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Renewable energy sources in transnational cooperation in the Baltic Sea Region

Tomasz Studzieniecki[1, CDFMR], Tadeusz Palmowski[2, CDFMR]

[1]*Gdynia Maritime University*, Faculty Of Management And Quality Science, ul. Morska 81-87, 225 Gdynia, Poland, e-mail: t.studzieniecki@wznj.umg.edu.pl *(corresponding author)*, https://orcid.org/0000-0002-1272-0908; [2]*University of Gdańsk,* Faculty of Social Sciences, ul. Jana Bażyńskiego 4, 80-309 Gdańsk, Poland, e-mail: tadeusz.palmowski@ug.edu.pl, https://orcid.org/0000-0002-1644-7945

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Abstract. The implementation of the EU Strategy for the Baltic Sea Region (BSR) has made the use of renewable energy sources a priority. The region has always been economically and ecologically very diverse. The development of transnational cooperation was an opportunity to bridge disparities and support renewable energy development. The aim of the article is to determine how the transnational cooperation implemented under the EU Cohesion Policy could contribute to BSR energy transition. The authors elaborated a research model, which presents a sequence of activities. The research used secondary sources, which were KEEP.EU, EUROSTAT and EUSBSR. The article examined cooperation within 41 projects financed under seven territorial cooperation programmes in the BSR in the period 2000–2020. The research results are presented in terms of subject, object and space, and visually presented in relation to NUTS 2 and NUTS 3 units.

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1. Introduction

The development of renewable energy sources has become one of the key issues of sustainable transition (Sangkyun, 2015; Chodkowska-Miszczuk & Szymańska, 2012), which is the essence of transition from a brown economy to a green economy (Ryszawska, 2016; Sgouridis & Csala, 2014). The primary sources of renewable energy are the earth, the sun and the gravitational pull of the moon. Electric and thermal energy is generated through the transformation of resources (Fig. 1).

The production of renewable energy is based on diverse technologies (Dincer, 2020; Bielek, 2014). The technology applied depends on numerous factors, including: geographic location, climate conditions, technology owned, public awareness and the economic situation of a country. Renewable energy resources and technologies (Fig. 2) are a key component of sustainable development because they generally have less environmental impact than other energy sources (Dincer & Rosen, 2020). They also favour system decentralization and local solutions that are somewhat independent of the national network, thus enhancing the flexibility of the system and providing economic benefits to small, isolated populations.

The development of renewable energy requires that several conditions be met, including ecologic education, the liquidation of barriers hampering the diffusion of renewable energy, and the development of renewable energy markets. Cooperation between key stakeholders (Fig. 3) is indispensable for energy transition (Farla, et al., 2012; Bergek, et al., 2008). The stakeholders may fall under up to seven groups (Geels, 2011) on three levels: local, regional and national (Loorbach et al., 2008).

The rich literature devoted to renewable energy sources (RES) presents analyses of transition on national levels. The development of energy transition at the sub-national level is still under study. It is emphasized (Smith et al., 2010) that "there many places, such as villages, cities and regions, wondering how they can transform their mobility, energy, waste, housing and other systems into more sustainable forms". When T. Hoppe and M. Miedema (2020) analysed the problem, they noted that, in the analysed transitions, locations other than regional administrative levels are referred to, such as local or provincial administrative levels, or somewhere in between. However, it should be noted that, due to how borders and administrative divisions differ between European Union countries (Jakubowski et al., 2017), the definitions and delimitations of regions vary. Hence, incompatible areas are difficult to compare.

In this situation, the NUTS system turns out to be very valuable. The NUTS classification (Nomenclature of Territorial Units for Statistics) is a hierarchical system for dividing the economic territory of the EU and the UK for the purposes of collecting, developing and harmonizing European regional statistics.

The system includes three levels (EUROSTAT, 2021):

1. NUTS 1: major socio-economic regions,
2. NUTS 2: basic regions for the application of regional policies,
3. NUTS 3: small regions for specific diagnoses.

