DUST | Democratising jUst Sustainability Transitions

Deliverable D4.1: Spatial representation of the just sustainability transition policy context in case study regions

DUST: Work Package 4, Task 4.2

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26-08-2024	V1.0	Alexander Wandl	Final version submitted to the EC

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Abbreviation list

Term	Description
BG	Bulgaria
D	Deliverable
DE	Germany
EC	European Commission
EU	European Union
GIS	Geographic Information System
JTF	Just Transition Fund
LEC	Least-engaged communities
PL	Poland
RFFL	Regional Futures Literacy Lab
SME	Small and medium-sized business
SE	Sweden
TC	Territorial capital
TCC	Territorial capital catalogue
TJTP	Territorial Just Transition Plan
WP	Work package

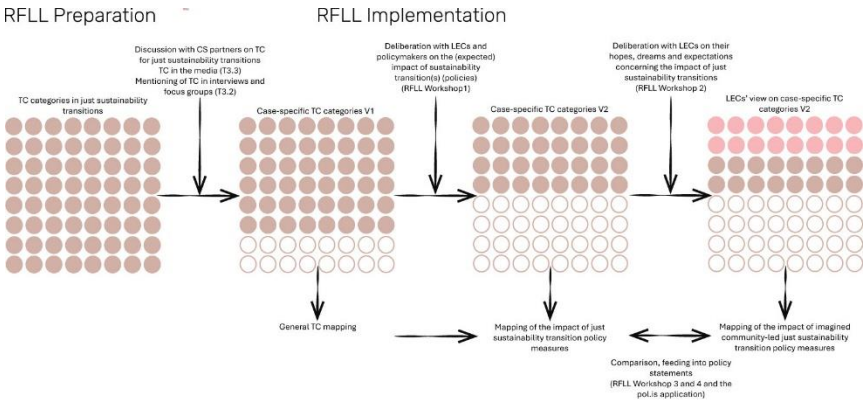
1 Introduction

Work package (WP) 4 ‘Setting the stage for participation: Mapping, visualization, and digitalization’ of the DUST project builds on research in WP2 and 3 and is oriented at preparing and supporting the participatory experimentation with citizens, policymakers, and experts - the Regional Futures Literacy Labs (RFLLs) - in WP5. The labs combine design-led territorial and digital instruments for more proactive and strategic involvement of least-engaged communities (LECs) in sustainability transition policymaking. Within WP4, Task 4.2 maps the policy context for the experiments in the four case study regions where the experiments will be carried out, namely Stara Zagora (BG), Lusatia (DE), Katowice (PL) and Norrbotten (SE). More specifically, the task foresees the impact of place-based just sustainability transition policy measures. This will later allow to contrast this projected impact with the impact of measures that are imagined by LECs, the development of policy statements on this base, and deliberating these statements using the e-democracy tool Pol.is.

The context mapping performed in Task 4.2 has been carried out to foresee the impact of ongoing and upcoming just sustainability transition measures in case study regions. A consistent and comprehensible spatial representation of impact is constituted via the use of an adapted version of the Territorial capital (TC) framework developed by Orsi et al. (2022)[1] (for more information on this framework, see section ‘Territorial capital’). To achieve output, a Geographic information systems (GIS) application was used to create a geographic database that collects and combines data on the thematic key issues that are identified in relevant policy documents (for more information on creating this database, see Chapter 2 Methodology). This database constitutes the deliverable (D) 4.1.

Task 4.2 drew on the results of Tasks 3.1, 3.2, and 5.2.1. Results of the task in the form of maps and other visualisations will feed into Tasks 5.2 and 5.3 to support participants' interaction in the RFLLs. This deliverable D4.1 is a living database, including a supportive table titled Territorial Capital Catalogue (TCC), which introduces the identified capitals across policies and categorizes them based on our adapted framework. The database will be complemented and transformed as interaction in the RFLLs proceeds.

Figure 1 The use of the territorial capital concept in the RFLLs



[1] Orsi, F., Cavaco, C., & Gil, J. (2022). From territorial capital to regional design: A multidimensional model for territorial analysis and scenario evaluation. Planning Practice & Research, 1–20. https://doi.org/10.1080/02697459.2022.2120490

1.1 Territorial Capital

To guarantee a consistent mapping of the actual and imagined impact of place-based just sustainability transition policy measures, WP4 uses the Territorial Capital (TC) concept. TC is a concept used in policy-making to address specific areas' internal development and regional competitiveness, emphasizing the importance of place-based territorial strategies and the integration of spatial planning with regional development policies. Initially introduced in the OECD's *Territorial Outlook*, the concept suggests that "each area possesses a unique capital—its 'territorial capital'—which differs from other areas and is shaped by various factors" (OECD, 2001, p. 15)[2]. These factors include " (...) geographical location, size, production resource endowment, climate, traditions, natural resources, quality of life, and the agglomeration economies provided by its cities, (...) business incubators, industrial districts, or other business networks (...), as well as other 'untraded interdependencies' like shared understandings, customs, and informal rules that facilitate collaboration among economic actors" (idem).

In essence, TC refers to a diverse array of both tangible and intangible assets, from geographic location and the availability of natural and physical resources to the so-called 'quality of the milieu'—the local, non-material factors that promote entrepreneurship, creativity, and innovation. In the context of the DUST project's RFLLs, the TC framework facilitates identifying and categorising key indicators that will be intervened through policy on the path towards a just sustainability transition. By identifying these indicators, we can foresee how policies use a region's potential for a better future and how this use relates to communities' hopes and expectations concerning the development of their places and identities. Thus, in the DUST WP4, an emerging Territorial Capital Catalogue (TCC) is first fed by the results of a TC analysis of the policies of each case study region and second by a TC analysis of community expressions during the DUST focus groups and RFLL workshops. Feedback loops between results of analyses – both adopted in the TCC - will lead to a broadening or sharpening of discussions in the RFLL workshops. In either case, the TCC will allow for a mapping of common ground for policy co-creation between policymakers and LECs.

The TC framework applied in this document takes as a starting point the framework developed by Orsi et al. (2022)[3] and adapts it to suit better the context of the DUST project and its stakeholders. The following Table 1 showcases the resulting adaptation.

Table 1 Explanation table for regional territorial capital mapping

Territorial Capital	Definition	Colloquial term	Dimension	Indicator	Example
Built Environment Capital (BC) (settlement capital)	Refers to the spatial distribution of buildings and built-up areas.	Construction advantages	occupation	population density, building density,	Gross space index (GSI), Dispersion Index,
Economic Capital (EC) (entrepreneurial capital)	Distribution of economic clusters per sector and the combination and diversity of economic activities.	Economic advantages	functions	building dynamics, functional mix, combination of economic activities index,	Empty dwellings, Diversity Index, Amount of economic activities/business per sector (1st,2nd,3rd)

[2] OECD. (2001). OECD Territorial Outlook. OECD. https://doi.org/10.1787/9789264189911-en

[3] Orsi, F., Cavaco, C., & Gil, J. (2022). From territorial capital to regional design: A multidimensional model for territorial analysis and scenario evaluation. Planning Practice & Research, 1–20. https://doi.org/10.1080/02697459.2022.2120490

Human Capital (HC) (cultural capital, social capital)	Refers to those advantages that are related to people.	People advantages	demographics societal physical	population skills, population dynamics, identity, values, norms, cultural heritage, religion	Population with higher levels of education, professional skills, over 65+, on working age (15-65),
Infrastructural Capital (IC) (relational capital)	Capacity and connectivity of the transportation infrastructure. Capacity to facilitate mobility of people and goods, and ultimately the exchange of ideas,	Network advantages	networks	capacity, connectivity, hierarchy, accessibility	Infrastructure density, betweenness and centrality at 1-5-10 km.
Natural Capital (NC) (environmental capital, ecological capital)	Advantages that rise from natural resources in the region such as weather, flora, fauna, ecosystems, high supply of a particular raw material	Natural advantages	nature	ecosystem services, biodiversity	Deposits of natural/raw materials, places with great biodiversity value, variety of ecosystems across a region, consistent weather, etc
X Capital	Often a capital might fit in more than one category or in neither at all. In such cases the X category can be used to classify those capitals that have not a clear delimitation	X capital	various	various	

1.2 Methodology

The first step of Task 4.2 involved selecting the policies that would serve as inputs to produce the TCC and the corresponding geographical database necessary for its spatial analysis.

Two to four policies per case study were selected, drawing on the results of WP1 and 3 and through additional desktop research. The main criteria for selection included that (1) measures are place-based (as defined in WP1 and 3), (2) measures are ongoing or upcoming, and (3) measures address the just and sustainable transition in the case study regions. The selected policies vary in scope, ranging from local (municipal) to provincial and regional levels, leading to differences in addressed topics, lengths, and projected timelines.

Each policy underwent analysis at two levels. The first level provided a general overview of the policy's content through a summary and network analysis performed using Atlas.ti software. At this stage, the policies were input into the software, where they were processed using the AI-based summary and intentional coding functions. This initial analysis was crucial to verify and filter out policies that do not fully address the Task 4.2 research scope.

Following this preliminary analysis, a more detailed, manual analysis was conducted. This second level of analysis involved manually (with guidance from the Atlas.ti preselection) extracting TC content from each policy, recording it in an Excel database, and coding it according to an adapted version of the TC framework (as illustrated in Figure 2).

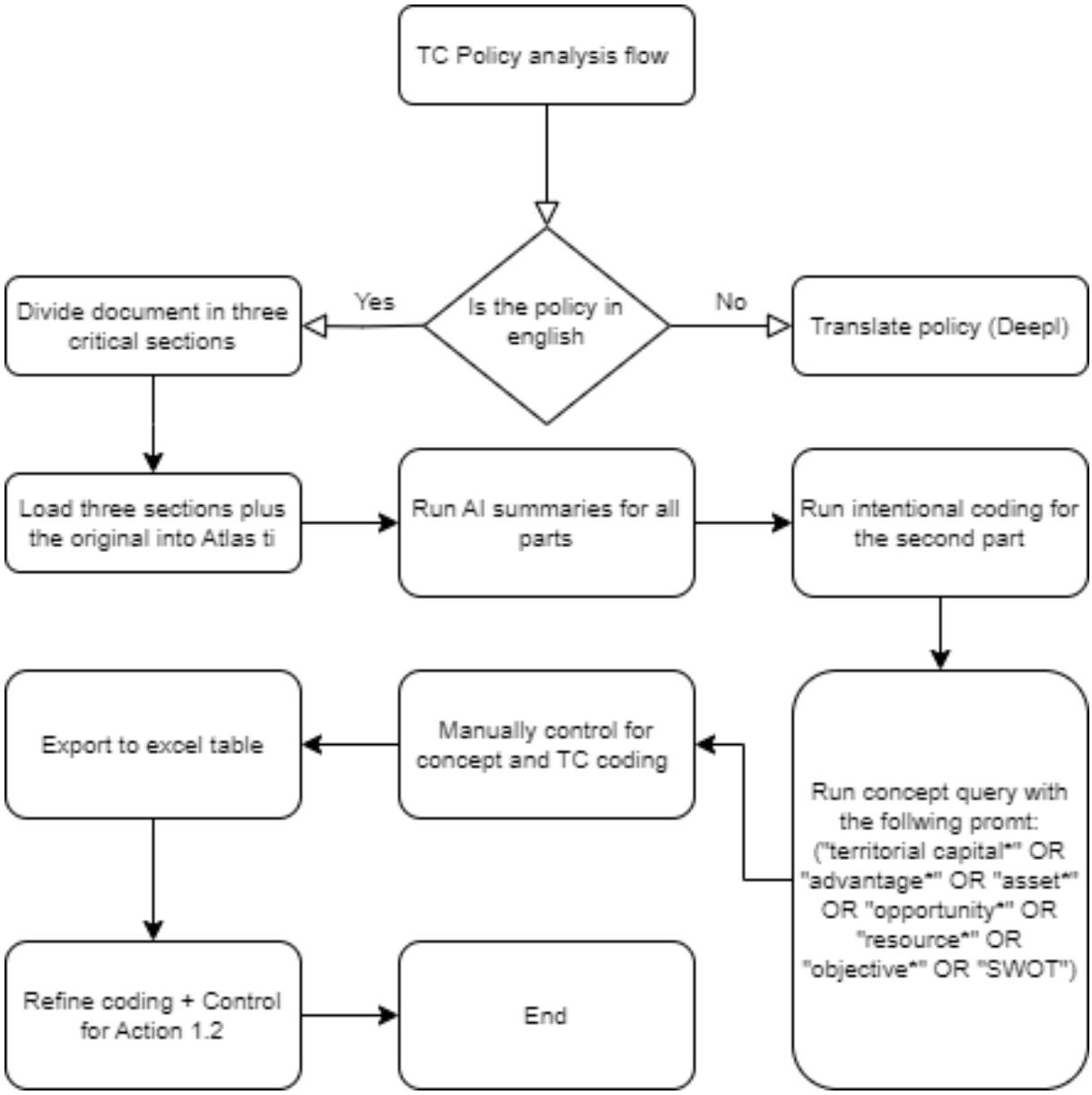
Text from policies containing excerpts of territorial capital was copied verbatim into an Excel table, where it was contrasted with the TC framework. Following this, spatial proxies and indicators were assigned, which served as a roadmap for constructing the GIS database.

