemistry, cement production, extraction of marine resources - salt pans, mussel and rapan farms. Almost all Black Sea villages are practically resort centers, along with specialized resort areas such as Rusalka; Albena; Golden Sands; Sunny Beach, Elenite, Kavatsite and others. Practically the entire Bulgarian sea tourism is realized in the Black Sea zone. At the same time, the Black Sea coast is an area with an extremely rich history and with preserved and maintained dozens of historical monuments, some of which are world famous and important. Such are, for example, the Palace-summer residence of the Romanian queen; Varna Baths, Varna Chalcolithic necropolis with the oldest gold in the world; The Provadia salt pans, which were developed in ancient times, Old Nessebar with the medieval churches and colorful towns on the southern Bulgarian Black Sea coast - Sozopol, Tsarevo, Ahtopol, which have existed since the Greek colonization of the Thracian Black Sea coast. In recent times, the two major Bulgarian ports on the Black Sea - Varna and Bourgas are emerging as leading administrative, economic, cultural and tourist centers in the Black Sea region with all the problems arising from their role and their extremely dynamic urbanization in recent decades. century and in the first decades of the current XXI century.

## **2 Totalitarian and post-totalitarian socialization of Bulgarian Black Sea cities**

In the conditions of established market relations in the Bulgarian national economy, the need for a comprehensive reassessment and reorientation of regional policy on a national scale comes to the fore. Such reorientation is especially necessary for the cities of the Black Sea region, due to their role in strategic for the

development of the Bulgarian economy industries such as water transport, tourism, construction, trade, extraction of marine resources and in general due to their position as centres for development of modern Bulgarian maritime economy.

Both of the largest Black Sea cities of the Republic of Bulgaria - Varna and Burgas - grew significantly during the socialist period - after September 9th, 1944 Varna was the city with the largest mechanical growth in the Republic of Bulgaria. On September 9th, 1944 the population of the city of Varna was 45,000 people. In 2007, when the Republic of Bulgaria became a member of the EU, the city of Varna officially numbered 710,000 people. This is an increase in city residents more than 15 times. The growth rates of the city of Burgas are similar, which for the period from 1944 to the beginning of the Millennium became the fourth largest city in Bulgaria, after Sofia, Varna and Plovdiv.

The rapid and uncontrollable pace of urbanization under socialism was predetermined by the rapid growth of consumption under socialism. This consumption is essentially mass, uniform, standardized and therefore defective and of poor quality of goods and services. This gives rise to a specific Bulgarian socialist phenomenon - the DIY (do it yourself) movement. Bulgarian citizens try to provide themselves with consumer goods by making the necessary repairs, improvements and productions in the personal farm. Low incomes are complemented and compensated by the process of "naturalization of incomes". Almost every household has a small farm, which produces some of the products needed for consumption - fruits, vegetables, poultry, eggs, milk and more.

The logic of capitalism is the opposite: under capitalism, competition between producers requires an increase in the quality of products produced and services rendered. The increased quality of goods and services leads to higher prices. As a result, extras are constantly being created for all kinds of goods. New models of various goods are designed, fashion trends are set. This presupposes specialization of activities and continuous growth of the used services - communal, repair, construction, supply, information, administrative, etc. The market for services under capitalism is highly developed, while in the socialist system it is very limited and almost non-existent.

The Bulgarian socialist worker, on the other hand, cannot rely on the services market. Even if he pays for the service, he is not sure that it will satisfy him in terms of quantity and quality. That is why the socialist reality introduces something like an additional currency - the supplement under the table. These are barter services, or extra money over the price and other corrupt practices. It turns out that cheap mass consumption under socialism requires extra work - everyone has to build a kind of informal trade network to survive.