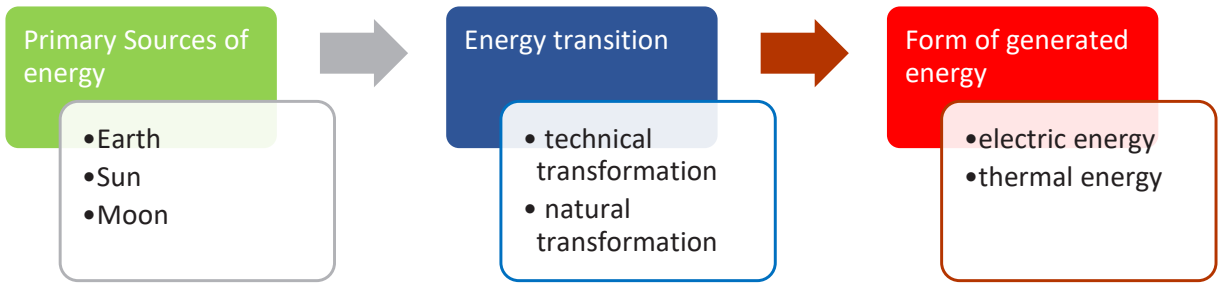

Fig. 1. The essence of energy transition
Source: author's own work

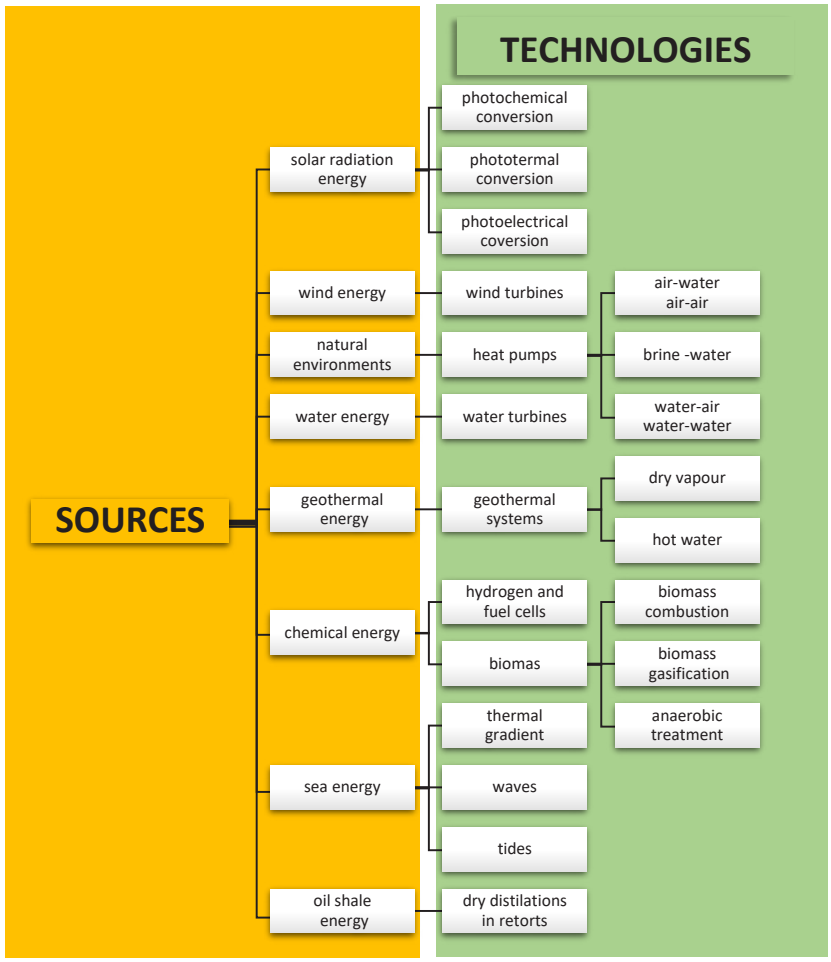

Fig. 2. Classification of key renewable energy sources and technologies
Source: author's own work based on (Bielek, 2014)

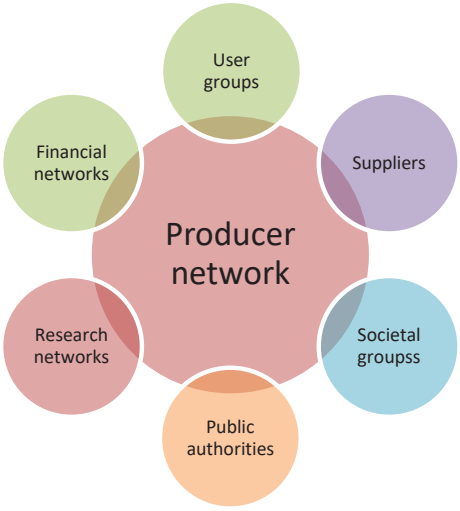

Fig. 3. Key stakeholders in energy transition
Source: author's own work based on (Geels, 2011)

Spatial analyses of the renewable energy phenomena and related problems use all the above-mentioned exchangeable NUTS levels. Of course, individual researchers choose those levels that are important to them. The NUTS system finds application in many research areas relevant to sustainable transition, fossil energy transition (Sasse, Trutnevyte, 2020) and energy poverty (Kyprianou, Serghides, 2020). Therefore, the application of NUTS in the BSR energy transition study is justified.

2. Aims and Methods

The aim of the article is to identify the attributes of transnational cooperation on renewable energy financed by the Cohesion Policy Fund in the Baltic Sea region (BSR) in the period 2000–2020.

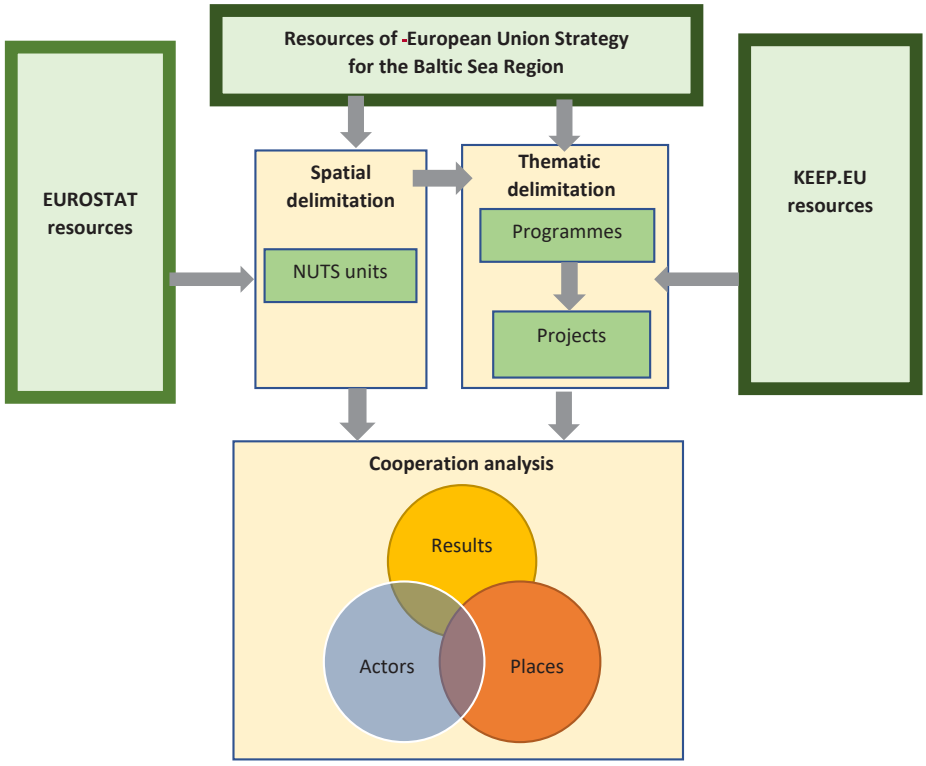

Fig. 4. Research model
Source: author's own work

Achieving this objective, the researchers could move on to answering the study questions:

1. Which regions were most active in renewable energy cooperation?
2. Which subject categories (actors) were most heavily engaged in energy renewal cooperation?
3. Who were the cooperation leaders?
4. What were the effects of this cooperation?

The developed research model is to allow for a spatial, subject and object analysis of territorial cooperation on renewable energy in the Baltic Sea Region in the years 2000–2020 (Fig. 4).

The answers to these questions required a sequence of steps to be followed, i.e. the selection of themes, territories, programmes and projects (Fig. 5).

The performed analysis and interpretation of results covers four NUTS levels: the national level (NUTS 0) and three regional levels (NUTS 1, NUTS 2, NUTS 3).