In parallel with the TC analysis, DUST partners conducted a similar (though simplified) policy assessment as part of the RFLL Action Plan (Milestone M4), specifically within the Action 1.2 table. The RFLL Action Plan is designed as a template to guide the RFLL experiments conducted in the DUST case study regions. The Action Plan provides a framework for the RFLL case study

teams to analyse and synthesise important knowledge and information gathered from completed tasks in DUST Work Packages (WP) 2, 3, 4, 6, 7, and 8. This data is crucial for preparing and implementing the RFLLs, allowing case study teams to tailor the RFLLs to their regions' unique territorial contexts and specificities. In this context of tailoring to unique territorial conditions, the filled-out Action 1.2 tables complement the TCC.

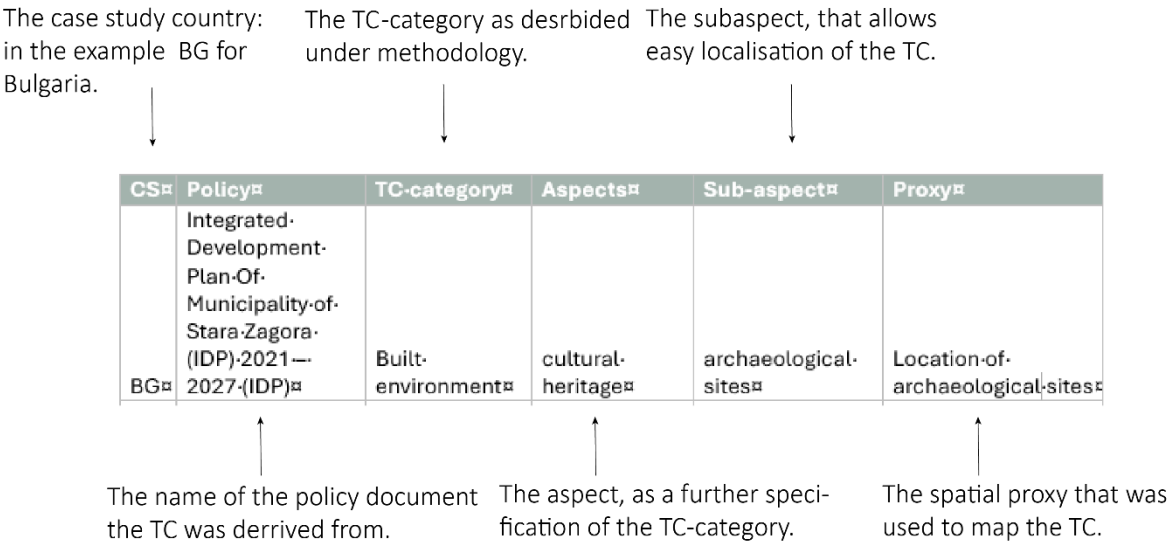
For each partner, the Action 1.2 tables were compared with the TCC in the last step of the analysis. This approach allowed us to capture nuanced, endemic, and context-specific information that only local partners could interpret or connect. This step is also relevant given one of the limitations of our analysis: the necessity to translate policies from their original languages into English for analysis, which can sometimes lead to the loss of content and context. By comparing the TCC with the partners' Action 1.2 inputs, we ensured that the TCC remains as reliable and faithful as possible. These information excerpts were then added to the TCC and categorised similarly to the rest of the policy analyses.

Figure 2 Diagram displaying the analysis processes of territorial capital (TC) in each case study policies.



The TCC is an Excel file consisting of three sheets: (i) the cover page, (ii) the TC Matrix, which collects the steps from the TC category to the spatial proxy for mapping a specific TC, and (iii) the data source sheet, which provides the links to the data source of the spatial proxy. The content of the Matrix sheet is explained in Figure 2

Figure 3: Example of the TCC Matrix sheet and explanations of the columns.



1.1 Next steps: Determining themes for deliberation in the RFLLs

D4.1 is a database representing the policy context of (and policy perspectives on) the RFLLs. The data set (including the TCC) will be used in several actions to prepare interaction in the RFLLs. The most important imminent of these actions concerns defining the thematic scope of deliberation between policymakers and LECs. Because the framing of deliberation is a sensitive issue, several steps have been and will be taken for this purpose.

The first step that has already been accomplished involves creating a thematic cloud to highlight the main TC concepts and their potential connections or conflicts. This process was carried out by the TU Delft's TC leading team, who conducted a heuristic evaluation to broadly quantify the most predominant types of TC within the case-specific TCCs. The themes that emerged from the analysis are presented in Chapter 3 of this report and as thematic clouds or diagrams, illustrating three to five TC themes found in the policies per case study and their potential synergies and conflicts. To guarantee the relevance of themes not only for policymakers but also LECs, these themes will be tested against a community perspective (results of Task 3.2) and media perspective (results of Task 3.3) in a next step. Finally, TU Delft's TC leading team, in collaboration with partners working on Action 1.2 (part of the M4 RFLL Action plan) will discuss the resulting clusters and their interrelationships. The academic and societal case study partners will finally decide upon the RFLL themes to be discussed in the RFLL workshops based on the input and discussions.

2 Outputs

2.1 Case Study Boundaries

The case study boundaries, which are presented in the following tables and figures, are derived, on the one hand, from the territorial boundaries described in the selected policy documents. On the other hand, it was considered that some of the DUST case study regions (for example Norrbotten and Lusatia) have had historically changing geographical extents. To take account of both conditions, we used different municipal and regional statistical unit boundaries to form an outline of the case study boundaries. It is important that those boundaries have to be seen as 'fuzzy' or 'soft' boundaries in the following research process.

Table 2 Case study regions comparative table

Country	Name	Components	Population	Year	Density (ha/km^2)	Size (km^2)
Germany	Lusatia	**Germany:** Saxony: • Görlitz • Bautzen Brandenburg: • Oberspreewald-Lusatia • Spree-Neiße • Elbe-Elster • Dahme-Spreewald • Oder-Spree • Cottbus **Poland:** • Zgorzelec • Lubań • Żary • Żagań • Krosno	1.300.000,00	2021	220,00	13.000,00
Bulgaria	Stara Zagora	**Municipalities:** Bratya Chirpan Gurkovo Galabovo Kazanlak Maglizh Nikolaevo Opan Pavel Banya Radnevo Stara Zagora	291,85	2022	130,00	5.151,10
Sweden	Norrbotten	**Towns:** Lulea 79,244 Piteå 42,362 Grounds 28,048	194,57	2022	7.3	26,67
Poland	Katowice	I. Central District 1. Śródmieście 4. Osiedle Paderewskiego-Muchowiec 12. Koszutka 13. Bogucice II. Northern District 7. Załęże 8. Osiedle Witosa 9. Osiedle Tysiąclecia 10. Dąb 11. Wełnowiec-Józefowiec III. Western District 2. Brynów-Załęska Hałda 5. Brynów-Osiedle Zgrzebnioka	315,000	2021	1.780,00	164.64

		6. Ligota-Panewniki IV. Eastern District 3. Zawodzie 14. Dąbrówka Mała 15. Szopienice-Burowiec 16. Janów-Nikiszowiec 17. Giszowiec V. Southern District 18. Murcki 19. Piotrowice-Ochojec 20. Zarzecze 21. Kostuchna 22. Podlesie				

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Title:
Case study regions comparison

Map code:
TC_01

Author(s):
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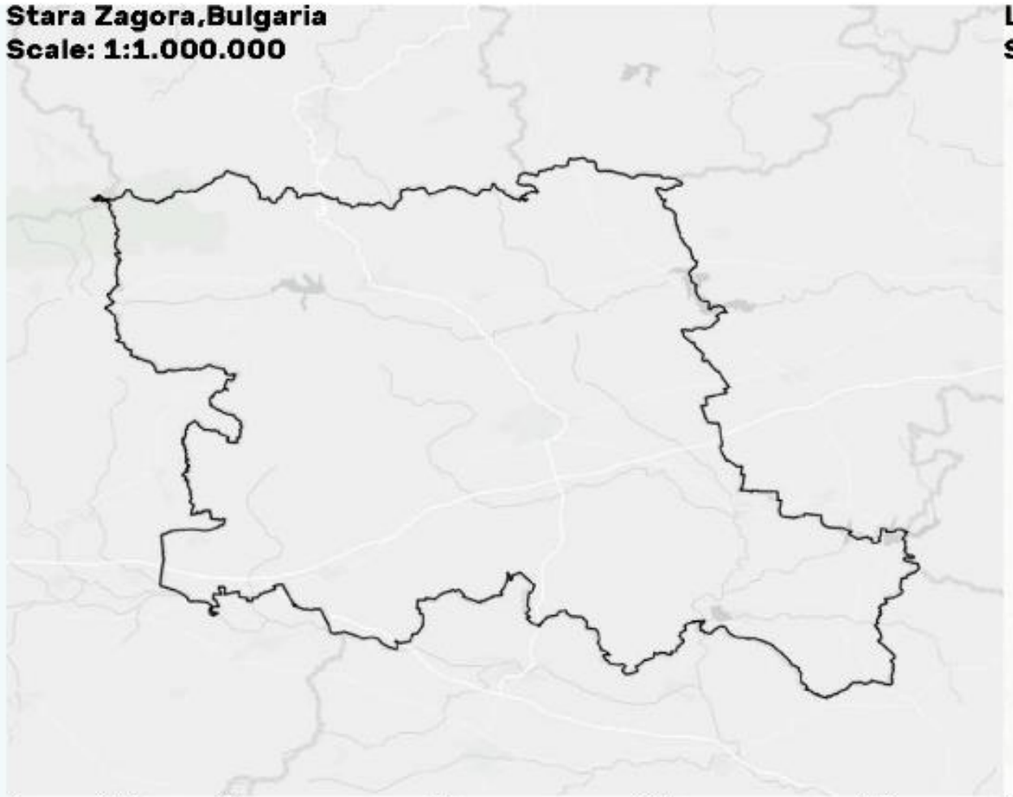
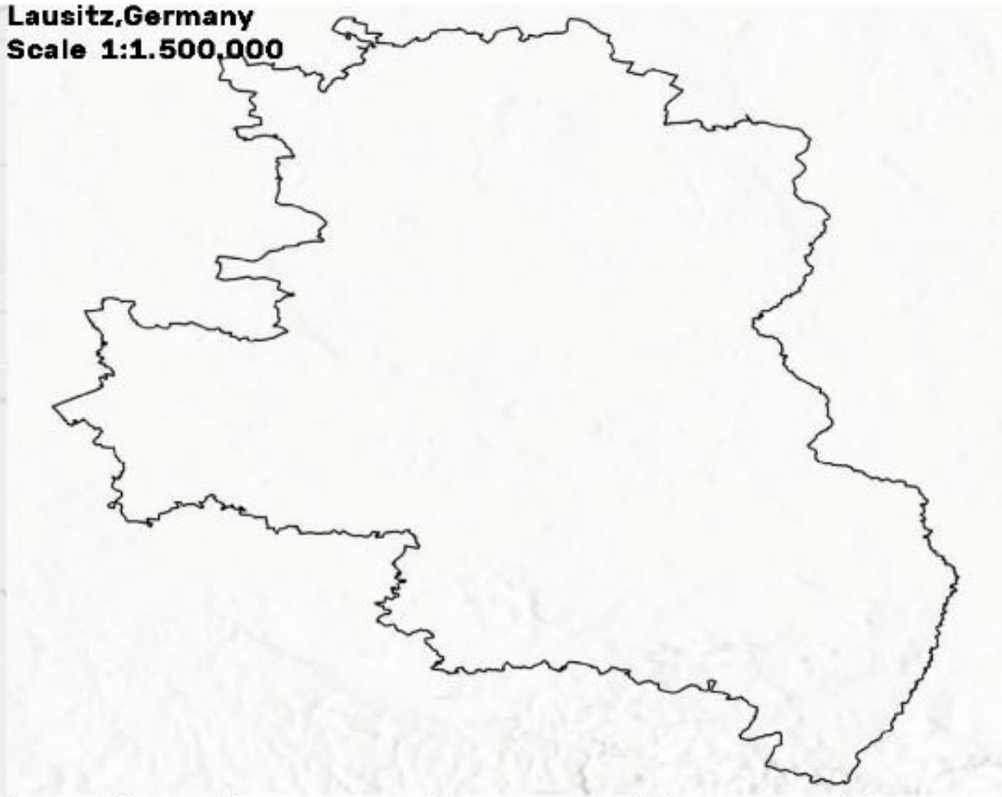
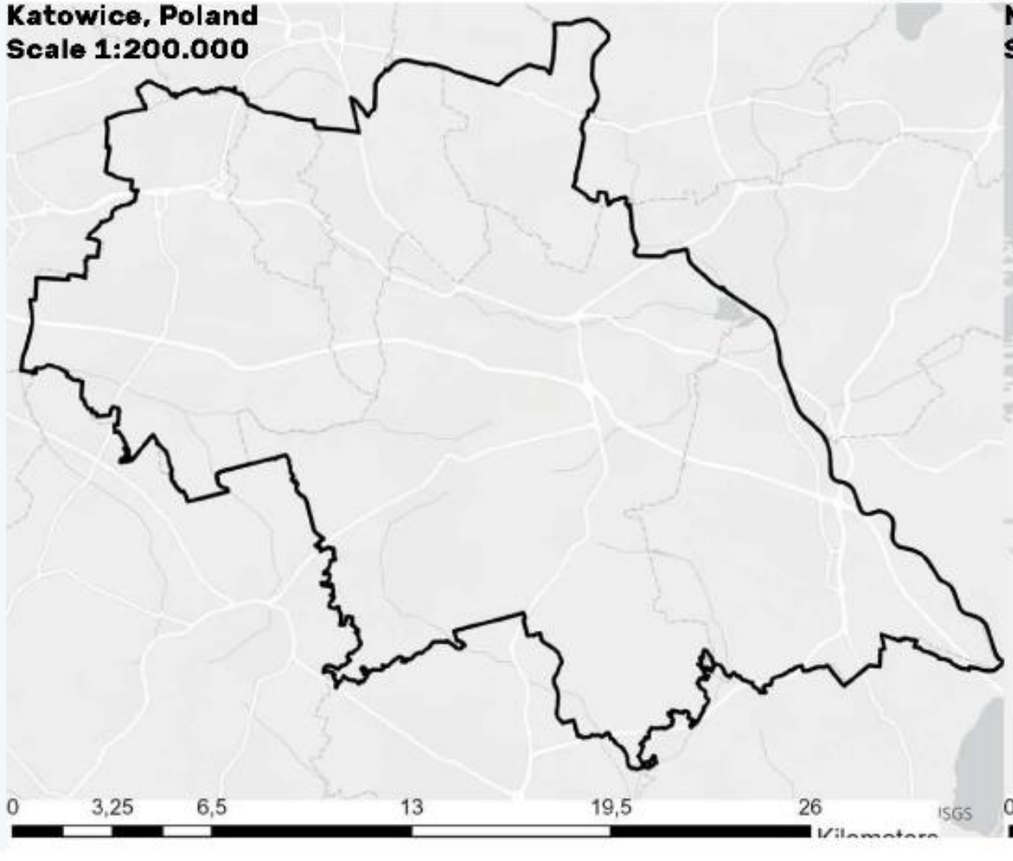
Stara Zagora,Bulgaria
Scale: 1:1.000.000