"The unexpected effect of these informal trade networks - according to Ivaylo Dichev - is the general stabilization of the system: people become much more dependent on each other. Any form of resistance marginalizes man, excluding him from the forms of gift exchange, just as unemployment marginalizes people in

developed Western countries. In other words, "defective" consumption of low-quality and defective goods produces sociality. You have to constantly expand the perimeter of the alliances to multiply your resources - and although the basic building material of solidarity is traditional, the big city multiplies possible connections between people, combines kinship and politics, fellowship and generational fashions, etc." [6]

This "socialization" of the big Bulgarian cities inherited from the recent totalitarian past (including in cities like Burgas and Varna) is preserved as a tradition (especially in terms of corruption) in the post-totalitarian period. Moreover, this socialization and resilience is reinforced by the increased opportunities for the inhabitants of large cities to join informal groups (which were banned by the authorities under socialism). These are such informal groups as hunting parties, professional guilds, elite clubs, private associations, etc. Another thing that strengthens the socialization and sustainability of life in big cities are the opportunities for larger sales and distribution projects for more enterprising urban residents, mainly in the field of direct marketing and social entrepreneurship. We can also accept a more trivial thesis: "Numerous studies show that people who have a lot of social contacts / friends, relatives / live longer and are less vulnerable to stress diseases than people who have fewer social contacts to support." [7]

### 3 Comprehensive assessment of the potential of sustainability on the basis of the main parameters characterizing the known practices of sustainable development

In the conditions of the fast and dynamic development of the urban environment in the second half of the XX century and at the beginning of the XXI century, sustainability is practically absent as a priority. The negative consequences on the urban environment are caused by a complex of different in nature and dynamics processes. The most significant of them are: urbanization (mass relocation of the population from rural areas and small towns to large urban centers and industrial agglomerations); industrialization; the development of urban and interurban infrastructure; extraction of various resources in suburban areas (drinking water, inert building materials, logging, food production); problems with municipal waste management; the need for wastewater treatment; pollution and dust in the city air from car traffic. All these processes develop and proceed with different speed and intensity. Dealing with these negative consequences is usually based on the principle of eliminating the most pressing problem at a time. However, when the problems are solved on their own and there is no complex approach, there are moments of accumulation and combination of negatives, which require a different and more complex approach in dealing with the negative consequences of the problems listed above. Sustainability in the development of the city in all its dimensions is just such an opportunity for a complex

approach in solving the problems caused by the dynamic development of large cities. The following table – Table 1. - presents the economic potential of the parameters of sustainability in the development of the urban environment. It is multifaceted and diverse and ranges from resource and energy savings, through the efficiency and rationality of urban consumption to the generation of additional jobs, income and profits from the development of the green economy of modern cities. inert building materials logging.

**Table 1.** Economic potential of the parameters of sustainability in the development of the urban environment

Parameters of sustainability	Change in micro- and macroeconomic indicators
1. The reduction of input materials used.	Reducing the material consumption of the production.
2. Waste reduction.	Reduction of waste processing costs.
3. Reducing the emission of harmful substances along the value chain.	Reducing the costs of neutralization and storage of harmful and toxic substances.
4. Encouraging the reuse of packaging, containers, capacities, pallets and other logistics aspects of production and transport activities.	Reduction of production costs and replacement of materials with possible reusable and reusable.
5. The recycling of resources.	Saving of primary raw materials.
6. Substitution of resources.	Effective recovery of available substitute raw materials.
7. The use of alternative energy sources.	Limiting the dependence of the energy system on the import of fossil fuels.
8. Production of energy from renewable energy sources.	Reduce the costs of neutralization and reduce harmful emissions.
9. The promotion of ecologically clean and resource efficient productions.	Energy saving and efficient use of energy and natural resources.
10. Development of technological solutions for waste-free technologies in production.	Reduction of costs for processing and storage of waste.
11. Innovative solutions aimed at extending the life cycle of products.	Reduction of household consumption expenditures.
12. Introduction of alternative productions using waste as raw material.	Reduction of costs for processing and storage of waste. Increasing the number of possible professions and new jobs.
13. Generating "green" demand for environmentally friendly products and services	Creating new products, new technologies, new jobs, a new niche in the advertising business.
14. Implementation of intelligent systems for administration and support of the market of recyclable raw materials.	Creating new jobs in the IT sector, opening new market niches.
15. Development and implementation of modern polymeric substitute	Reduction of household consumption expenditures.