The study assumed the use of three sources:

1. The KEEP.EU (2021) database is an instrument developed for studies on European Union territorial cooperation. It provides access to aggregated data on programmes, projects and project beneficiaries of territorial cooperation.

Fig. 5. Sequence of actions to analyse macroregional cooperation on BSR renewable energy collaboration in the years 2000–2020
Source: author's own work

2. EUROSTAT (2021) for analysis of the spatial delimitation of cooperation based on the NUTS system.
3. EUSBSR (2021) sources for information on renewable energy in the BSR.

3. Transnational cooperation in the BSR

The BSR has always been defined and delimited in a specific context and for the needs of a specific field of science or industry. The VASAB 2010 initiative (Vision and Strategies around the Baltic Sea 2010, 2014) played a key role in developing the definition of the Baltic Sea Region. VASAB is an intergovernmental cooperation network of the states of the Baltic Sea Region. The main task of this initiative is to plan a long-term strategy for socio-economic development, creating a framework and interrelated structures for the rational management of space (Zaucha, 2007).

The definition of the BSR proposed by VASAB has gained wide recognition and appears very often in the scientific literature (Klemeshev, et al., 2017; Studzieniecki et al., 2020). According to the definition of VASAB, the BSR includes 11 countries: Poland, Denmark, Sweden, Norway, Finland, Lithuania, Latvia, Estonia, and parts of Russia (St Petersburg, Republic of Karelia, Murmansk, Kaliningrad, Novgorod, Pskov, Leningrad oblasts) and Germany (Hamburg, Berlin, Mecklenburg-Vorpommern, Schleswig-Holstein, Brandenburg. In the INTERREG programmes of European Territorial Cooperation (Fig. 6), the area of financial support in the BSR has been enlarged. In the case of Germany, Bremen and the NUTS 2 region of Lüneburg were included in the cooperation area. The expansion of the Russian part of the BSR in the INTERREG initiative included: the Vologda Oblast, the Komi Republic and the Nenets Autonomous Okrug. International cooperation lasting many years in the Baltic Sea Region (Zaucha, 2013) underwent dynamic acceleration with Poland and the Baltic States acceding to the European Union in 2004.

Fig. 6. Delimitation of the Baltic Sea Region
Source: (Nordregio, 2022)

The development of transnational cooperation within the BSR (Studzieniecki & Spiriajevas, 2019; Kropinova, 2021) was financially supported by the EU Cohesion Policy (Gänzle, 2018) via an instrument called European Territorial Cooperation (ETC). The overarching objective of ETC was to promote a harmonious economic, social and territorial development of the Union as a whole. Interreg was built around three strands of cooperation: cross-border (Interreg A), transnational (Interreg B) and interregional (Interreg C). Five programming periods of Interreg have succeeded one another (Fig. 7).

The time span covered by the study (2000–2020) encompasses the last three of the above stages. Three BSR transnational programmes and two specific European Territorial Cooperation Maritime Cross-Border Programmes, i.e. South Baltic and Central Baltic, played a key role in supporting transnational

Fig. 7. Five programming periods of Interreg
Source: author's own work

Table 1. Eligible area for the Central Baltic 2014–2020 Programme

Country	Proper area	Adjacent area
Estonia	Kirde-Eesti, Kesk-Eesti, Põhja-Eesti, Lääne-Eesti	Lõuna – Eesti
Finland	VarsinaisSuomi, Uusimaa, ItäUusimaa, Kymenlaakso, Åland, Satakunta	Kanta-Häme, Päijät-Häme, Etelä-Karjala, Pirkanmaa
Latvia	Kurzeme, Riga, Pieriga	Vidzeme, Zemgale
Sweden	Gävleborgs län, Uppsala län, Stockholms län, Södermanlands län, Östergötlands län, Gotlands län	Västmanlands län, Örebro län

Source: author's own work

Table 2. Eligible area for South Baltic Programme 2014–2020

Country	Proper area
Denmark	Bornholm, Østsjælland, Vest-og Sydsjælland
Sweden	Skåne län, Blekinge län; Kalmar län, Kronobergs län
Germany	Regions [Ger. *Landkreise*] Nordwestmecklenburg, Rostock, Vorpommern-Rügen, Vorpommern Greifswald and district-free city (kreisfreie Stadt) of Rostock;
Poland	Miasto Szczecin, Szczeciński, Stargardzki, Koszaliński, Słupski, Starogardzki, Gdański, Trójmiejski, Elbląski
Lithuania	Klaipėdos apskritis, Tauragės apskritis, Telšių apskritis

Source: author's own work

energy transition. The latter two programmes were carried out in 2007–2013 and 2014–2020.

The Interreg III B (2000–2006) for the Baltic Sea Region Programme (2021) covered an area of around 2.3 million square kilometres with a population of about 103 million inhabitants. It included Denmark, North-East Germany, Sweden, Finland, Estonia, Latvia, Lithuania, Poland, Norway, Russia and Belarus.

The area of the Baltic Sea Region programme was slightly expanded in the next period 2007–2013. The German part covered such regions [Ger. *Länder*] as Berlin, Brandenburg, Bremen, Hamburg, Mecklenburg-Vorpommern, Schleswig-Holstein, and Niedersachsen (only the NUTS 2 area Lüneburg). The Russian part covered St Petersburg and the surrounding Leningrad Oblast, the Republic of Karelia, the Oblasts of Kaliningrad, Murmansk, Novgorod and Pskov. Within The Baltic Sea Region Programme 2014–2020 (2021), the Russian part expanded to include St Petersburg, Arkhangelsk Oblast, Vologda Oblast, Kaliningrad Oblast, Republic of Karelia, Komi Republic, Leningrad Oblast, Murmansk Oblast, Nenetsky Autonomous Okrug, Novgorod Oblast and Pskov Oblast.

The area eligible for the Central Baltic Programme 2007–2013 (2021) embraced eighteen NUTS 3 units and an adjacent area of eight NUTS 3 units. In the following period 2014–2020, the qualified area stretched to embrace two regions in Finland: Satakunta as the core area and Pirkanmaa as the additional area (Central Baltic Programme 2014–2020, 2021).