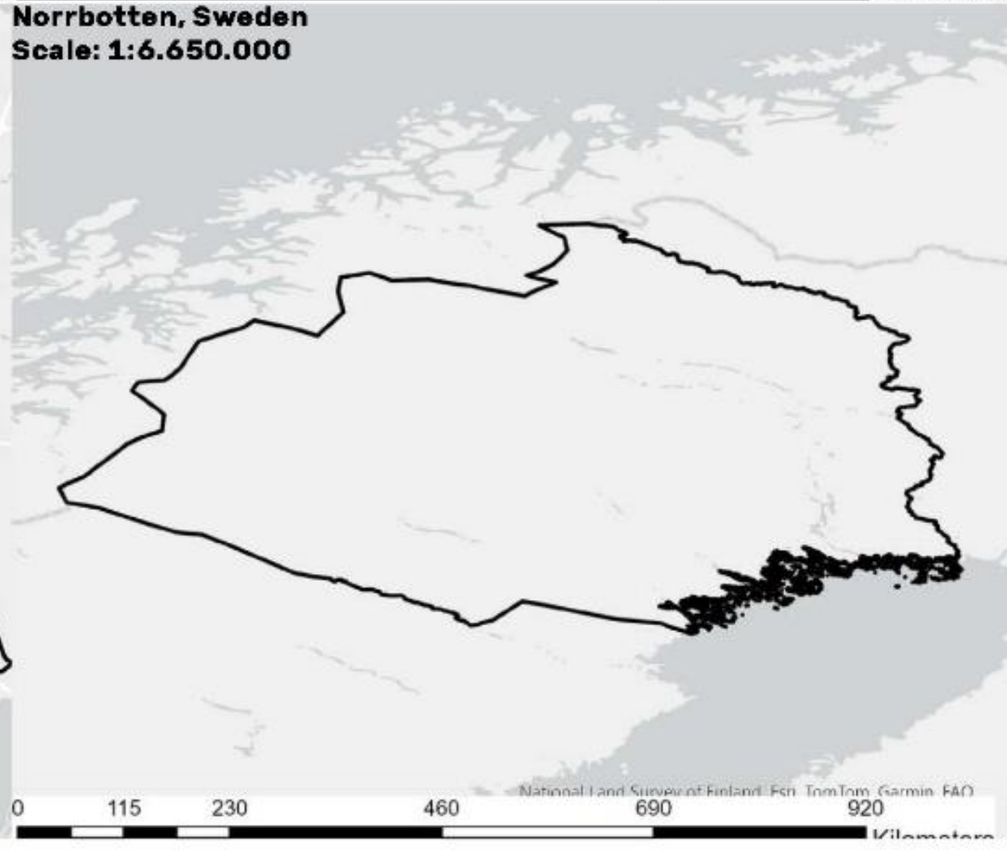
Lausitz,Germany
Scale 1:1.500.000



Katowice, Poland
Scale 1:200.000



Norrbotten, Sweden
Scale: 1:6.650.000



2.2 Territorial Capital Catalogues

2.2.1 Stara Zagora (BG)

2.2.1.1 TCC

Table 3 Territorial capital catalogue for the Stara Zagora case study area.

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Built environment	cultural heritage	archaeological sites	Location of archaeological sites
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Built environment	cultural	sports	Sports facilities
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Built environment	metropolitan form	rurality	OECD urban-rural classification
BG	Territorial Just Transition Plan (TJTP) - Stara Zagora Region	Built environment	energy	renewable energy potential	
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	metropolitan form	monocetricity	Polycentricity index
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	location factor	local taxes	tax rates in different regions
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	industrial	industrial foundations	location of high-tech industries
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	labour market	working income	income per person per household
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	labour market	unemployment	unemployment rates/
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	tourism	tourism infrastructure	restaurants+hotels+ tourist map
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	industrial	manufacturing	locations of manufacturing plants

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Economic	waste and resource management	energy recovery	location of drop places
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Human	cultural	fine arts	Locations that facilitate fine arts/community places that facilitate/
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Human	education	levels of education	# highest level of education
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Human	population	density	The density of the residential population
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Human	population	age composition	Number of people in age classes
BG	Territorial Just Transition Plan (TJTP) - Stara Zagora Region	Human	education	high skilled workforce	#jobs in technical sectors
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	connectivity	railway and motorways	trains stations, highways,
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	education	green economy	education institutions
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	education	education facilities	# universities/school
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	education	vocational education	#
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	resource management	waste management	waste and wastewater treatment facilities
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Infrastructure	transportation system	logistics	areas with the potential to be transformed into logistics hubs
BG	Territorial Just Transition Plan (TJTP) - Stara Zagora Region	Infrastructure	energy	electricity infrastructure	facilities related to energy infrastructures
BG	Territorial Just Transition Plan (TJTP) - Stara Zagora Region	Infrastructure	industrial	energy & clean technology	location of current coal generation

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
BG	Territorial Just Transition Plan (TJTP) - Stara Zagora Region	Infrastructure	energy	clean energy	dedicated/potential areas for the valley
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Natural	health	cultural heritage	locations of baths
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Natural	water resources	groundwater	location of deposits/
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Natural	urban green infrastructure	ecosystem services	Natural areas - landscape diversity
BG	Integrated Development Plan Of Municipality of Stara Zagora (IDP) 2021 – 2027 (IDP)	Natural	cultural heritage	kulturlandschaft/	Natural areas - landscape diversity

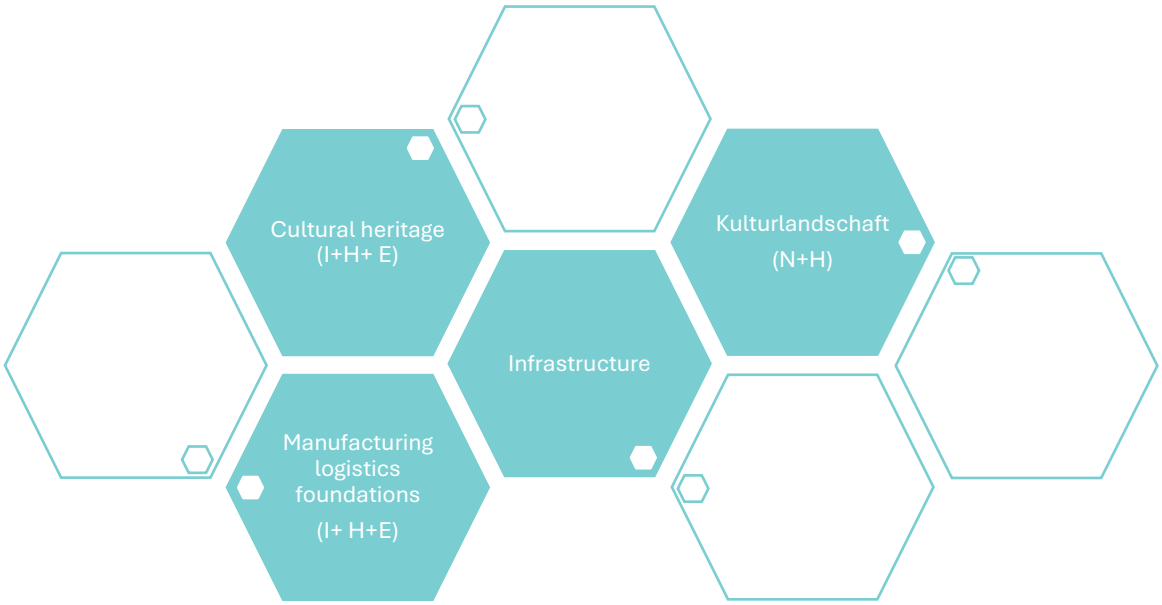
2.2.1.2 Thematic Clouds

In the case of Stara Zagora, we can identify two themes at the intersection of multiple TCs. The first is the aspect of cultural heritage, which includes both built and natural TCs, which provide economic potential mostly for tourism.

