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The south-east Romania's "green" infrastructure region in the context of the european green pact

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Abstract. The setting up of a modern and integrated system of complex green infrastructure (auto, naval and air) between Dobrogea, Moldova and the Republic of Moldova led to the development of the economic and cultural links of Dobrogea with Moldova, and the Republic of Moldova is a fundamental goal for the integration of Romania and the Republic of Moldova in the European Green Pact. The EU has set itself the target of implementing the "Ready for 55" plan by 2050 to reduce gas emissions by at least 55% by 2030

Keywords: Romania, green infrastructure, South-East Development Region

1. Introduction

On 11 December 2019, the European Commission presented the European Green Deal, the European Union's new growth strategy, aiming to put Europe on the path to becoming a climate-neutral, equitable and prosperous society with a modern, resource-efficient and competitive economy [1]. The transition to climate neutrality will generate significant opportunities, the emergence of potential for economic growth, new business models and markets, new jobs and technological development [2].

As part of the European Green Pact, the EU has set a binding target of achieving climate neutrality by 2050 through the European Climate Act. This means a substantial decrease in current levels of greenhouse gas emissions over the coming decades. As an intermediate step towards climate neutrality, the EU has increased its climate ambition for the next period, committing to reduce emissions by at least 55% by 2030 [1].

To this end, the EU is working on revising climate, energy and transport legislation in the so-called "Ready for 55" legislative package to bring current legislation in line with ambitions for 2030 and 2050 [1].

It includes a comprehensive set of changes to the existing EU Emissions Trading Scheme (EU ETS), which should reduce emissions in the targeted sectors by 61% by 2030 compared to 2005.

In particular, the proposal aims to: include emissions from maritime transport in the EU ETS; phase out the free allocation of allowances for aviation and sectors to be covered by the Carbon Border Adjustment Mechanism (CBAM); implement the EU ETS's global carbon offset and reduction scheme for international aviation; increase the funding available from the Modernization Fund and the Innovation Fund, and review the Market Stability Reserve to ensure a continued stable and functioning EU ETS [1].

2. Data and methods

The primary purpose of this paper is to study, analyses and present the authors' views on the economic and cultural development of the South-East Development Region, through the transition to the green economy, in the context of the need to accelerate Romania's development within the overall EU development framework, including through the facilities offered by the European Resilience and Recovery Programme, which provides Romania with necessary logistical and financial support in the coming years. The main objective of a case study presented in this paper is to achieve a modern and integrated system of complex green infrastructure, auto naval and aero, between Dobrogea, Moldova and the Republic of Moldova, leading to the development of economic and cultural links of Dobrogea with Moldova and the Republic of Moldova. Specific objectives can be defined as follows:

1. Economic and cultural green development of the counties in the South-East development region, by developing and transforming the inter-county auto-green network related to this region into the auto-green network, with extension to the Republic of Moldova.
2. Green economic and cultural development of the counties in the South-East development region through the development and transformation of the inter-county maritime network of this region into the green maritime network, with extension to the Republic of Moldova.
3. Green economic and cultural development of the counties in the South-East development region through the development and transformation of the inter-county railway network into a green naval network, with extension to the Republic of Moldova.
4. Economic and cultural development of the counties in the South-East development region through the development and transformation of the regional air network into the green air network, extending the whole Romanian territory and the Republic of Moldova.