The eligible area for the second maritime cross-border South Baltic Programme 2014–2020 (2021) comprised regions from five EU countries, which included the NUTS 3 units listed in Table 3. In comparison to the period 2007–2013, there were two significant changes. Firstly, there was no division between the core and adjacent territories of the programme. Secondly, due to an administrative reorganisation of districts and district-free cities introduced in Mecklenburg-Vorpommern (DE) in 2011, the total area covered by the programme increased, with the former district [Ger. *Landkreis*] Güstrow becoming a part of the Rostock district for the programming period 2014–2020.

In the period 2014–2020, the transnational programme covered 11 countries (restricted in Germany and Russia), whereas quasi-transnational programmes (South Baltic and Central Baltic) embraced fragments of five and four countries, respectively (Fig. 8).

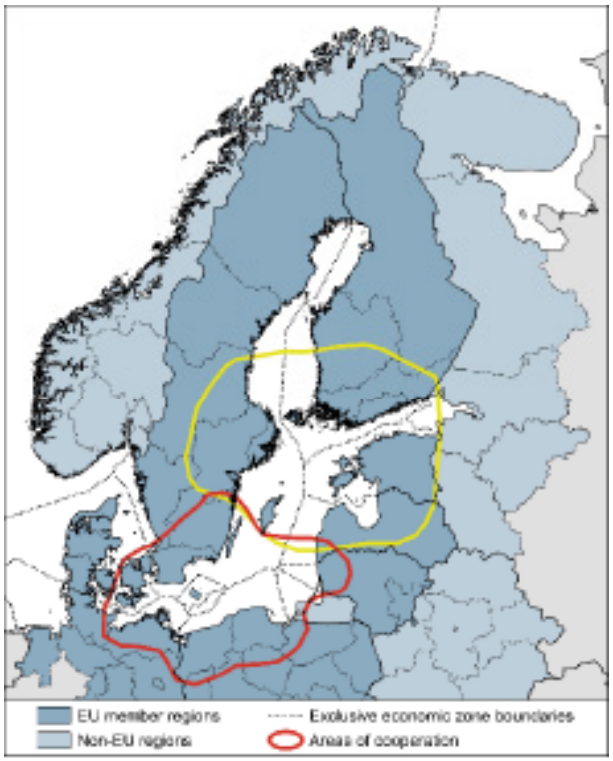

Fig. 8. Areas eligible for the Baltic Sea Programme 2014–2020, South Baltic Programme 2014–2020, Central Baltic Programme 2014–2020
Source: author's own work

Territorial cooperation concerning renewable energy in the BSR gained impetus with the developing Baltic integration process beginning early in the twentieth century. Considering the economic and ecological diversification of the BSR (Fig. 9), reducing these disparities became a challenge, which include the problem of renewable energy consumption.

The analysis of the energy evolution shows that this objective was achieved to a small extent. Scandinavian countries became more ecology friendly, whereas Poland and Germany remained brown economy countries. A breakthrough in transnational cooperation took place in 2004. However, a dynamic development started with the implementation of the European Strategy for the Baltic Sea Region. Macroregional strategies became innovative EU instruments fostering territorial cooperation in selected areas where cooperation was most advanced. Actors in a given macro-region could benefit from their joint potential in solving key common problems of the area (Gänzle & Kern, 2016). Thus, countries of a given macro-region enjoy the synergy effect and are jointly more effective in solving problems than if they faced them individually. In practice, however, macro-regional strategies showed a number of flaws, including a lack of new funds. Therefore, the greatest renewable energy success of the strategy in transnational cooperation was the improved cooperation between stakeholders and support for flag projects particularly important for the ambitious strategy goals (Palmowski, 2021).

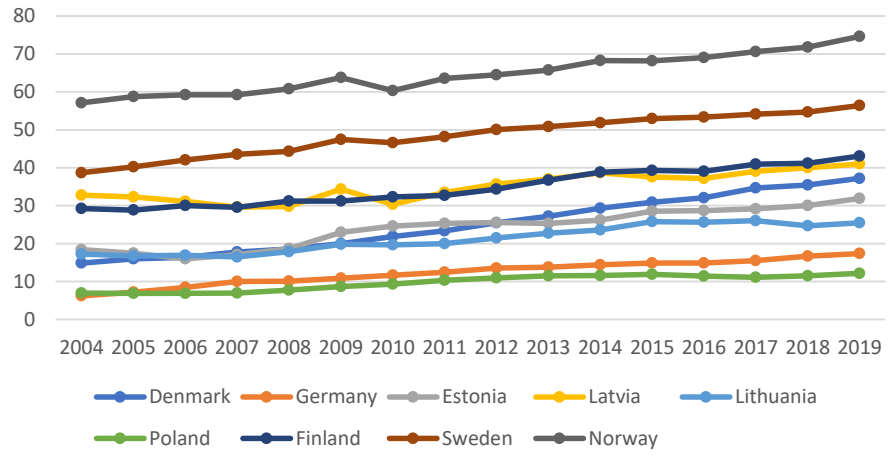

Fig. 9. Renewable energy consumption in BSR countries, 2004–2020
Source: author's own work based on (EUROSTAT, 2021)

Table 3. EU territorial cooperation programmes covering renewable energy in BSR in the years 2000–2020