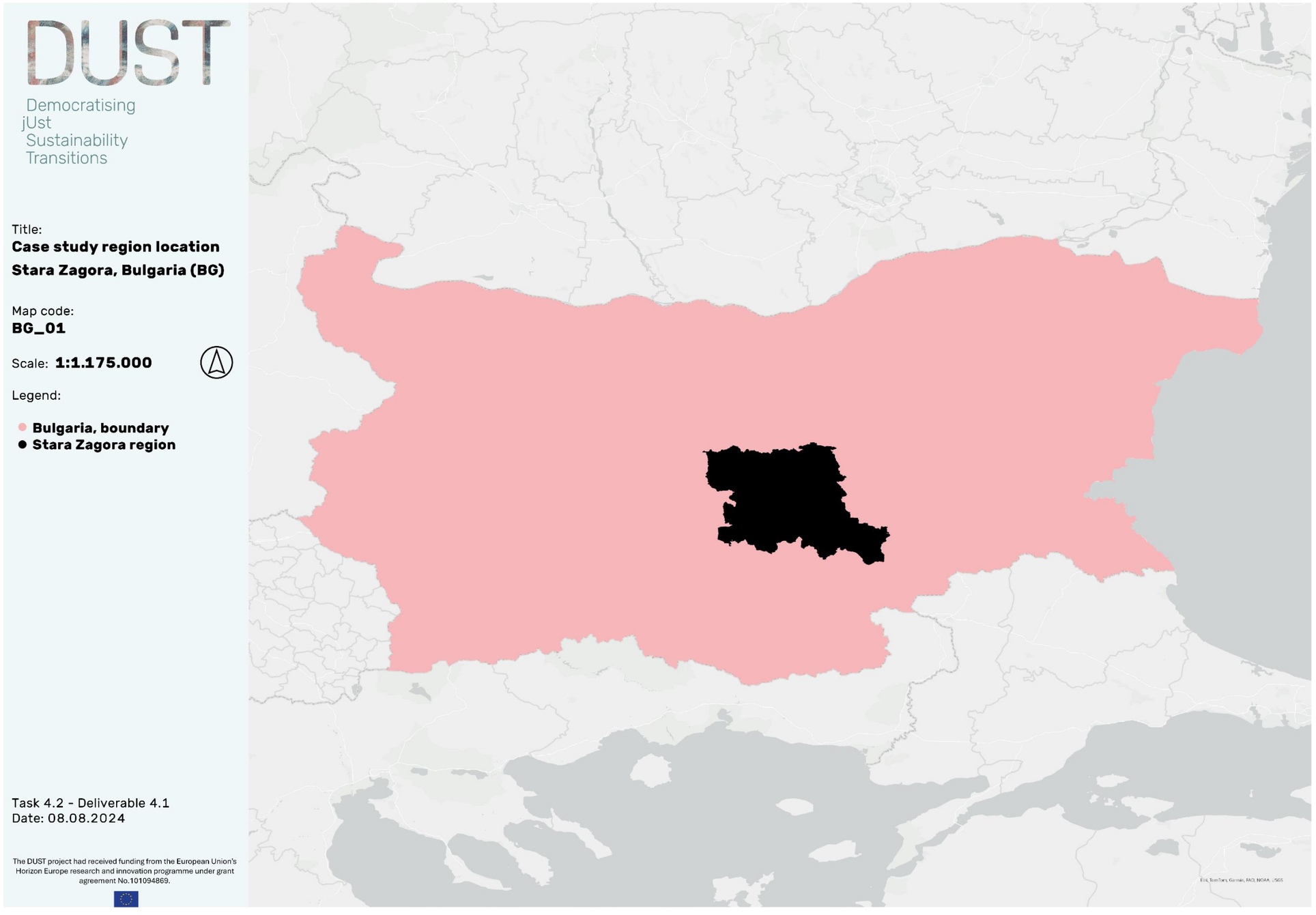
- Cultural heritage (I+H+ E): Archeological sites + Fine arts
- Kulturlandschaft: (N + H): natural areas and springs with well-developed tourism infrastructure.

The second theme combines a strong foundation for a manufacturing-based transition towards a greener economy, which is supported by both physical and relational infrastructure.

- Manufacturing logistics foundations: Large workforce in medium and high tech manufacturing, low local taxes, (E+I +H);
- Infrastructure: educational networks, roads, logistical hubs (i+E+H)


Cultural heritage
(I+H+ E)
Kulturlandschaft
(N+H)
Infrastructure
Manufacturing
logistics
foundations
(I+ H+E)

2.2.1.3 GIS mapping



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Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_02

Scale: **1: 225,000**

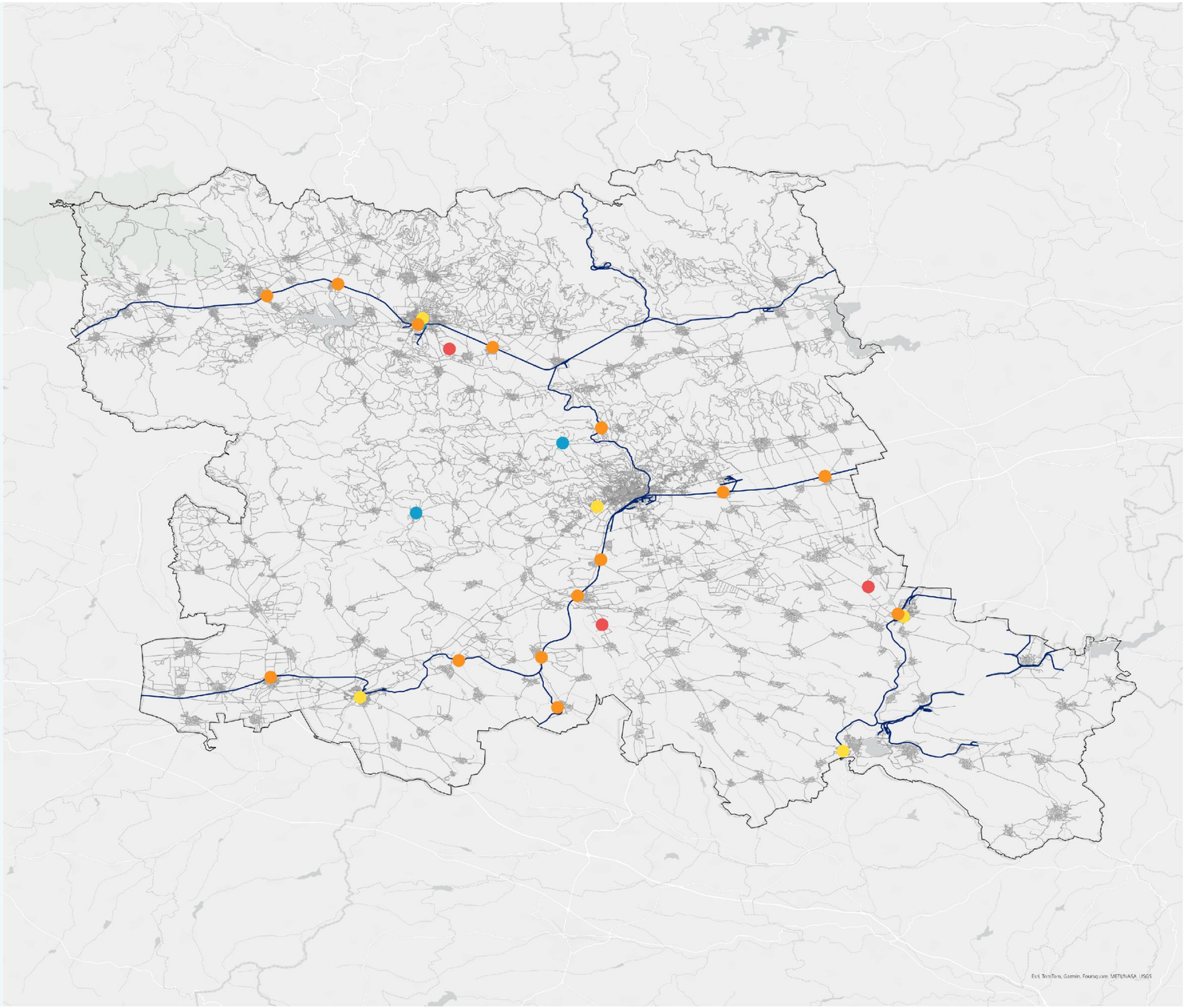
Legend:

Transport infrastructure

- **Airports**
- **Bus stations**
- **Taxi**
- **Railway station**

- **Railways**
- **Roads**

- **Stara Zagora outline**



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Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_03

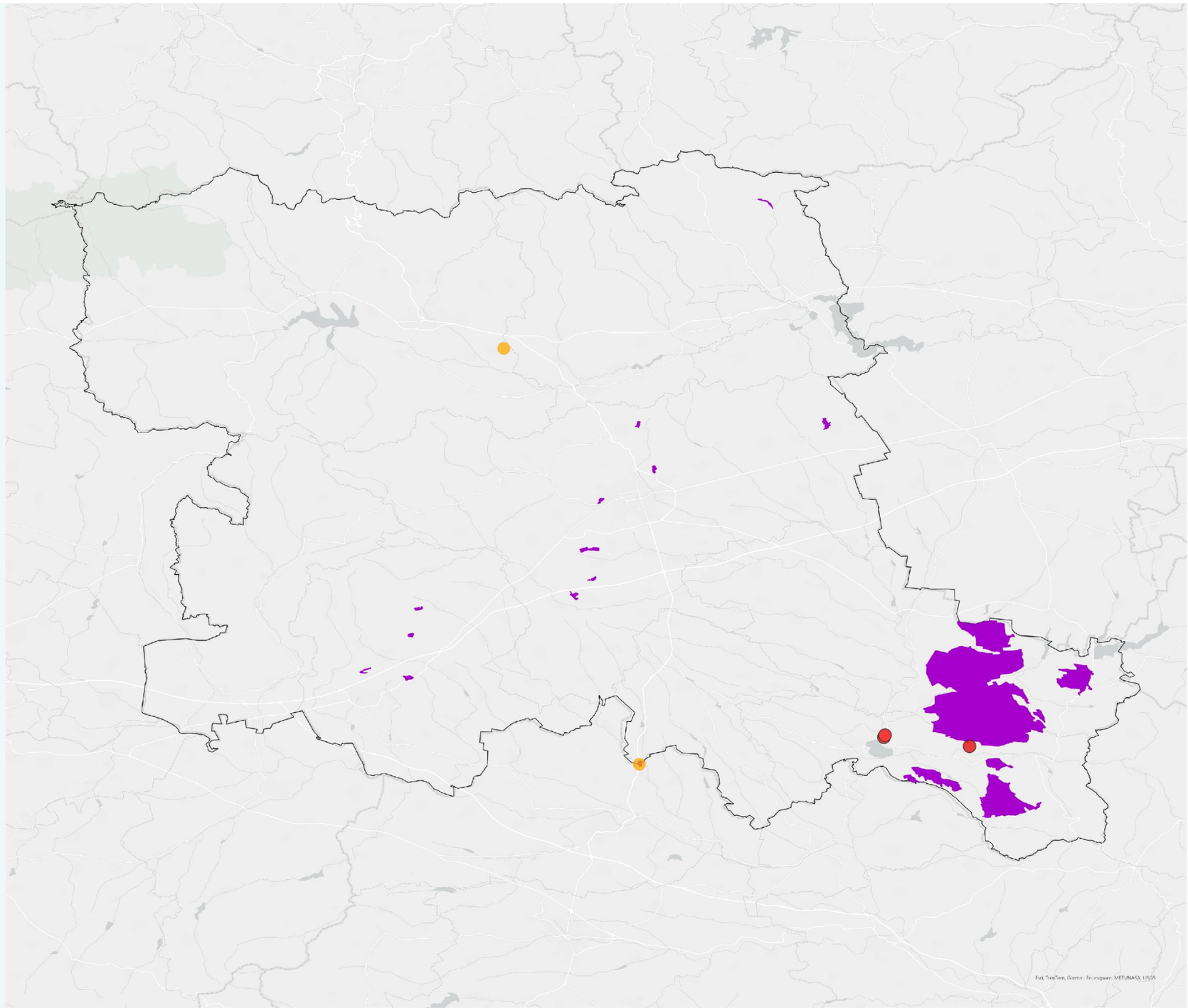
Scale: **1: 225,000**

Legend:

Energy plants and extraction areas (CLC)

- **Solar (42)**
- **Coal (4)**

- **Extraction sites (CLC 131)**
- **Stara Zagora outline**



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Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_04

Scale: **1: 225,000**

Legend:

Kulturlandschaft from CLC

- **131. Mineral extraction site**
- **242. Complex cultivation patterns**
- **311. Broad-leaved forest**
- **312. Coniferous forest**
- **313. Mixed forest**
- **321. Natural grasslands**
- **324. Transitional woodland-shrub**
- **411. Inland marshes**