In Romania, according to the Classification System of Regions in the European Union, used by the European Commission, according to EC Regulation 1059/2003 on the establishment of the Nomenclature of Territorial Statistical Units, there are 8 NUST II type areas (development regions with a population between 800,000 and 3,000,000 inhabitants) and 42 NUST III type areas (counties). NUTS 2 region RO22 South-East is part of Macro region two RO2 and comprises RO221 Braila county, RO222 Buzau county, RO223 Constanța county, RO224 Galati county, RO225 Tulcea county, RO226 Vrancea county. The South-East development region is located in the south-eastern part of Romania, with an area of 35 762 km² (15% of the country's total area), the second-largest of Romania's eight development regions. Geographically, the South-East Region is complex, with different but complementary landforms: Romania's Black Sea coastline, the Dobrogea Plateau, Romania's oldest mountains (the Măcin Mountains), the Danube Delta (UNESCO monument), part of the Danube River (Europe's most crucial river artery), part of the Bărăgan Plain, part of the Carpathian Mountains and the Curved Subcarpathians, with a predominantly continental climate, but also coastal or sub-Mediterranean (at Mangalia). The region's population is about 3 million inhabitants, 13% of the total population of Romania. The density is approximately 80 inhabitants/km², below the national average (90.91 inhabitants/km²), with the highest population density in Galati county and the lowest in Tulcea county. The urban population is over 55% of the total population, decreasing trends. In the South-East region, there are 33 cities (11 municipalities) and 1,455 villages (organized in 339 communes). The largest city in the region is Constanta, followed by the other county capitals: Galați, Brăila, Buzau, Focsani, Tulcea. Dobrogea is linked to the rest of Romania and, implicitly, directly and indirectly, to the other counties of the South-East region by the bridges at Cernavoda, Giurgeni Vadu Oii and Brăila (under construction), with their related roads, via the airports of Mihail Kogalniceanu and Tulcea, via the seaports of Mangalia, Constanta, Midia and the sea-river ports of Sulina, Galati, Braila, Cernavoda and the Danube-Black Sea Canal, with the main port of Medgidia and further on with the Republic of

Moldova via the port of Giurgiulesti. The South-East Development Region also has a relatively well-developed network of county and national roads, some of which have been modernized, which ensure the transport of goods and people to the other regions of Romania and the Republic of Moldova (Figure 1).

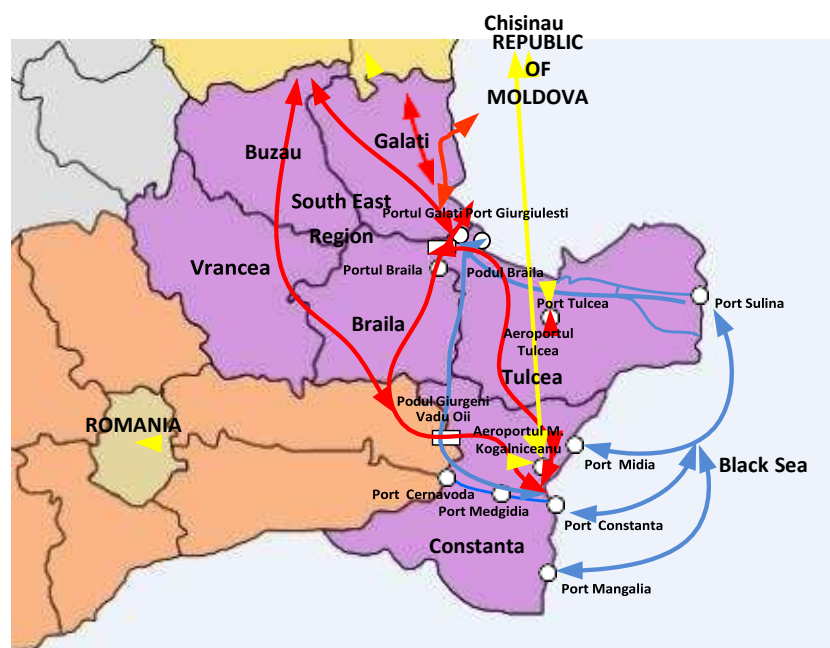


Figure 1 Auto, sea and air links of the South-East Development Region with the other developing regions of Romania and the Republic of Moldova

The development of the green economy, as part of the achievement in the European Union of a sustainable and resilient society of the future, which can efficiently and successfully meet the challenges of climate change, global and local geopolitical trends, multiple health, humanitarian, military crises, etc., is the foundation of the EU's medium and long-term policy. For Romania, as part of the European Union and which has to catch up with the other EU member countries, accelerated national development in this direction is its strategy as the country of the future. This orientation is even more imperative for the development regions (which include the South East Region), which have a certain degree of economic backwardness compared to the rest of Romania.

The idea of the South East Region pilot project, the first region with "green" infrastructure in Romania, is based on the realities and human, natural and material resources of the region, which could ensure the thought, approval and implementation of a pioneering project, of pressing topicality, through which a region of economic development that is not based on a long-standing geographical and historical reality can accelerate its economic and cultural development based on a current European precept, through which the modern green economy ensures development, prosperity, added value and resilience.