No.	Programme	No. of projects	No. of partners	No. of partnerships
1.	2014 - 2020 INTERREG VB North Sea	10	115	121
2.	2007 - 2013 Interreg IVC	11	112	120
3.	2007 - 2013 Central Europe	15	155	159
4.	2014 - 2020 INTERREG VB Northern Periphery and Arctic	22	88	142
5.	2007 - 2013 Baltic Sea Region	8	107	114
6.	2014 - 2020 Interreg Europe	13	96	100
7.	2014 - 2020 INTERREG V-A Sweden - Finland - Norway (Nord)	3	3	3
8.	2007 - 2013 South Baltic (PL-SE-DK-LT-DE)	7	47	51
9.	2014 - 2020 INTERREG VB Baltic Sea	8	8	8
10.	2007 - 2013 North Sea Region	11	124	137
11.	2007 - 2013 Karelia ENPI CBC	5	30	30
12.	2014 - 2020 INTERREG VB Central Europe	7	76	79
13.	2000 - 2006 Baltic Sea Region	5	77	107
14.	2007 - 2013 Estonia - Latvia (EE-LV)	2	9	9
15.	2007 - 2013 Central Baltic (FI-SE-EE-LA)	8	34	37
16.	2014 - 2020 INTERREG V-A Poland - Denmark - Germany - Lithuania - Sweden (South Baltic)	4	16	20
17.	2007 - 2013 Botnia Atlantica (SE-FI-NO)	5	19	21
18.	2007 - 2013 Öresund - Kattegat - Skagerrak (SE-DK-NO)	4	19	19
19.	2007 - 2013 Northern Periphery	9	44	56
20.	2000 - 2006 Kvarken - Mittskandia (FI-SE-NO)	2	10	10
21.	2014 - 2020 INTERREG V-A Sweden - Finland - Norway (Botnia Atlantica)	3	3	3
22.	2000 - 2006 Fyn - K.E.R.N. (DK/DE)	1	2	2
23.	2014 - 2020 INTERREG V-A Sweden - Denmark - Norway (Öresund - Kattegat - Skagerrak)	8	7	8
24.	2007 - 2013 Nord (SE-FI-NO)	4	9	13
25.	2007 - 2013 Lithuania - Poland (LT-PL)	2	4	5
26.	2014 - 2020 INTERREG V-A Germany - Denmark	5	32	33
27.	2014 - 2020 South-East Finland - Russia ENI CBC	1	3	3
28.	2007 - 2013 Latvia-Lithuania (LV-LT)	4	11	11
29.	2000 - 2006 North Sea Region	5	31	32
30.	2000 - 2006 Euregion - Karelia (FI-RU)	2	9	9
31.	2007 - 2013 Sweden - Norway (SE-NO)	10	13	16
32.	2007 - 2013 Syddanmark-Schleswig-K.E.R.N.	5	16	17
33.	2000 - 2006 Storstrøm - Ostholstein-Lübeck (DK-DE)	1	2	2
34.	2007 - 2013 Mecklenburg-Vorpommern / Brandenburg - Zachodniopomorskie (DE-PL)	1	2	2
35.	2014 - 2020 INTERREG V-A Germany / Mecklenburg - Western Pomerania / Brandenburg – Poland	2	2	2
36.	2007 - 2013 Kolarctic ENPI CBC	2	7	7
37.	2000 - 2006 Lithuania - Poland - Russia (LT-PL-RU)	1	7	7
38.	2000 - 2006 Öresund region (SE-DK)	1	2	2
39.	2000 - 2006 Interreg IIIC East	3	27	27
40.	2007 - 2013 Estonia-Latvia-Russia ENPI CBC	1	6	6
41.	2007 - 2013 Saxony - Poland (DE-PL)	1	2	2
42.	2007 - 2013 Lubuskie - Brandenburg (PL-DE)	1	2	2
43.	2014 - 2020 INTERREG V-A Germany / Brandenburg - Poland	1	1	1
44.	2000 - 2006 Nord (FI-SE-NO-RU)	1	1	1
45.	2014 - 2020 INTERREG V-A Finland - Estonia - Latvia - Sweden (Central Baltic)	1	5	5
46.	2000 - 2006 Interreg IIIC North	1	8	8
47.	Other projects related to EUSBSR	6	-	-
Together		**233**	**1403**	**1569**

Source: author's own work based on (Keep.eu, 2021)

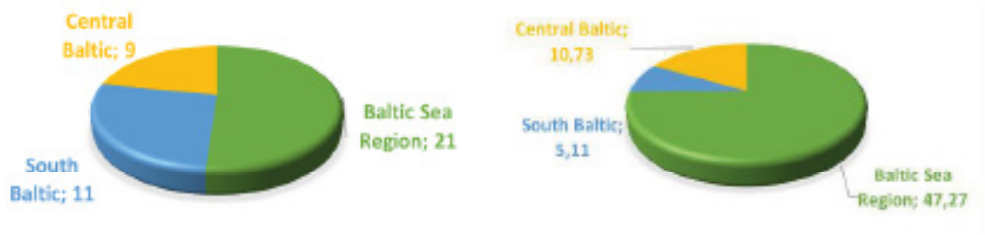

Fig. 10. Number of projects completed in BSR, and budgets (in million EUR) allocated to renewable energy, 2000–2020
Source: author's own work based on (EUROSTAT, 2021)

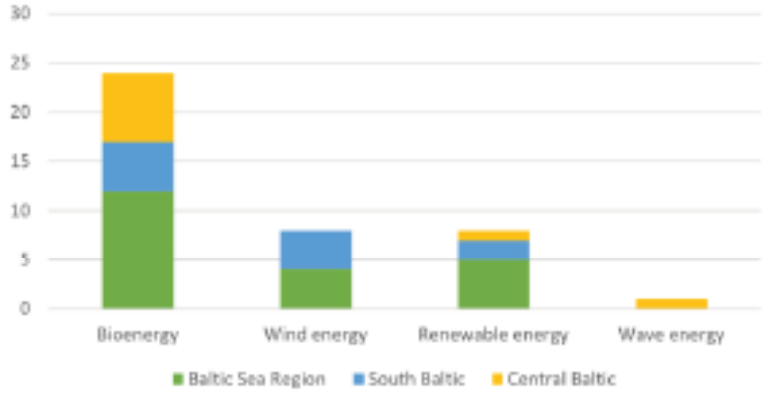

Fig. 11. Number of projects in each thematic category implemented in BSR, 2000–2020
Source: author's own work based on (Keep.eu, 2021)

4. Renewable energy cooperation in the BSR: results and discussion

In the years 2000–2020, international territorial cooperation concerning renewable energy took place under 188 out of 269 programmes.

Forty-seven programmes operated in the BSR under these programmes, implementing 233 projects with the participation of 1,403 partners. The number of partnerships was 1,569 (Table 3).

Three transnational sustainable energy programmes covering the entire region (the periods 2000–2006, 2007–2013, 2014–2020) played a key role in macroregional cooperation, and four multilateral sub-transnational programmes covering subregions (Central Baltic and South Baltic). Under the seven programmes mentioned above, over 41 projects were carried out with an allocated budget of EUR 63.11 million (Fig. 10).

Bio-energy and wind-energy projects dominated in terms of the types of renewable energy. All programmes implemented projects devoted to renewable energy in general, including the energy transition. Only one project within the Central Baltic programme concerned wave energy (Fig. 11).

The projects involved a total of 421 partners. The most numerous partner groups came from Germany, Sweden and Poland, and the fewest from Norway, Russia and Belarus, i.e. states outside the EU (Fig. 12).