Stara Zagora outline

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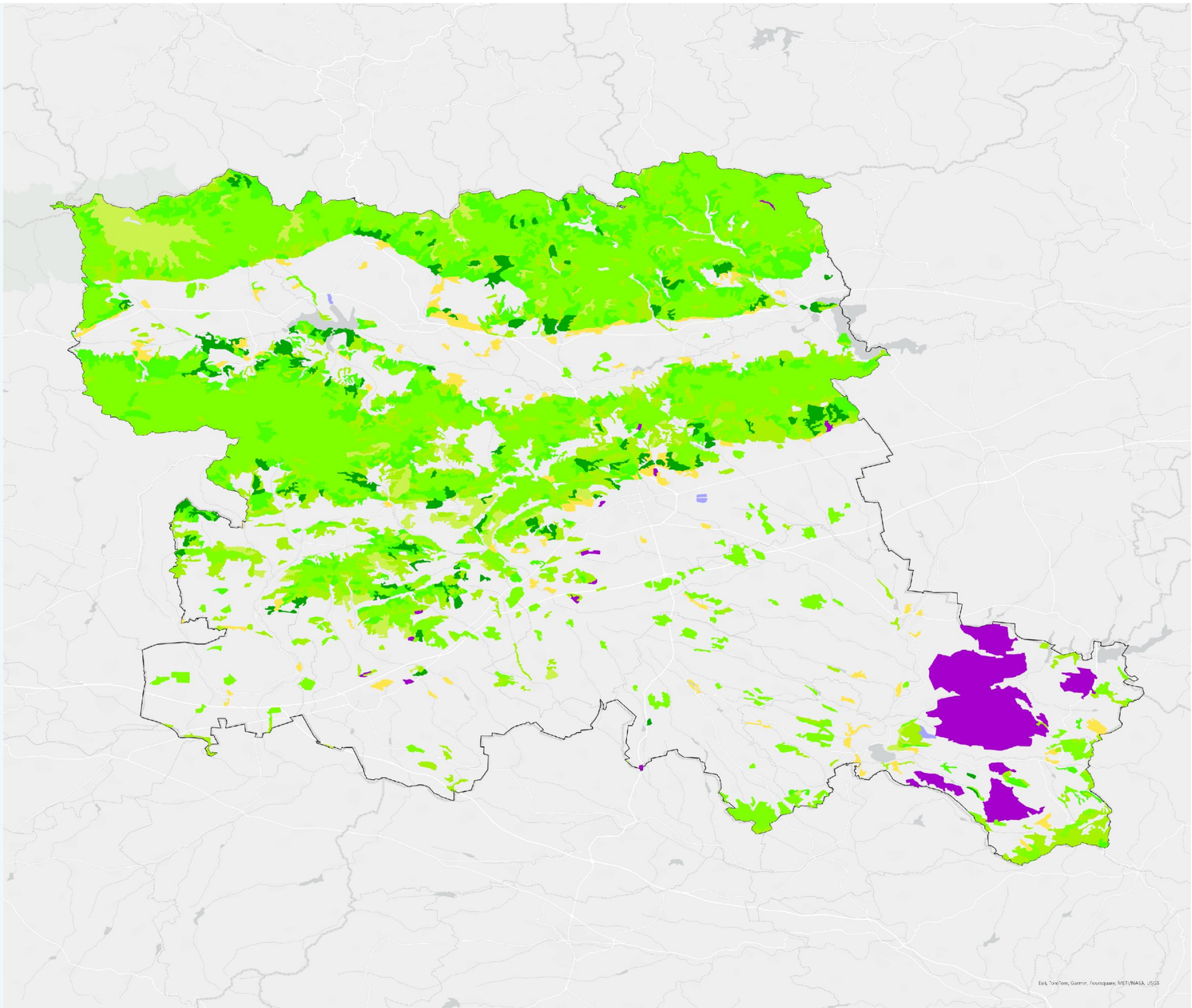

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Transitions

Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_05

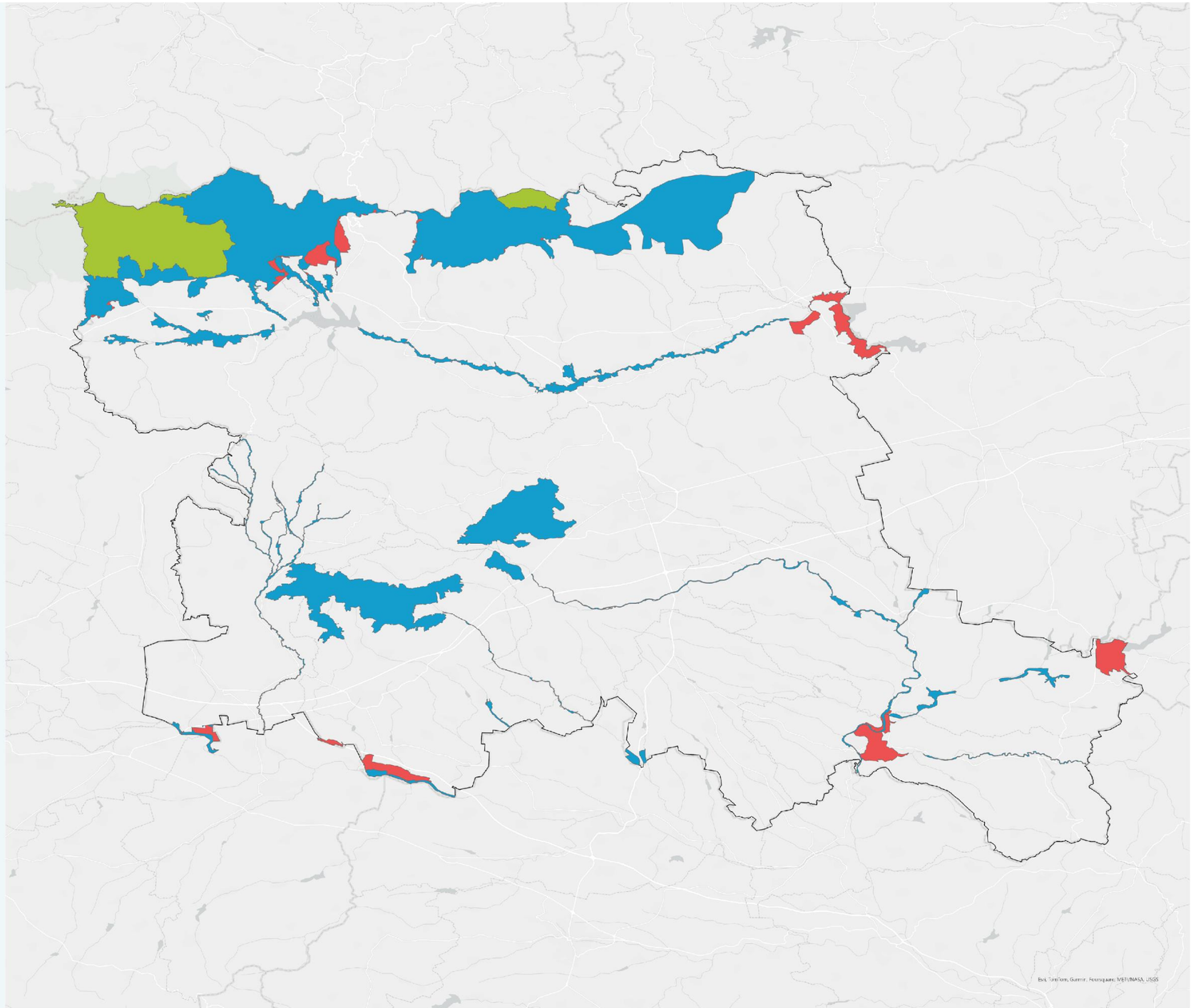
Scale: **1: 225,000**

Legend:

Biodiversity - NATURA 2000

A: designated under the Birds directive
B: designated under the Habitats directive
C: Both

Stara Zagora outline



The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.

DUST

Democratising
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Sustainability
Transitions

Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_06

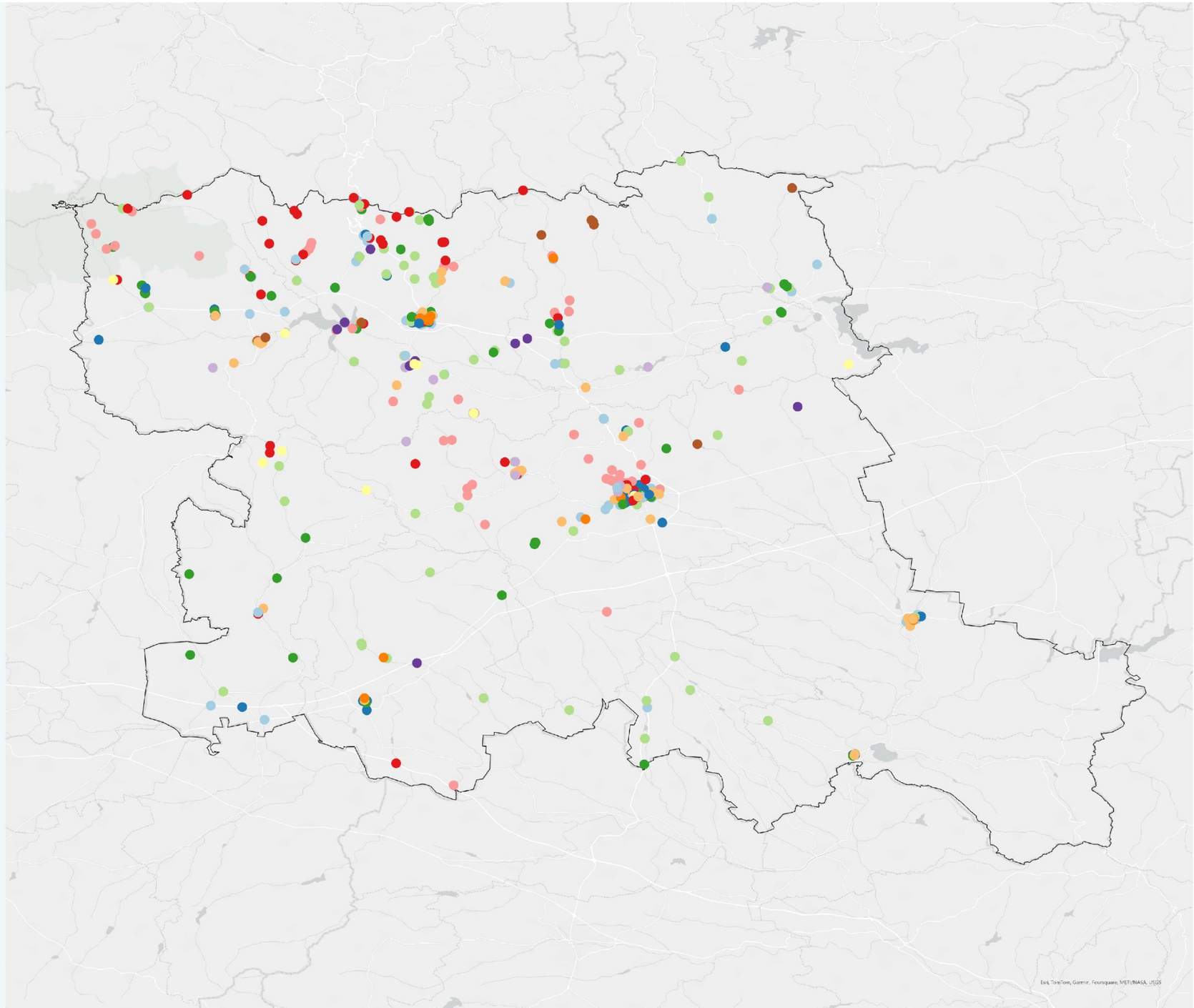
Scale: **1: 225,000**

Legend:

Points of intrest - HORECA
- **Restaurant (126)**
- **Cafe (97)**
- **Memorial (79)**
- **Monument (61)**
- **Viewpoint (55)**
- **Tourist info (42)**
- **Hotel (40)**
- **Museum (14)**
- **Attraction (13)**
- **Archeological site (12)**
- **Ruins (10)**
- **Chalet (8)**
- **Pub (7)**
- **Guest house (5)**
- **Castle (3)**
- **Theater (2)**
- **Observation tower (2)**
- **Hostel (2)**
- **Cinema (2)**
- **Wayside cross (1)**
- **Zoo (1)**

Stara Zagora outline

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Stara Zagora, Bulgaria (BG)

Map code:
BG_07

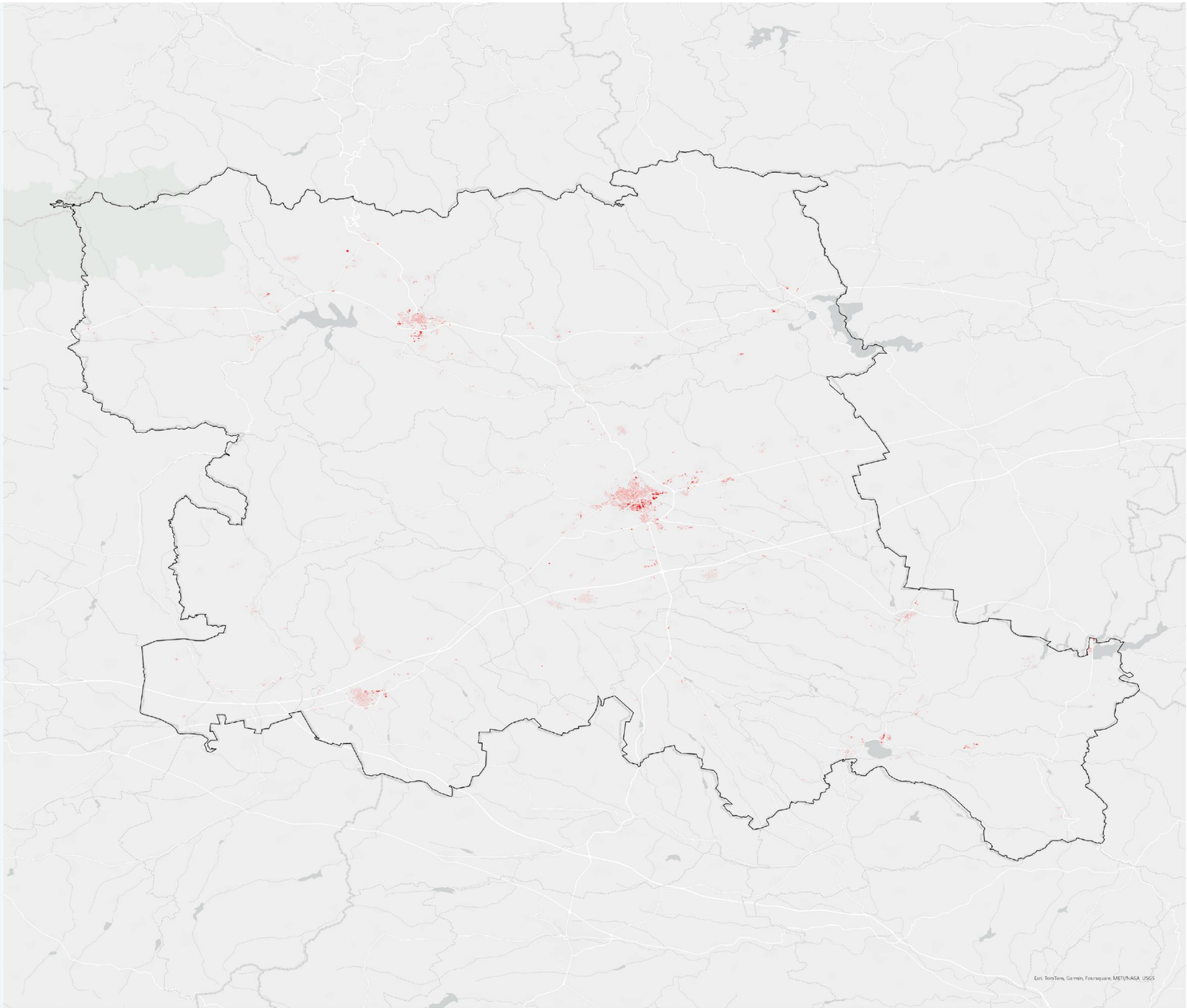
Scale: **1: 225,000**

Legend:

Policentricity

Buildings footprint

Stara Zagora outline



The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.