The main idea is to bring economic growth to the South-East Development Region, a region with great development potential, by modernizing the transport infrastructure, using the advantages of the region's geography and shifting to green transport of all categories.

3. Results and discussion

Swat analysis of the green development potential of the South East Region

The initial analysis of the green development potential of the South East Region shows the following strengths and weaknesses:

Strengths:

- extremely favorable geographical position with exit to the Black Sea (Constanta port the largest in the Black Sea and among the important EU ports);
- varied and attractive landforms from a tourist point of view;
- favorable geographical position on the Lower Danube;
- direct links with the Republic of Moldova, Bulgaria and Ukraine;

- good economic development;
- considerable population of around 3 million inhabitants, with industrial, agricultural and service economic activity;
- the existence of scientific solid research centers (Constanta, Galati, Braila, Tulcea);
- the existence of solid university centers (Galati, Constanta, Braila).

Weaknesses:

- the development region is not based on a historically validated and unified geographical and historical area;
- the inhabitants are not yet very used to economic mobility, although the reality of recent years shows that many Romanians have left their homelands for better jobs abroad or in other more economically developed areas of Romania;
- significant differences in economic development between the various component counties (e.g. Constanța - Vrancea) and hence differences in living standards.

The green economic and cultural development of the South East Region will be based on an integrated system whereby green energy, already produced in Dobrogea, will be used directly in the realization (Figure 2):

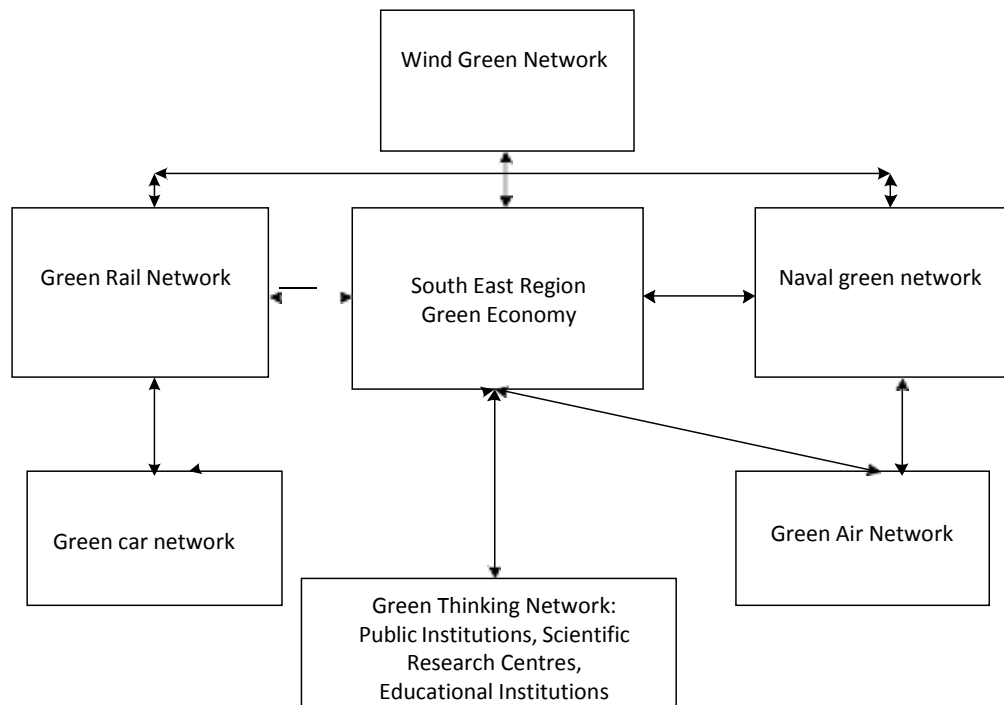


Figure 2 Functional links between the green economy and green infrastructure

1. developing strong green thinking within the county and local public institutions: county councils, prefectures, town halls, in the framework of a joint medium and long-term programme agreed upon at the level of development region, counties, municipalities;
2. developing strong green thinking within scientific research institutes (GEOECOMAR, INCDM Grigore Antipa, Danube Delta Institute, etc.) in collaboration with universities in Constanta, Galati, Braila, etc.;
3. development of the wind energy sector, including the construction of wind farms installed at sea and in hilly and mountainous areas, linking it to the needs of the future economy and electric transport in this development region and the energy needs of local households;
4. green car network, whereby the existing roads connecting the county capitals are modernized, equipped with electric battery charging stations and even battery exchange stations;
5. green rail network, whereby the long-lagging Dobrogea railway lines are developed, electrified to the north and provide high transport capacity and speed;