A more detailed picture was obtained by presenting the number of partners in NUTS 2 and NUTS 3 (Fig. 13).

Presenting data at the NUTS 1 level is deemed pointless. NUTS 1 regions are too big to properly illustrate the situation. The BSR does not feature a single country where NUTS 1 regions correspond to administrative regions (apart from a few exceptions in Germany). The picture of activity becomes more comprehensible at the NUTS 2 level. NUTS 2 units correspond to administrative regions in Poland, Denmark and a considerable part of Germany.

Nevertheless, they extend to cover entire smaller countries such as Latvia and Estonia. NUTS 3 units correspond to administrative regions in Sweden, Finland, Germany (administrative regions of the second order) and former administrative regions

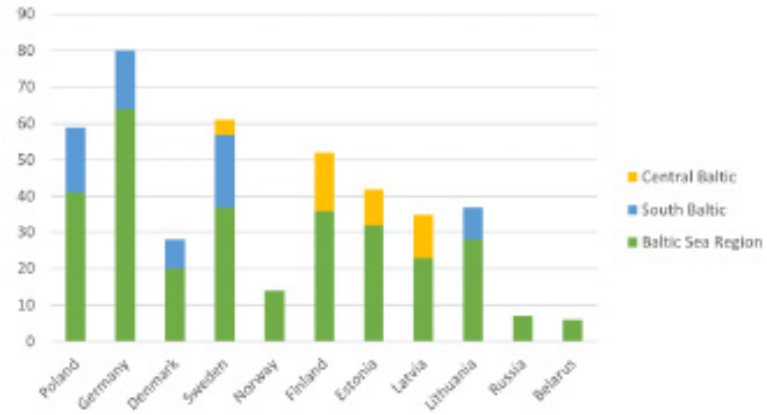

Fig. 12. Number of projects implemented in individual BSR countries, 2000–2020
Source: author's own work based on (Keep.eu, 2021)

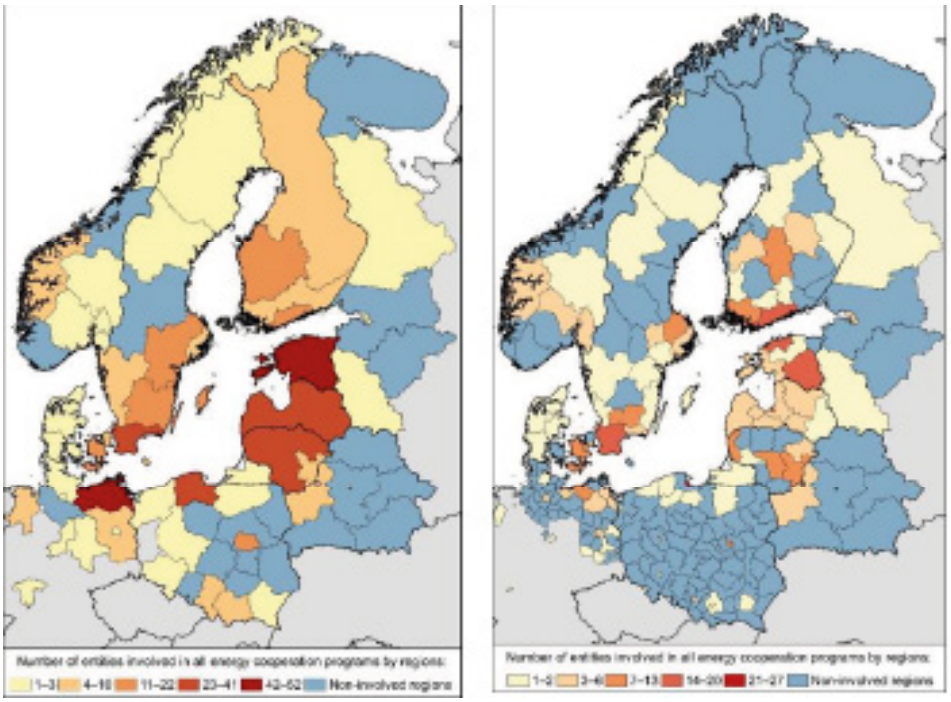

Fig. 13. Number of partners participating in territorial cooperation renewable energy in NUTS 2 and NUTS 3
Source: author's own work based on (Keep.eu, 2021)

in Lithuania. Thus, the optimal solution is the joint presentation of data.

In terms of NUTS 2, Estonia, Mecklenburg-West Pomerania demonstrated the most active involvement. In Poland, the level of activity was greatest in Pomorskie Voivodship, and, in Sweden, in the statistical region 'South Sweden'. Similar involvement characterised Estonia and the 'Central and western Lithuanian region', which embraces nearly the entire country except for the capital.

In terms of NUT 3, the most active regions (over 20 partners) were: the district-free city of Rostock in Mecklenburg - West Pomerania in Germany, and the Tricity subregion covering the cities Gdańsk, Gdynia, Sopot in Poland's Pomorskie Voivodship. The Swedish region Skania was very active (20 partners).

The breakdown into the most active cities also deserves attention (Fig. 14). The leaders in this configuration are Gdańsk (Pomorskie Voivodship,

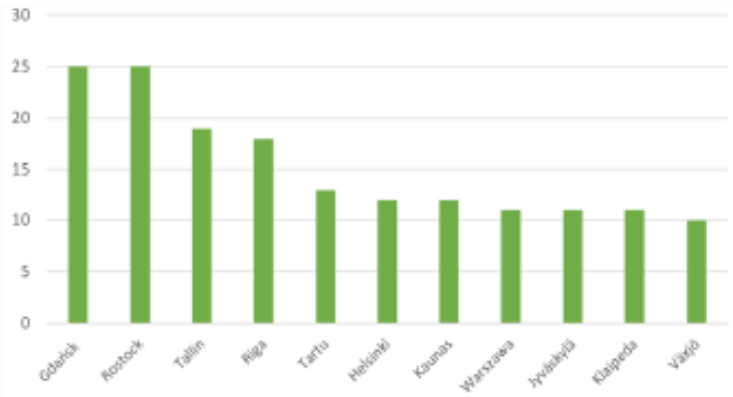

Fig. 14. The cities most active in territorial cooperation on renewable energy
Source: author's own work based on (Keep.eu, 2021)