2.2.2 Lusatia (DE)

2.2.2.1 TCC

Table 4 Territorial capital catalogue for the Lusatia case study area.

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
DE	Lausitzprogramm 2038 and TJTP	Built environment	countryside	space (vastness)	All districts in the region, including the city of Cottbus as the regional center, are classified as rural (ländlich)
DE	Lausitzprogramm 2038 and TJTP	Built environment	post-mining areas	regeneration	Decommissioned open-cast mines being recultivated and reused
DE	Lausitzprogramm 2038 and TJTP	Built environment	attractiveness	small town living/ attraktive dörfer und städte	Quality of life - with beautified and renovated towns, a modern infrastructure
DE	Lausitzprogramm 2038 and TJTP	Built environment	prosperity	policentricity	Spatial planning policy is directed at creating central locations (anchor towns) to offer a concentrated variety of services (trade, medicine, postal services) to dispersed small communities.
DE	Lausitzprogramm 2038 and TJTP	Built environment	cultural heritage	kulturlandschaft/	Lusatia's cultural landscape – including monuments of industrial culture, Branitz Foundation, the Cottbus State Theatre, the Brandenburg State Museum of Modern Art etc
DE	Lausitzprogramm 2038 and TJTP	Built environment	cultural heritage	kulturlandschaft/	The Lusatian cultural landscape is characterized by numerous smaller and few nationally known places and events. d
DE	Lausitzprogramm 2038 and TJTP	Economic	diversity of activities	sme manufacturing	Presence of smaller industrial, commercial, and craft employers in the region.
DE	Lausitzprogramm 2038 and TJTP	Economic	connectivity	logistics	Links in the service sector in the areas of logistics and mobility.
DE	Lausitzprogramm 2038 and TJTP	Economic	sectoral diversity	industrial foundations	Strong industrial economy
DE	Lausitzprogramm 2038 and TJTP	Economic	rural development	collaboration	Established development approaches in rural areas
DE	Lausitzprogramm 2038 and TJTP	Economic	health	youth opportunities	The healthcare sector is the fastest-growing industry in Lusatia
DE	Lausitzprogramm 2038 and TJTP	Economic	fishing	aquaculture	Strong aquaculture and fish farming industry
DE	Lausitzprogramm 2038 and TJTP	Economic	tourism	landscape based tourism	Important tourism destinations
DE	Lausitzprogramm 2038 and TJTP	Human	green growth	transferable skills (green)	High-skilled people - energy technology systems and processes
DE	Lausitzprogramm 2038 and TJTP	Human	social cohesion	community	initiatives, social partners, clubs, and associations
DE	Lausitzprogramm 2038 and TJTP	Human	social cohesion	adaptability	Resilient society - proactive attitude toward change
DE	Lausitzprogramm 2038 and TJTP	Human	cultural	identity	Local pride- (old) energy supply and phase-out of coal
DE	Lausitzprogramm 2038 and TJTP	Human	cultural heritage	ethnical	The Sorbian/Wendish way of life - cultural identity
DE	Lausitzprogramm 2038 and TJTP	Human	cultural	initiatives	Valuable cultural initiatives (that lack visibility). F.g. The Lausitz Cultural Plan and the cross-border Lausitz Festival

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
DE	Lausitzprogramm 2038 and TJTP	Human	cultural heritage	crossborder	Linguistic and cultural proximity of the Sorbian people to the Czech Republic and Poland
DE	Lausitzprogramm 2038 and TJTP	Human	cultural heritage	crossborder	Lusatia has always been at the convergence of European developments.
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	industrial	energy & transport	Good foundations for new industrial jobs: railway+chemical+power plant
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	education	r+d+i	strong and wide-ranging research and teaching infrastructure (technical, humanities, social sciences)
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	education	energy	Attractive training locations in energy
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	digital infrastructure	piloting projects	Vast ongoing digital initiatives
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	temporary working facilities	co-working	Co-working spaces and networking
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	education	vocational education	Attractive school centres for vocational training
DE	Lausitzprogramm 2038 and TJTP	Infrastructure	geographical position	regional connectivity	Lusatia is supra-regionally well located between the economically dynamic areas of Berlin, Wroclaw, Dresden, and Leipzig.
DE	Lausitzprogramm 2038 and TJTP	Natural	landscape	kulturlandschaft/	Rural areas as an extension of natural areas
DE	Lausitzprogramm 2038 and TJTP	Natural	biodiversity	ecosystem services	Natural areas - landscape diversity
DE	Lausitzprogramm 2038 and TJTP	Natural	biodiversity	conservation	Conservation investment for natural areas
DE	Lausitzprogramm 2038 and TJTP	Natural	biodiversity	ecological corridors	Biotope network corridor (Lusatian forest)

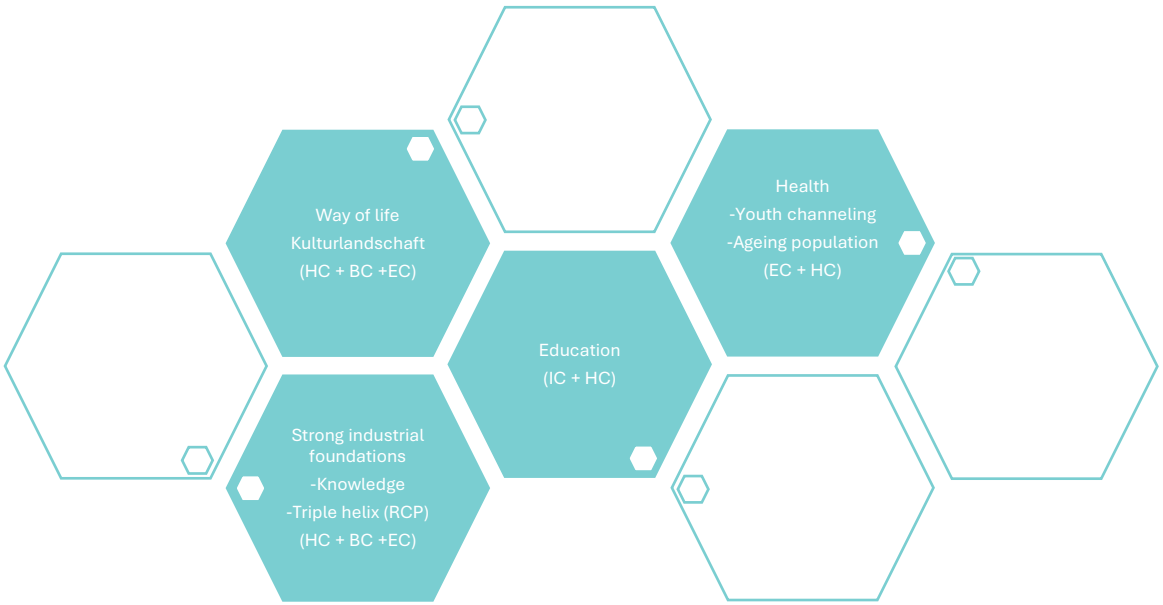
2.2.2.2 Thematic clouds

The Lusatian TCC showed that the region possesses strong industrial foundations in (traditional) energy, chemical, logistic, and (modern) health sectors, which are assets in the just sustainable transition. In what follows, we elaborate on the identified thematic clusters and their potential connections.

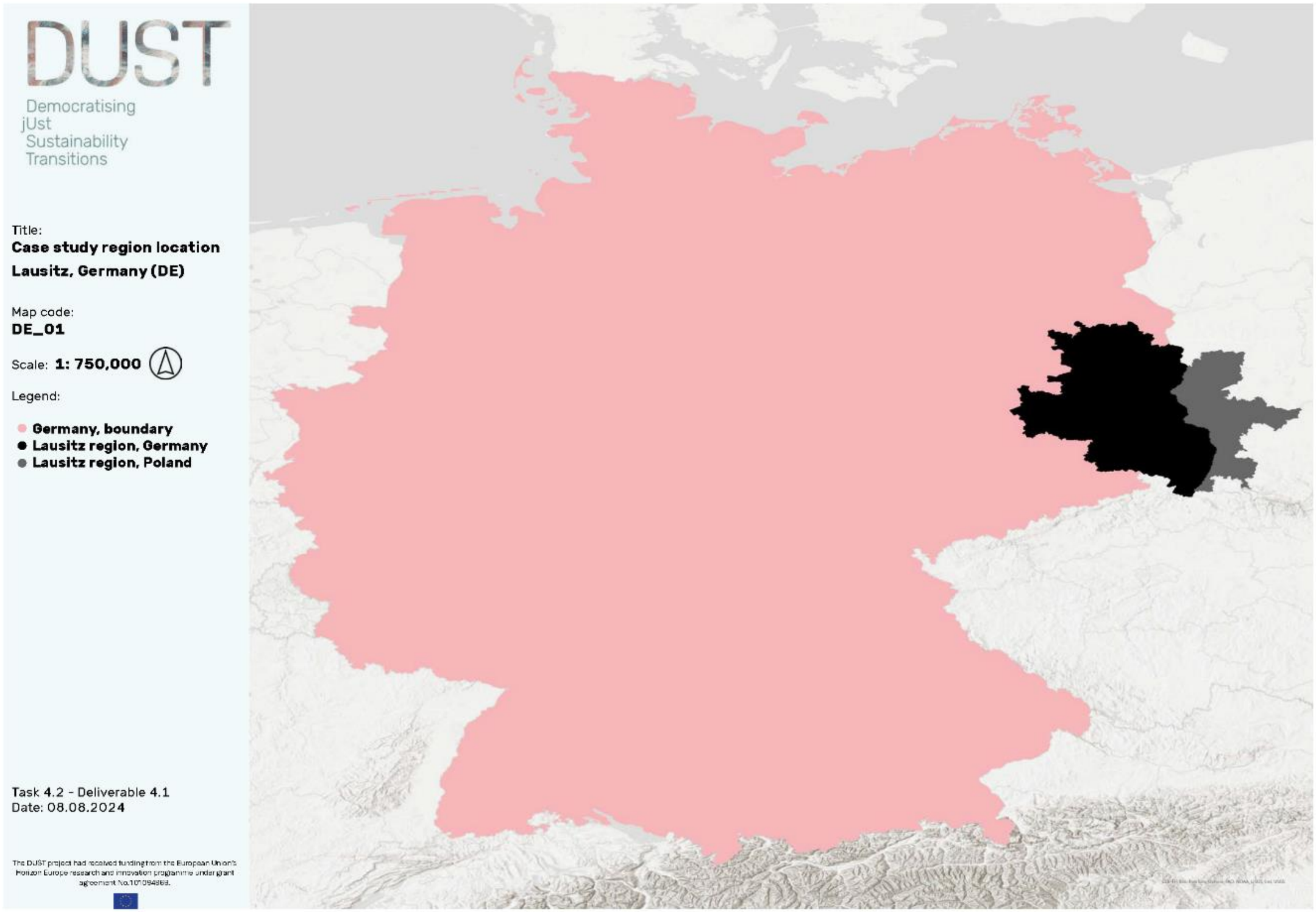
- Economic capital: high diversity of SMEs in manufacturing.
- Infrastructure and Built environment capital: infrastructure, rail, land availability, former mines
- Human capital: knowledge of how to produce things
- Human capital: The health sector is the strongest growing sector
- Infrastructure capital: Education in the sense of a network of educational institutions, building upon existing ones, is crucial for the transition.