materials in the production of products, after the use of which widespread waste is formed.	
16. Achieving market equality of environmental products and services and their equivalents.	Opportunity to ensure competitive prices and quality of these products and services through effective tax and tax policy, as well as targeted subsidies.
17. Impact on markets through economic instruments to internalize external costs (related to environmental protection) through the polluter pays principle.	Increasing consumer preferences for innovative products with high environmental performance compared to their equivalents.
18. Promoting green public procurement and green jobs.	Increasing employment in the eco-industry.
19. Development of sustainable forms of tourism (cultural, eco-, balneo / spa, etc.).	Job and income creation in depressed and hard-to-reach areas.
20. Production of second generation biofuels based on the processing of waste biomass.	Creation of new jobs and incomes for the population.
21. Reproduction of urban park areas, which includes the activities for the creation of new parks and gardens, conducting breeding, sanitary and regenerative felling.	Creating employment and opportunities for low-skilled labor.
22. Energy certification of the city building and infrastructure fund - survey for energy efficiency of buildings and industrial systems in order to determine the level of energy consumption.	Energy and resource savings.
23. Checking for energy efficiency of hot water boilers and air conditioning systems in buildings - energy efficiency management in buildings and industrial systems - energy management.	Increasing the economic efficiency of the operation of energy facilities in the urban environment.
24. Extraction of secondary raw materials and energy from waste from the city park economy (fruit growing, floriculture and gardening).	Creating employment and opportunities for low-skilled labor.
25. Management of specific waste streams - recycling, reuse of waste from wood processing and production of panels and furniture, sludge from wastewater treatment, obsolete electrical and electronic equipment, batteries and accumulators, biodegradable waste and much more	Saving raw materials, energy and resources. Opportunity for new forms of employment.

The following table - Table 2. - presents the social potential of the parameters of sustainability of the urban environment as changes in various social indicators and meters. In this case, we are not referring to any quantitative indicators of social change as much as qualitative changes in the social behavior of citizens and improvements in social practices referring to various aspects of sustainability in the development of the urban environment.

**Table 2.** Social potential of the parameters of sustainability in the development of the urban environment

Parameters of sustainability	Changing the social indicators of the urban environment
1. The reduction of input materials used.	Reducing the social commitment to the acquisition of primary resources.
2. Waste reduction.	Maintaining a socially acceptable urban environment.
3. Reducing the emission of harmful substances along the value chain.	Reduction of morbidity caused by harmful substances and polluted air.
4. Encouraging the reuse of packaging, containers, capacities, pallets and other logistics aspects of production and transport activities.	Increasing the social commitment of the urban population regarding the reuse of raw materials and materials used in urban life.
5. The recycling of resources.	Stimulating the social commitment of citizens for separate waste collection
6. Substitution of resources.	Encouraging the ingenuity and innovation of citizens in the direction of finding different substitutes for resources.
7. The use of alternative energy sources.	Improving the public eco-consciousness of the urban population.
8. Production of energy from renewable energy sources.	Creating a healthier urban environment.
9. The promotion of ecologically clean and resource efficient productions.	Cultivation of responsible behavior towards future generations.
10. Development of technological solutions for waste-free technologies in production.	Mobilizing public awareness of the importance of environmental technologies.
11. Innovative solutions aimed at extending the life cycle of products.	Positive change in the consumer behavior of citizens.
12. Introduction of alternative productions using waste as raw material.	Changing the attitude towards waste products and increasing social responsibility for more efficient utilization of waste products in the urban environment.
13. Generating "green" demand for environmentally friendly products and services	Generation of eco-standards in mass consumption.
14. Implementation of intelligent systems for administration and support of the market of recyclable raw materials.	Intellectualization of modern social practices through mass introduction of high technologies in the management of the urban

	environment.
15. Development and implementation of modern polymeric substitute materials in the production of products, after the use of which widespread waste is formed.	Change in consumer attitudes of urban communities.
16. Achieving market equality of environmental products and services and their equivalents.	Massification of eco-consumption in urban conditions.
17. Impact on markets through economic instruments to internalize external costs (related to environmental protection) through the polluter pays principle.	Stimulating eco-friendly consumption at all levels - community, group, individual.
18. Promoting green public procurement and green jobs.	New zones of socialization of the urban population.
19. Development of sustainable forms of tourism (cultural, eco-, balneo / spa, etc.).	Improving the conditions for rest, relaxation and recovery in the urban environment.
20. Production of second generation biofuels based on the processing of waste biomass.	Change in consumer behavior.
21. Reproduction of urban park areas, which includes the activities for the creation of new parks and gardens, conducting breeding, sanitary and regenerative felling.	Expansion and improvement of the places for socialization, rest and recovery of the urban population.
22. Energy certification of the city building and infrastructure fund - survey for energy efficiency of buildings and industrial systems in order to determine the level of energy consumption.	Increasing social and household comfortable citizens.
23. Checking for energy efficiency of hot water boilers and air conditioning systems in buildings - energy efficiency management in buildings and industrial systems - energy management.	Increasing the public security of the urban environment.
24. Extraction of secondary raw materials and energy from waste from the city park economy (fruit growing, floriculture and gardening).	Additional opportunities for solving problems with urban employment.
25. Management of specific waste streams - recycling, reuse of waste from wood processing and production of panels and furniture, sludge from wastewater treatment, obsolete electrical and electronic equipment, batteries and accumulators, biodegradable waste and much more	Modeling of socially responsible and eco-acceptable behavior of urban communities.