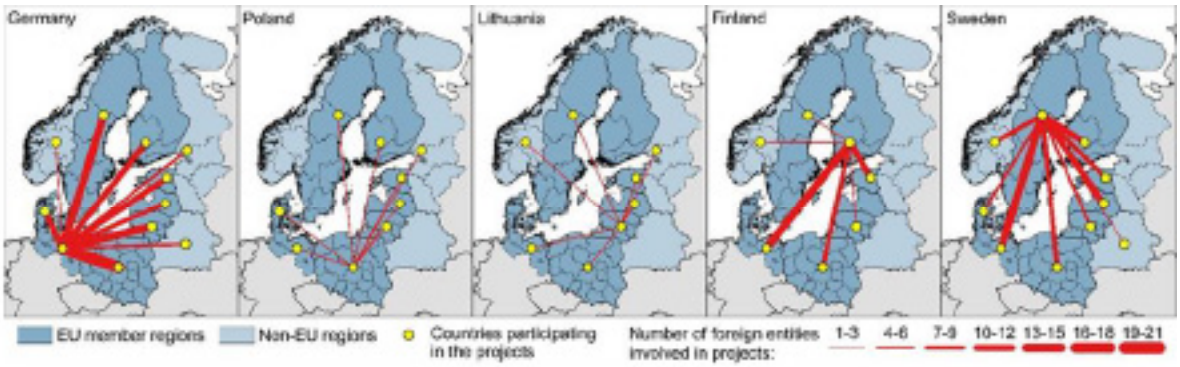

Fig. 15. Cooperation network of projects implemented and financed from 3 transnational programmes
Source: author's own work based on (Keep.eu, 2021)

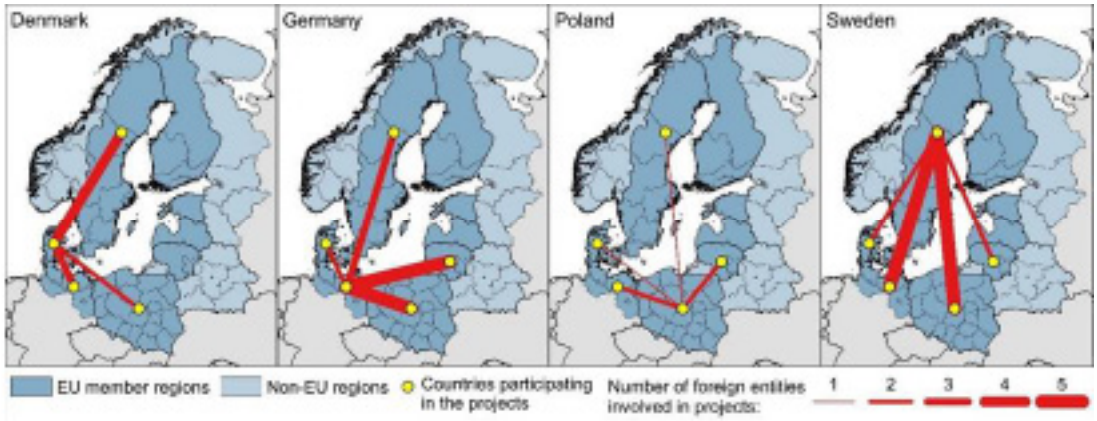

Fig. 16. Cooperation network of projects implemented under South Baltic programmes
Source: author's own work based on (Keep.eu, 2021)

Poland) and Rostock (Federal State Mecklenburg - West Pomerania, Germany).

Actors from Germany and Sweden usually took on the role of coordinators in implementing cross-border projects (Fig. 15). In the case of multilateral cross-border projects, the coordinators for South Baltic programme (Fig. 16) and Central Baltic programme (Fig. 17) came from Sweden and Finland, respectively.

The subject analysis regarding actors participating in renewable energy territorial cooperation proved the predominant participation of R&D and

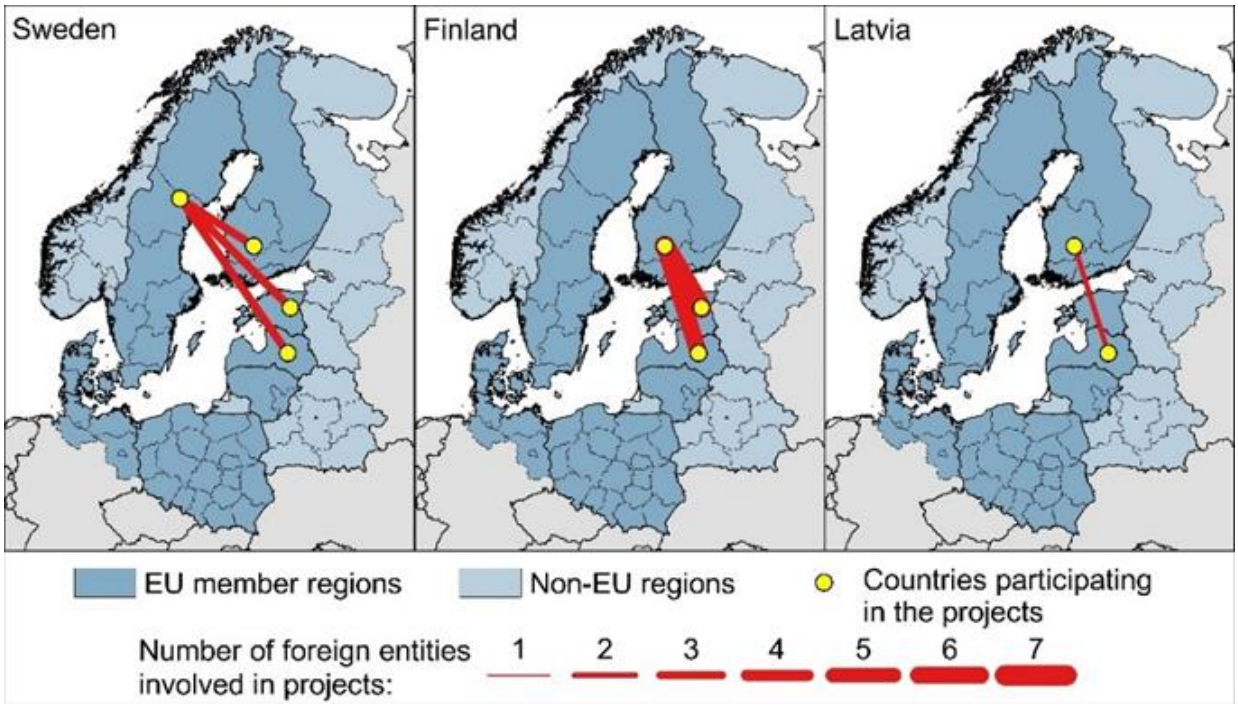

Fig. 17. Cooperation network of projects implemented under Central Baltic programmes
Source: author's own work based on (Keep.eu, 2021)