6. a green maritime network to ensure high-capacity, high-speed, pollution-reducing transport on the sea, the Danube and the Danube-Black Sea Canal
7. green air network, with modernized airports in Constanta and Tulcea, ensuring pollution reduction;
8. green, integrated tourist network for Dobrogea and the Lower Danube, based on the use of green energy and modern, electrically powered transport
9. drawing up a medium-term regional programme to switch households to the use of cheap, locally produced green electricity (regional and local wind power, local solar power, local downstream energy, etc.);
10. introducing green transport at regional, city and local levels (electric buses and minibuses, trams, trolleybuses, etc.);
11. developing a medium-term regional programme to encourage and support the population to switch from fossil fuels to green energy in both urban and rural areas, including the gradual transition to electric cars.

In line with the EU vision, there is a need to review existing legislation with the aim of accelerating the installation of infrastructure for recharging or refueling vehicles with alternative fuels and to provide alternative sources of energy supply for ships in port and stationary aircraft.

Pillar I of the National Recovery and Resilience Plan - NRRP, Green Transition, also includes component C4 Sustainable Transport, which shows that in terms of road quality, Romania ranks last, with a score of 2.96. Investments in the affected transport infrastructure will ensure investments in the infrastructure needed to ensure environmental protection, carbon reduction, safety and efficiency of transport services [4]. The measures are also related to initiatives currently being implemented with European funding through the Romanian Interconnection Mechanism (CEF) to implement the first network of refueling stations for compressed natural gas vehicles in Romania along European transport corridors [4].

4. Conclusions

The European Commission proposes important measures in the energy sector, which accounts for more than 75% of greenhouse gas emissions. 40% of energy should come from renewable sources such as wind and solar [3].

Romania needs to prepare more and better for this EU action, which will have a major impact on the less prepared and poorer economies of Eastern Europe.

Even if it is not officially stated in full force, Romania's green economic growth has become mandatory with the acceptance and implementation of the NRDP.

Romania's modernization with the help of the Recovery and Resilience Mechanism (RRM) is a historic opportunity, a national project that brings the necessary reforms for the actual development of a European country in the green and digital age [4]. Romania's National Recovery and Resilience Plan are designed to ensure an optimal balance between the priorities of the European Union and Romania's development needs in the context of recovery from the COVID-19 crisis that has significantly affected the country, as it has affected the whole European Union and the world [4].

The green economic growth of the South-East Development Region, a region with excellent development potential, through the modernization of transport infrastructure, can be achieved by switching to green transport of all categories.

Some of the measures necessary to achieve a green infrastructure are [5, 6, 7]:

- purchase of new clean vehicles by public entities;
- installation of speed enforcement systems, mobile speed cameras and video cameras to increase enforcement of speed limits and compliance with road safety rules;
- scrapping vehicles older than 15 years
- building more kilometers of the motorway;
- building modern monitoring and information systems for transport infrastructure users;
- building electricity stations in all counties;
- the establishment of linear forestry strips along newly built motorways and other congested transport routes;
- construction of secure car parks along newly built motorways and other major roads;

- Implementing a new charging system, especially for heavy traffic in Romania, according to the "polluter pays" principle, including possible incentives for those who own zero/low emission vehicles;
- a national road safety strategy with a related legislative package, as well as the implementation of measures to reduce the number of black spots;
- a significant reduction in the number of road accident fatalities,
- a substantial increase in the number of zero-emission vehicles (both passenger and goods) registered in Romania.

The European Commission is helping EU countries design and implements reforms that support the green transition and contribute to achieving the objectives of the European Green Deal. It also supports the development of the procedures needed by central and local administrations and the creation of the coordination structures needed to implement green policies [8].

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