Analogous to the presentation of the economic and social potential in the previous two tables, Table 3 presents the ecological potential of the parameters of sustainability in the development of the urban

environment. The indicators that illustrate the changes in the urban eco-environment are also predominantly qualitative. To some extent, they overlap with some of the economic and social indicators, and this is implicit, as the same parameters and the changes they cause in urban settings refer to similar environmental and sustainability practices and to similar results. As Professor Stella Todorova notes:

“The main considerations when using the indicators for sustainable development are aimed at:

- Setting specific goals;
- Data collection through monitoring;
- Achieving efficiency;
- Reporting on global development;

Improving the relationship between society and the environment;

Taking into account the following factors - geographical location, people, culture and institutions.” [8]

**Table 3.** Ecological potential of the parameters of sustainability in the development of the urban environment

Parameters of sustainability	Changing the ecological indicators of the urban environment
1. The reduction of input materials used.	Saving of primary raw materials. Reducing the human footprint on the planet.
2. Waste reduction.	Reducing the harmful effects of waste processing and storage.
3. Reducing the emission of harmful substances along the value chain.	Improving the urban eco-environment.
4. Encouraging the reuse of packaging, containers, capacities, pallets and other logistics aspects of production and transport activities.	Reducing the number of pollutants and the degree of pollution of the urban environment.
5. The recycling of resources.	Development of responsible eco-behavior for future generations.
6. Substitution of resources.	Saving resources and raw materials and minimizing the environmental consequences of the extraction of primary resources.
7. The use of alternative energy sources.	Reducing the yield of non-renewable resources.
8. Production of energy from renewable energy sources.	Reduction of harmful emissions.
9. The promotion of ecologically clean and resource efficient productions.	Saving energy and natural resources. Reducing the eco-footprint of urban communities.
10. Development of technological solutions for waste-free technologies in production.	Minimizing the eco-impact of production and economic activities in the urban environment.
11. Innovative solutions aimed at extending the life cycle of products.	Imposition of eco-standards in everyday consumption.
12. Introduction of alternative productions using waste as raw	Saving primary resources and responsible for future

material.	generations urban consumption.
13. Generating "green" demand for environmentally friendly products and services	Introduction of mass eco-behavior and various ecological practices in the consumption of the urban population.
14. Implementation of intelligent systems for administration and support of the market of recyclable raw materials.	Use of high technologies in supporting environmental business and management decisions.
15. Development and implementation of modern polymeric substitute materials in the production of products, after the use of which widespread waste is formed.	Saving natural raw materials such as wood, natural fibers (cotton, flax, hemp, jute, etc.), ore and non-ore minerals, etc.
16. Achieving market equality of environmental products and services and their equivalents.	The imposition of environmental practices as normal production and consumer standards in urban conditions.
17. Impact on markets through economic instruments to internalize external costs (related to environmental protection) through the polluter pays principle.	The introduction as a legal norm of sanctions for environmental damage and violations by citizens.
18. Promoting green public procurement and green jobs.	Increasing employment in the eco-industry.
19. Development of sustainable forms of tourism (cultural, eco-, balneo / spa, etc.).	Rescue, protection and care of unique natural phenomena in the urban environment as tourist sites.
20. Production of second generation biofuels based on the processing of waste biomass.	Saving of agricultural land used for extraction of first generation biofuels - areas sown rapeseed, corn, sunflower. Utilization of waste biomass. Saving energy and non-renewable energy sources.
21. Reproduction of urban park areas, which includes the activities for the creation of new parks and gardens, conducting breeding, sanitary and regenerative felling.	Direct environmental impact by increasing the "lungs" of cities.
22. Energy certification of the city building and infrastructure fund - survey for energy efficiency of buildings and industrial systems in order to determine the level of energy consumption.	Saving energy and non-renewable energy sources.
23. Checking for energy efficiency of hot water boilers and air conditioning systems in buildings - energy efficiency management in buildings and industrial systems - energy management.	Increasing the environmental efficiency of the operation of energy facilities in the urban environment.
24. Extraction of secondary raw materials and energy from waste from the city park economy (fruit growing, floriculture and gardening).	Reduction of part of the urban waste and more efficient use of the resources of the city parks and gardens.