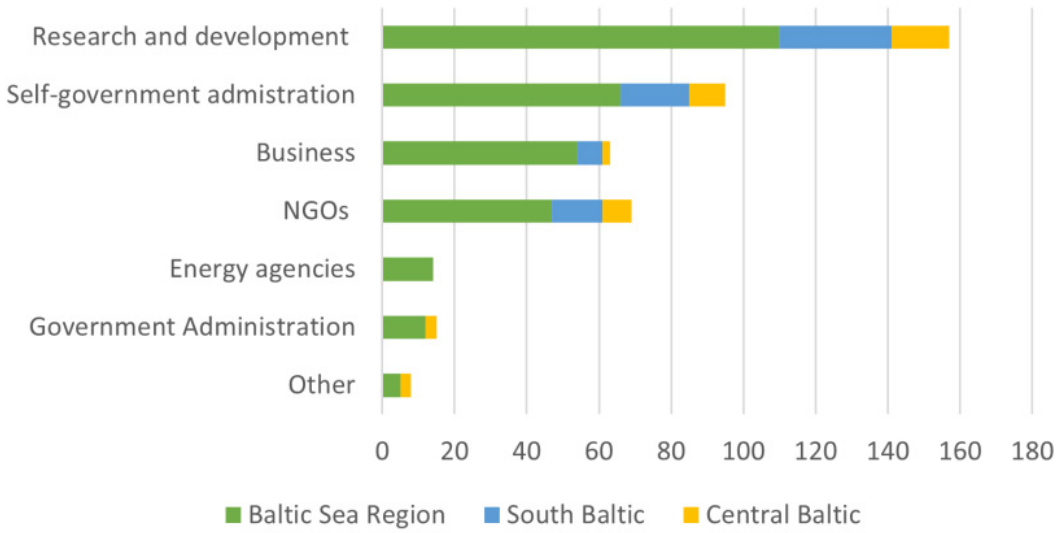

Fig. 18. Types of actors involved in renewable energy cooperation in BSR
Source: author's own work based on (Keep.eu, 2021)

Table 4. Renewable energy projects conducted within transnational cooperation in BSR in the period 2000–2020

	BSR	South Baltic	CB
Bioenergy	1. Implementing Advanced Concepts for Biological Utilization of Waste 2. Bioenergy Technology Transfer Network 3. Baltic Biogas Bus: Increase the use of biogas buses in public transport to reduce the emissions in urban areas in the Baltic Sea Region 4. Collaborative management planning and action for agriculture and environment in the Baltic Sea Region 5. Accelerating production of forest bioenergy in the Baltic Sea Region 6. Unlocking the potential of bio-based value chains in the Baltic Sea Region 7. The Baltic Sea Region Bioenergy Promotion Project 8. From strategies to activities 9. New Bioenergy Business During Emission Trading 10. Low Temperature District Heating for the Baltic Sea Region 11. Wood Biomass Production in Medium Rotation Plantations with Hybrid Aspen and Poplars 12. Investing and testing more biogas buses in the Baltic Sea Region, based on studies within the previous Baltic Biogas Bus project	1. Regional Sustainable Biogas Solutions 2. Bioeconomy in the South Baltic Area: Biomass-based Innovation and Green Growth (seed money) 3. Bioeconomy in the South Baltic Area: Biomass-based Innovation and Green Growth 4. The beneficial use of sewage sludge from small and medium sized municipalities 5. Liquefied (bio-)gas as a driving force for development and use of green energy technology	1. The Development of the Bioenergy and Industrial Charcoal (Biocoal) Production 2. Concepts for using reed biomass as local bioenergy and building material 3. Energy Efficient and Ecological Housing 4. Potential and competitiveness of biomass as energy source in Central BSR 5. Sustainable nutrient management in biogas production 6. From waste to traffic fuel 7. Wood Energy and Cleantech
Wind energy	13. Integrated Baltic offshore wind electricity grid development 14. EastWind - Establishing Wind energy use in the Russian Federation 15. Wind energy in the BSR - Planning, Construction and Investment 16. Wind energy in the BSR - Planning, Construction and Investment II	6. South Baltic Center of Offshore Wind Energy 7. South Baltic Offshore Wind Energy Regions 8. Wind energy in the BSR - the extension 9. Wind energy in the BSR 2: Demonstrators - the Upgrade	
Wave energy			8. Wave Energy for a Sustainable Archipelago
Renewable energy	17. Baltic Energy Areas – A Planning Perspective 18. Co-producing and co-financing renewable community energy projects 19. Network for Hydrogen in Combination with Renewable Energy sources 20. Public Energy Alternatives - Sustainable energy strategies as a chance for regional development 21. Regional Mobilizing of Sustainable Waste-to-Energy Production	10. Sustainable RES-CHAINS in the South Baltic Region 11. Smart Asset Management - Supporting a low carbon transformation	9. Covenant of Mayors in the Central Baltic Capitals

Source: author's own work based on (Keep.eu, 2021)

territorial self-governmental administration units in all programme types concerning renewable energy (Fig. 18).

Renewable energy cooperation took place in 41 projects. It was generally of an educational nature, propagating good practices and conducting energy-transition pilot projects (Table 4).

5. Conclusions

Renewable energy was always treated as a priority in BSR international cooperation. The Cohesion Policy ensured funding for territorial cooperation projects, including transnational and quasi-transnational cooperation projects. Taking into account the regulations in force, the programme budgets and projects, we note that the results are

primarily of an intangible nature. The actors from Poland and Germany – countries which have the greatest problems in use of renewable energy – showed deep involvement.

The beneficiaries of the projects were primarily research and science institutions and local and regional authorities. Nonetheless, in view of BSR integration, particularly within EUBSR, cooperation involving activity of stakeholders and the development of cooperation networks created a favourable environment for actions of the European Union and BSR states.

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