25. Management of specific waste streams - recycling, reuse of waste from wood processing and production of panels and furniture, sludge from wastewater treatment, obsolete electrical and electronic equipment, batteries and accumulators, biodegradable waste and much more	Activities with a direct environmental impact - conservation of resources, conservation of ecosystems and reduction of the human footprint on the global, and in particular, on the urban environment.
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The predominant part of the sustainability practices presented in the tables are applied in the large Bulgarian Black Sea cities - Varna and Burgas. In general, the tendency towards sustainability in the development of the two large traditional centres in Eastern Bulgaria is more and more noticeable and more and more visible. To a large extent, even some negative processes, such as deindustrialization in the period after 1989, contribute to this. In parallel with the change in the structure of the local economy, investment projects with a pronounced environmental character are increasingly sought after and implemented. At the same time, we are working on normative regulations that will allow to preserve and protect the natural, cultural and historical landmarks in the area of the two important port cities.

#### 4 Parameters of sustainable development and their impact on eco-management in the Black Sea region

The past period of over three decades since the beginning of the democratic changes in Bulgaria has radically changed the realities in the Bulgarian Black Sea cities. Historically, they were formed under different conditions and have different natural and demographic features. The common thing that unites them is their location in the coastal strip of the Bulgarian Black Sea coast and their connection with the sea and the Black Sea ecosystem.

The changes that have taken place in the context of the transition to a market economy have both positive and negative dimensions.

##### 4.1. Positive changes in the Black Sea cities during the transition to a market economy

At the present stage, the positive changes are relatively small and have little effect in the direction of improving the environmental situation. Rather, they are reflected in certain negative processes such as redevelopment of resort areas, pollution and destruction of unique ecosystems in the few remaining pristine beaches such as Irakli, Ropotamo, Perla and others.

##### 4.1.1 Shrinkage of industrial production in the Black Sea region of the Republic of Bulgaria

The most significant positive change in the ecological situation on the Bulgarian Black Sea coast is the drastic reduction of industrial production, mainly in the northern

Black Sea cities and mainly in the Varna-Devnya industrial agglomeration. The liquidation of entire structurally defining industries for the region, such as shipbuilding, production of internal combustion engines, radio electronics, heavy chemicals, as well as limiting electricity production to a minimum volume needed to cover the peak moments in the load of the country's energy system, lead to natural results: reduction of pollution of river and sea waters; to less harmful emissions into the air and to reduction of soil pollution.

The largest shipyard in the Republic of Bulgaria - the Varna Shipyard - has not been operating for almost two decades. The last buyers - Bulyard Shipbuilding Industry AD still cannot reach even half of the operational capacity of the former shipyard. Today the capacities of Bulyard Shipbuilding Industry AD are used only for ship repairs. The last ship to come down from the berths of the Varna Shipyard was the ship Persenk in 1998.

The largest Thermal power plant (TPP) on the Balkan Peninsula - TPP - Varna has long been operating at reduced capacity. Of the six generators of 200 megawatts of power, only one operates in minimum power mode only to cover the load at peak hours. The power plant, adapted to work with coal from the Donbas coal mining region, turned out to be unprofitable in the new conditions of market reorientation and economic restructuring.

Coal supply itself is irregular, given the complex situation in Ukraine. It relies on stocks from past periods and on occasional deliveries from different countries. For the time being, the plant's capacities are included in the so-called "Cold Reserve", as an opportunity to meet crisis moments in electricity generation and electricity supply. The latest instructions of the Prime Minister of the Republic of Bulgaria are to disconnect TPP Varna from the Cold Reserve and to use Cold Reserve only from the state power plant - Maritza-East-2 if necessary. The decision was prompted by the fact that the government has been accused by the opposition of diverting funds from the budget to the owner of Varna TPP - former politician and current businessman Ahmed Dogan. The contract for maintenance of "Cold Reserve" from TPP "Varna" is for BGN 54 million per year (about 27 million euros).

#### *4.1.2. Ecomanagement in Varna region*

In Varna region, which is controlled by the Regional Inspectorate for Environmental Protection and Water (RIEW) - Varna, 464 sites have been built and are functioning, which are potential and active sources of air pollution. Atmospheric air treatment facilities operate in only 163 of the above-mentioned sites. 329 autonomously operating facilities purifying the differentiated gas streams have been installed in these sites. Of these 329 facilities, only 304 operate effectively. The remaining facilities are characterized by an unsatisfactory cleaning effect. Reconstruction and modernization, as well as complete replacement are needed for the air purification facilities in TPP Varna, a large part of the electrostatic precipitators of the enterprise "Deven" AD, the facilities

of the production association "Agropolichim" AD in the town of Devnya, the furnaces for incineration of hospital waste of the university hospital. "St. Anna", the hospital "St. Marina" and the hospital in Dobrich, the treatment facilities of the plant for microproducts "Kaolin" AD in the village of Ignatievo and the asphalt bases of the enterprises: "Road Construction" AD Dobrich; Roads and Bridges AD Varna and Roads and Bridges AD Provadia.

The fact that the Republic of Bulgaria finds itself outside the network of gas highways has a positive side in environmental terms. In practice, Bulgaria is not on the gas map of Europe. This is not good for the national economy and for the economic development of the country, but it definitely has positive effects on the protection of the environment and ecosystems. The implementation of the South Stream project would lead to large-scale construction in the Varna Black Sea region, which would inevitably have a negative impact on the adjacent resort areas south of Varna.

#### *4.1.3. Ecomanagement in Burgas region*

"One of the industrial giants of heavy chemistry in the Republic of Bulgaria - Lukoil Neftochim" - Burgas has invested over \$ 35 million in treatment plants since 2014, which reduce harmful emissions into the air. Reconstruction and modernization of an existing boiler have been carried out in the plant, and a filtering system has been installed. The technology is of a new generation in the field of oil refining and this is one of its first applications within the EU. It reduces emissions from catalyst dust several times compared to the equipment used so far." [9]

As a positive fact for the Bulgarian economy can be assessed the fact that cities such as Burgas and Pomorie retain to some extent the industrial production, incl. and the production related to the extraction of marine resources (the Black Sea salt pans in Pomorie and Burgas). In Burgas, oil refining, machine building, metallurgy, ore mining and shipbuilding are the main pollutants of the ecosystem, including the waters of the Burgas Bay, as well as the lakes: Atanasovsko Lake, Mandre Lake and Lake Vaya.

One of the last investments in improving the ecological environment in e Burgas region is from March 19th, 2020. When a project for reclamation of a landfill for solid waste in the town of Obzor, Nessebar municipality in e Burgas region started. The project has a total value of BGN 1,254,410.89, of which BGN 1,066,249.26 is a grant from the European Regional Development Fund (ERDF) and BGN 188,161.63 is national co-financing.

The purpose of this eco-investment is to carry out technical reclamation of the decommissioned landfill for solid waste in the land of Obzor. The implementation of the project will provide an opportunity for the subsequent improvement of the landscape and for the restoration of the suitability of the terrains for agricultural or forest use. [10]

#### **4.2. Negative changes in the Black Sea cities during the transition to a market economy**

Unfortunately, the negative effects of the transition from a centrally managed economy to a market economy are much greater.

The accelerated development of industry in the 70s and 80s of the last century in the Black Sea cities of Bulgaria and especially in the region of Varna and Burgas (electrical production, heavy chemical industry, petrochemical engineering, shipbuilding, electrical industry, cement industry, locomotive production and wagons, etc.), has led to a sharp rise in water consumption and the formation, as a logical consequence, of huge volumes of polluted water. In this regard, the complex and rational use of groundwater and surface resources, as well as the fight against pollution of water bodies and marine waters, is becoming important. One specific danger of pollution of the largest water basin touched by the Republic of Bulgaria - the Black Sea - is oil. The research of the Specialized Laboratory of the Oceanological Institute of the Bulgarian Academy of Sciences found that only 30 grams of gas oil are completely sufficient to destroy 300 units of plankton per 1 cubic meter of water. Statistics show that 10% of the oil that is extracted from the water and 1% of the oil and petroleum products that are transported by sea fall into sea and river waters. In this way, these pollutants degrade water quality, pollute a huge area of the sea area and the coastline and at the same time cause irreparable damage to marine and river flora and fauna.

#### **4.3. Activities ensuring the sustainable development of the coastal region**

All these data show the need for an integrated approach to protect and maintain the purity of sea and river water. Here are some activities that can ensure the sustainable development of the coastal region in the direction of purification and decontamination of sea and river waters from the Black Sea region:

- the creation of new high-efficiency treatment facilities and modernization of existing ones;
- reduction of the norms of industrial water use, liquidation of the water losses during the production processes and the introduction of a closed cycle of water use;
- strengthening the control and self-control of the maintenance of the water quality in the points of water use and water discharge;
- the discovery of own water sources in the economic structures and their rational use;
- prevention, non-admission and timely elimination of pollution on the Black Sea coast by ships and coastal pollutants.

Particularly sensitive to industrial expansion is another very important ecosystem - forests, along with the surrounding terrain, natural landscape, flora and fauna. The main principle in the creation, growth and use of forests should be the strengthening of their protective, recreational, water regulatory and other environmental

functions. This means that forests should not be seen only as a source of wood. It is good to remember that they are a major source of oxygen enrichment. They are also a protector of mountainous and steep plots and areas of erosion, and are also an important nature-forming and conservation factor of wild flora and fauna. The forests are also the most majestic and beautiful ornament of nature and an indispensable place for rest and relaxation. It is necessary to start from these positions when planning and implementing measures for forest protection and enrichment of the forest fund.

#### **4.4. Problems in the maintenance of waterways in the region**

The lack of financial resources also limits the activity of the dredging fleet in cleaning the canal connecting Varna Lake with the Black Sea, as well as the access roads in the water area of the Varna port. The result of insufficient dredging is that with a design capacity of 23,500 tons, no more than 19,000 tons can pass through the canal today. This practically eliminates the possibility to operate the ferry ships from the former ferry connection "Varna-Ilichovsk". They are designed for the maximum capacity of the canal and have a displacement of 23,000 tons. The two Bulgarian ships from the ferry complex are unable to operate, regardless of the idea of developing a ferry connection with the port of Poti, the Republic of Georgia or with some of the Turkish Black Sea ports.

### **5 Conclusion**

Within one article, it is difficult to reveal the guidelines for sustainable development of an entire geographical region, such as the Bulgarian Black Sea coast. It is important to emphasize, above all, that this region has great potential, especially when the sustainable development of cities is combined with the necessary environmental activities to protect the air, water and soil. [11] More than half a century of research into public space and urban life since Jane Jacobs's 1961 book, *Death and Life in Major American Cities*, "has made people who use cities visible to politicians and designers. It is now possible to plan for an active increase in urban activities or, at a minimum, to ensure that public space is usable and pleasant for urban dwellers. Once neglected, urban life is already an established and recognized field, which has a great influence on the attractiveness of cities." [12] This statement of Jan Geel and Brigitte Sware has its full force for the Bulgarian Black Sea cities.

In the transition from surviving strategies to sustainable regional development of the Bulgarian Black Sea cities, the necessary conclusion is that the reasonable exploitation of the potential and resources of the Bulgarian Black Sea coast can serve as a basis for a dynamic regional development of the coastal region in economic, social and environmental terms and architecturally-urbanistically.

The Black Sea is the cradle of many human civilizations. With its resources it ensured the prosperity and development of Scythians, Thracians, Sarmatians,



Alans, Greeks, Macedonians, Romans, Russians, Tatars, Georgians, Abkhazians, Turks and Bulgarians. The reasonable exploitation of its potential and resources can serve as a basis for a dynamic regional development. In order for the direction of sustainability in the development of the main Bulgarian Black Sea cities to be correct, stable and irreversible, it is necessary not only to know the parameters of sustainable development, but also to popularize and impose them as urban standards, to incorporate them into regulatory measures of governmental and non-governmental structures and, above all, to become an integral part of the daily activities of residents and guests of cities and suburban areas.

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