Another thematic aspect that reoccurred is a specific way of life, perhaps best described as "Countryside living." This is not a rural lifestyle but a way of life in a polycentric settlement structure with high cultural and natural landscape values.

- Settlement capital: settlement structure that provides countryside living.
- Built Environment capital: The role of the mining areas, landscape and settlement, logistic infrastructure, and railways.
- Economic Capital for fishing and landscape-based tourism.
- Human capital: strong cohesion based on many clubs and associations
- (Human Capital: cross border cultural heritage based on Sorbian minority)



2.2.2.3 GIS mapping



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_02

Scale: **1: 350,000**

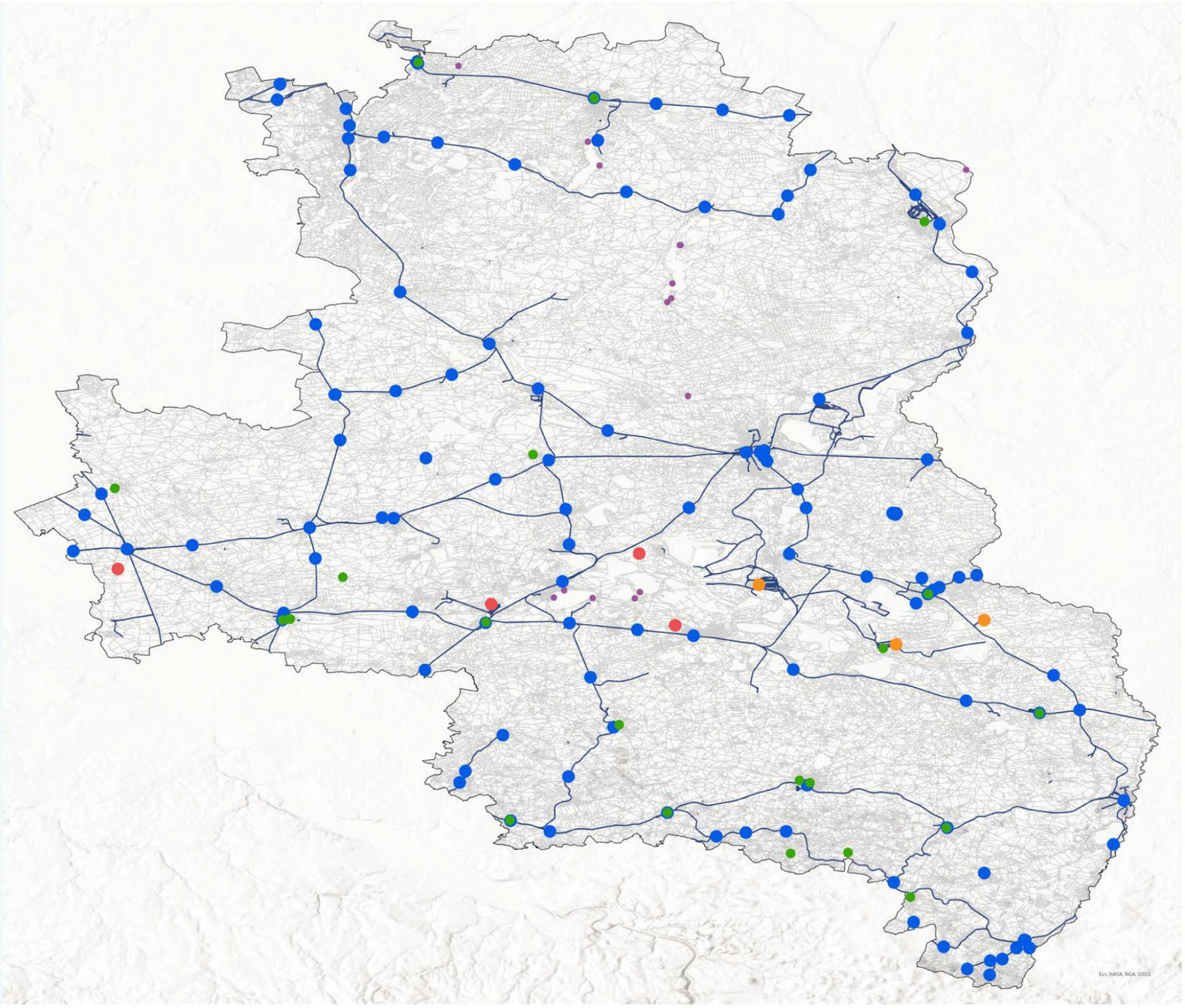
Legend:

Transport infrastructure

- **Airports**
- **Helipad**
- **Railway stations**
- **Bus stations**
- **Ferry terminal**

- **Railways**
- **Roads**

- **Lausitz region outline**



Task 4.2 - Deliverable 4.1
Date: 08.08.2024

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.

DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_03

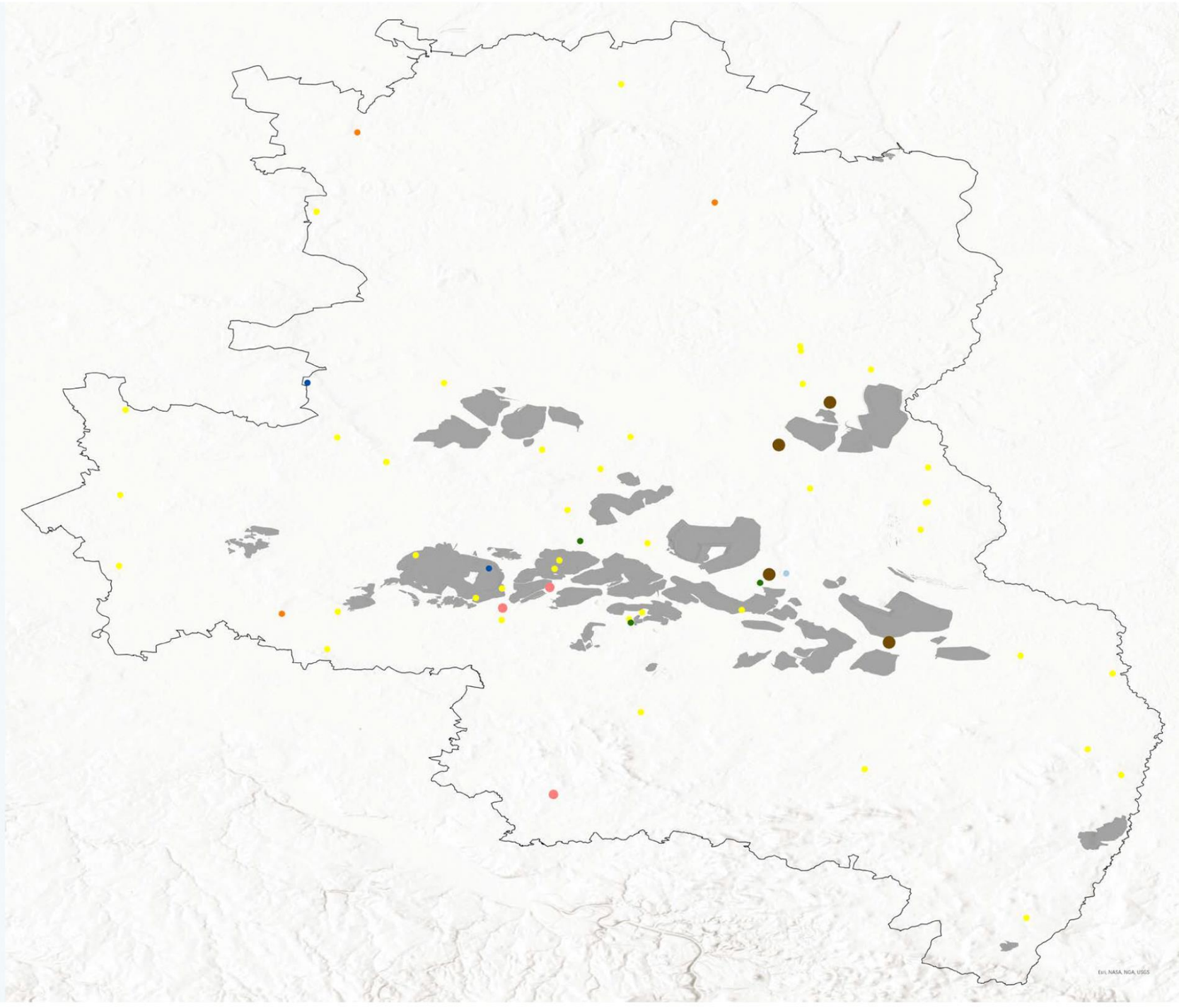
Scale: **1: 350,000**

Legend:

Power plants and mining sites

- **Solar (42)**
- **Coal (4)**
- **Waste (3)**
- **Biomass (3)**
- **Gas (3)**
- **Wind (2)**
- **Hydro (1)**

Mine sites
Lausitz region outline



Task 4.2 - Deliverable 4.1
Date: 08.08.2024

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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location Lausitz, Germany (DE)

Map code:
DE_04

Scale: **1: 350,000**

Legend:

Kulturlandschaft from CLC

- **131. Mineral extraction site**
- **242. Complex cultivation patterns**
- **311. Broad-leaved forest**
- **312. Coniferous forest**
- **313. Mixed forest**
- **321. Natural grasslands**
- **322. Moors and heathland**
- **324. Transitional woodland-shrub**
- **411. Inland marshes**
- **412. Peat bogs**

- **Lausitz region outline**

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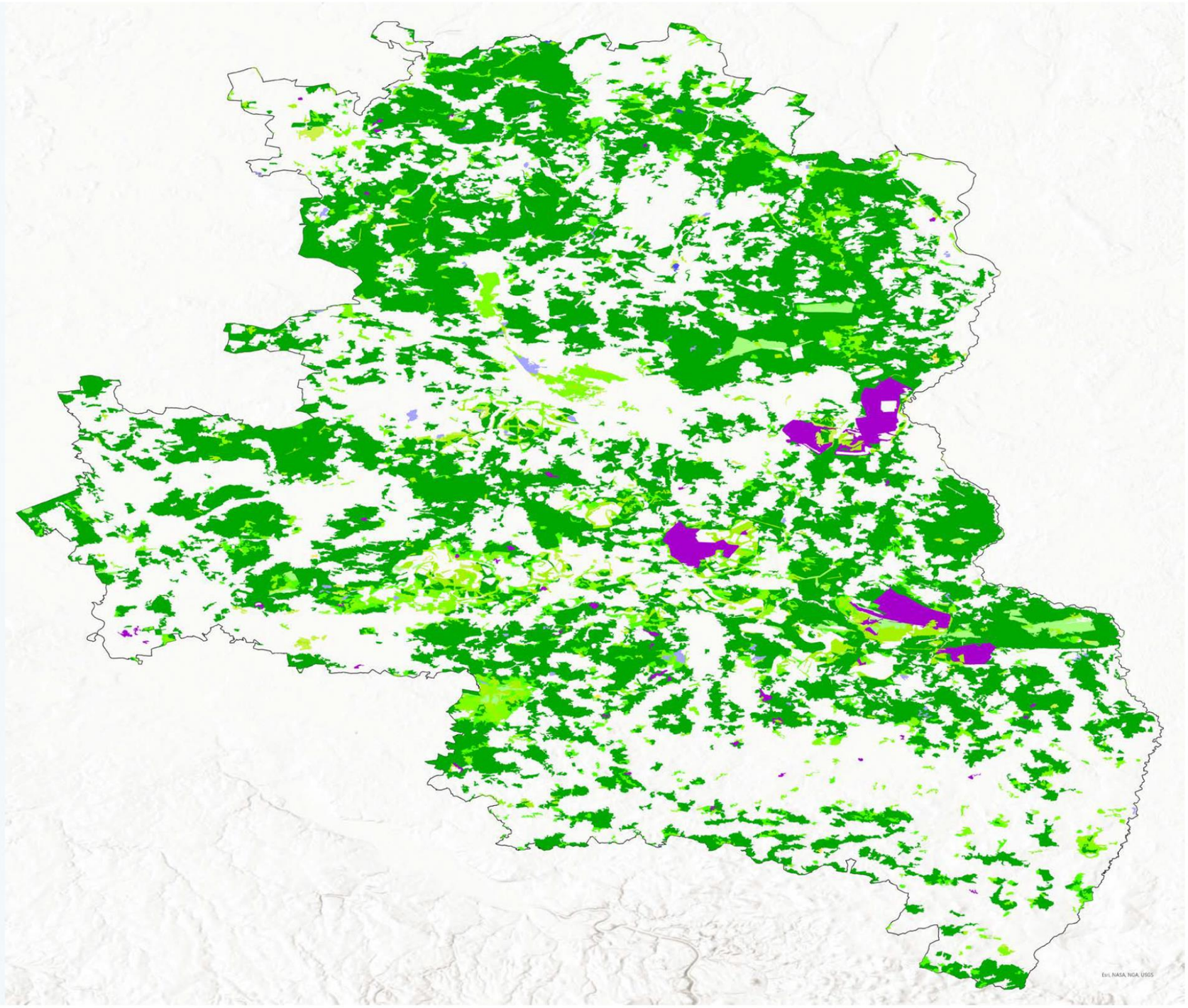


DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location Lausitz, Germany (DE)

Map code:
DE_05

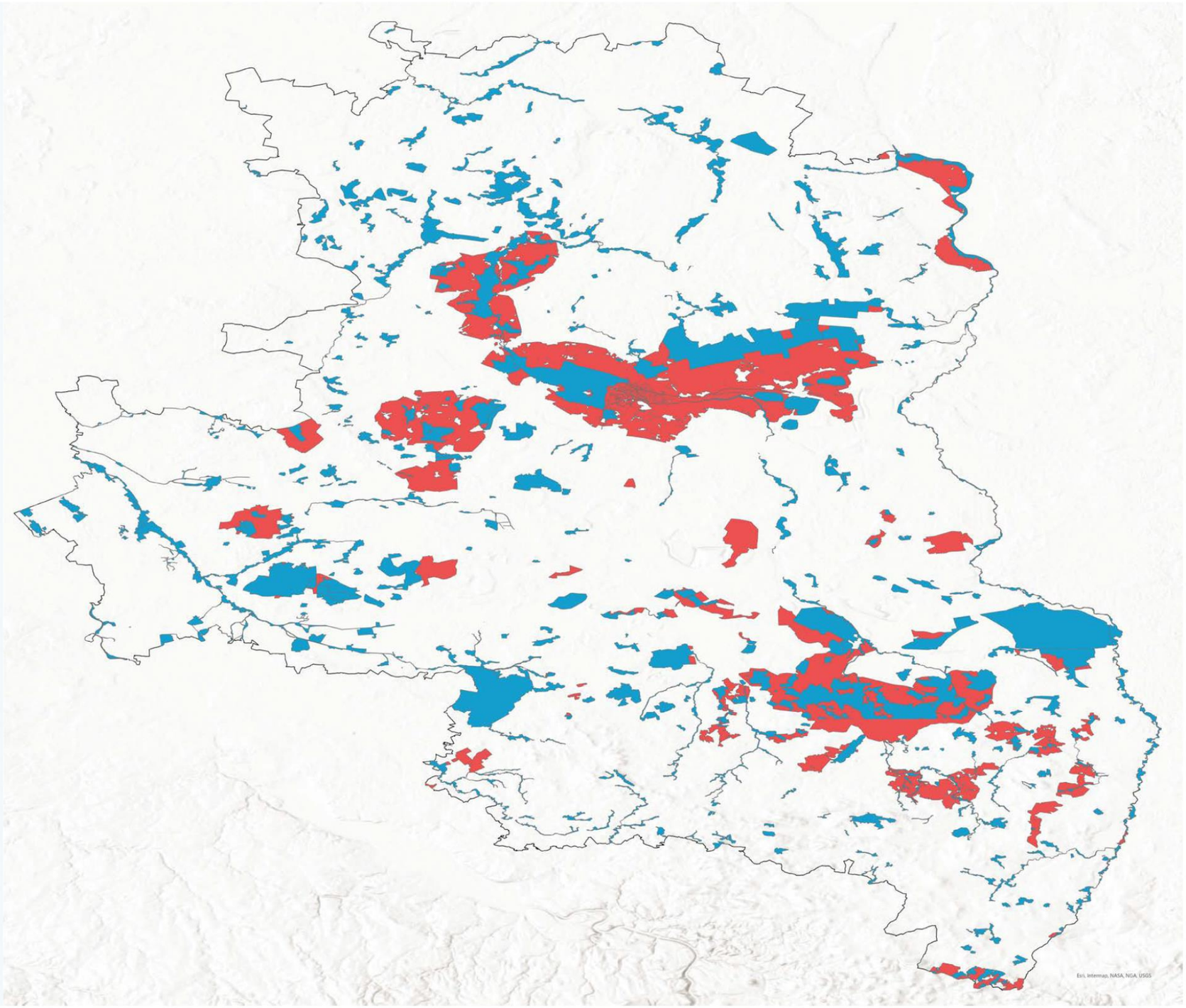
Scale: **1: 350,000**

Legend:

Biodiversity - NATURA 2000

A: designated under the Birds directive
B: designated under the Habitats directive

Lausitz region outline



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_06

Scale: **1: 350,000**

Legend:

Policentricity

Buildings footprint

Lausitz region outline

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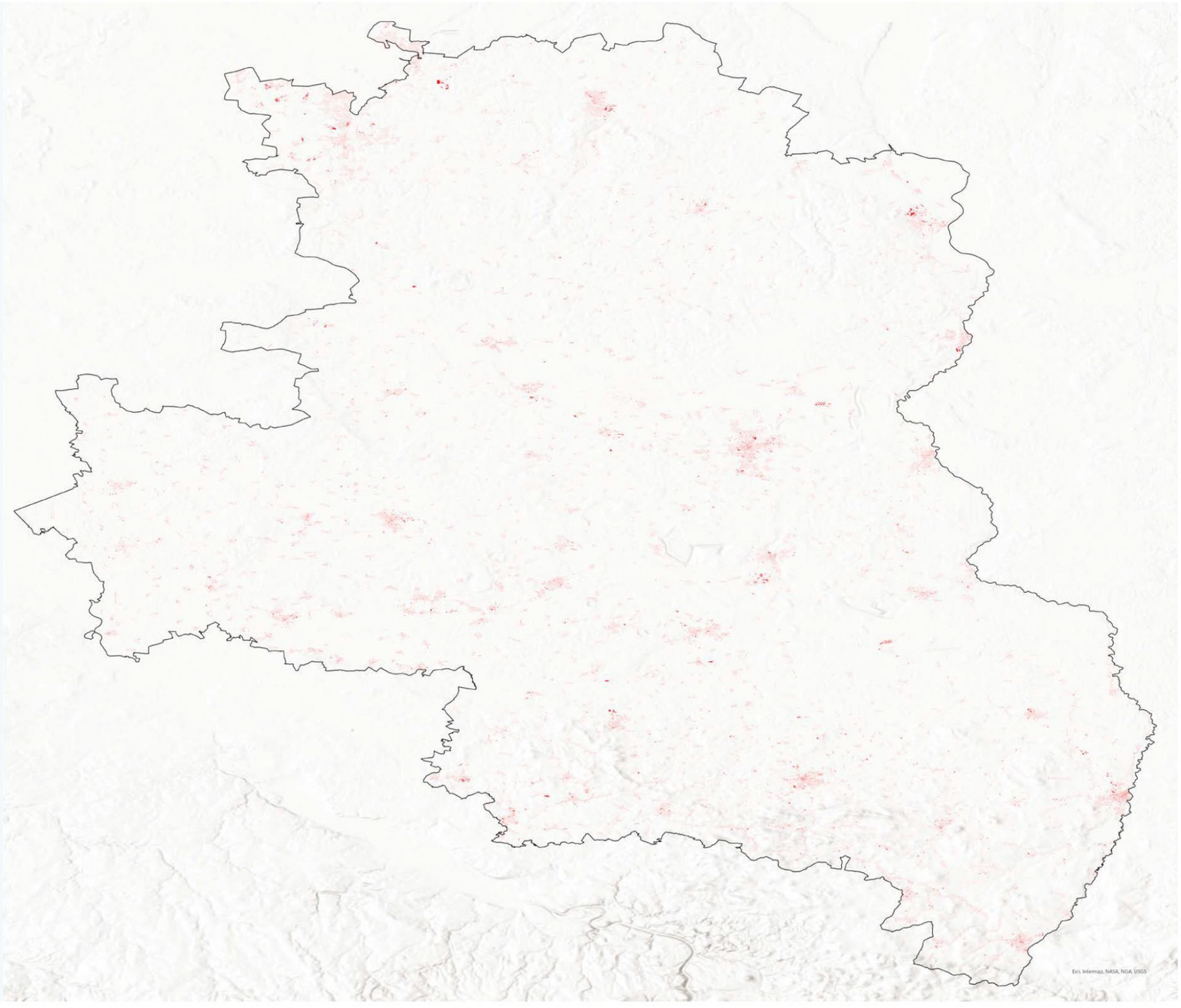


DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_06

Scale: **1: 350,000**

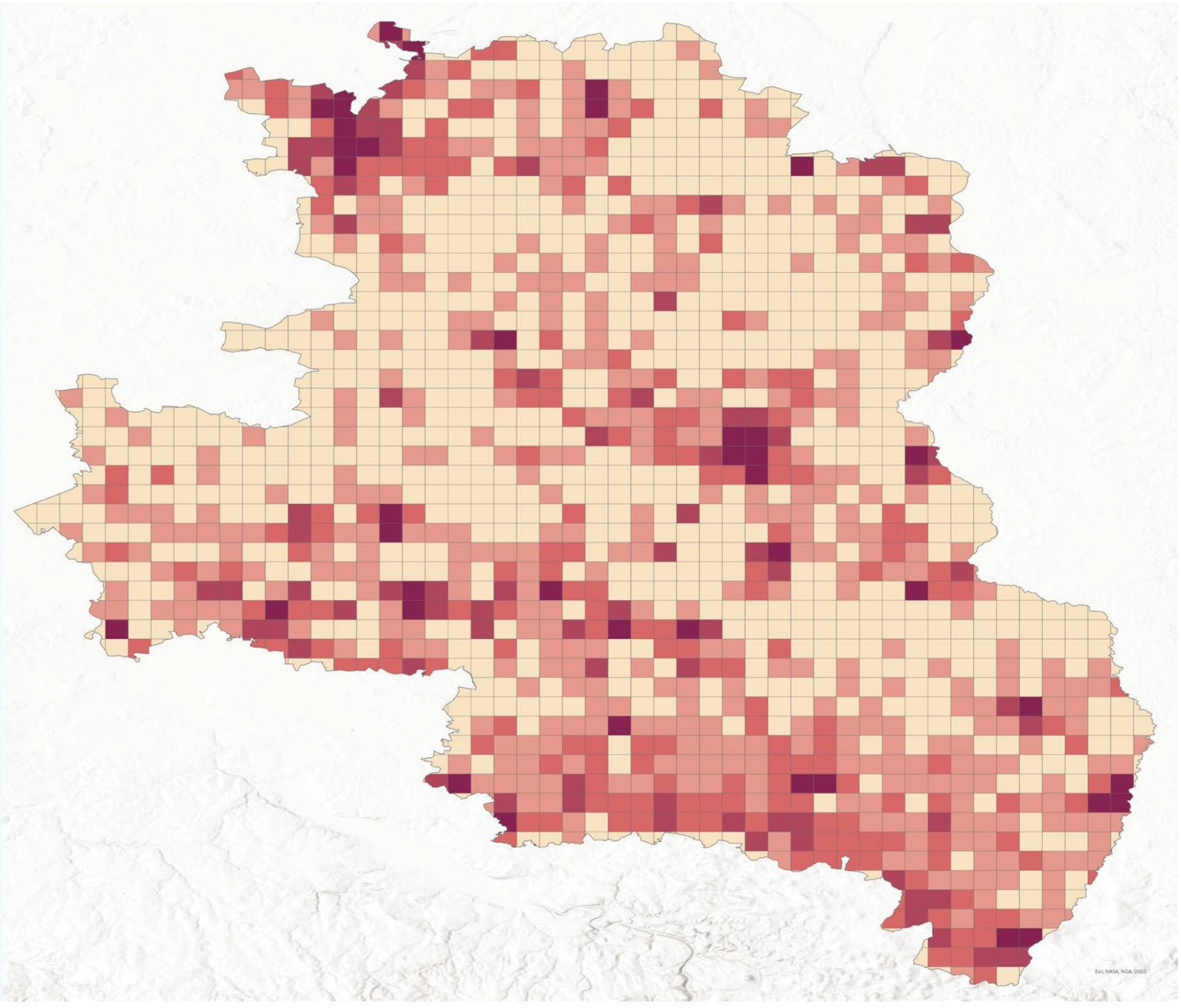
Legend:

Policentricity 1km

- **0 - 140**
- **141 - 344**
- **345 - 567**
- **568 - 825**
- **826 - 1159**
- **1160 - 1588**
- **1589 - 2331**
- **2332 - 3287**
- **3288 - 5190**
- **5191 - 8403**

- **Lausitz region outline**

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_07

Scale: **1: 350,000**

Legend:

Education

- **Hospital**
- **School**
- **University**

Lausitz region outline

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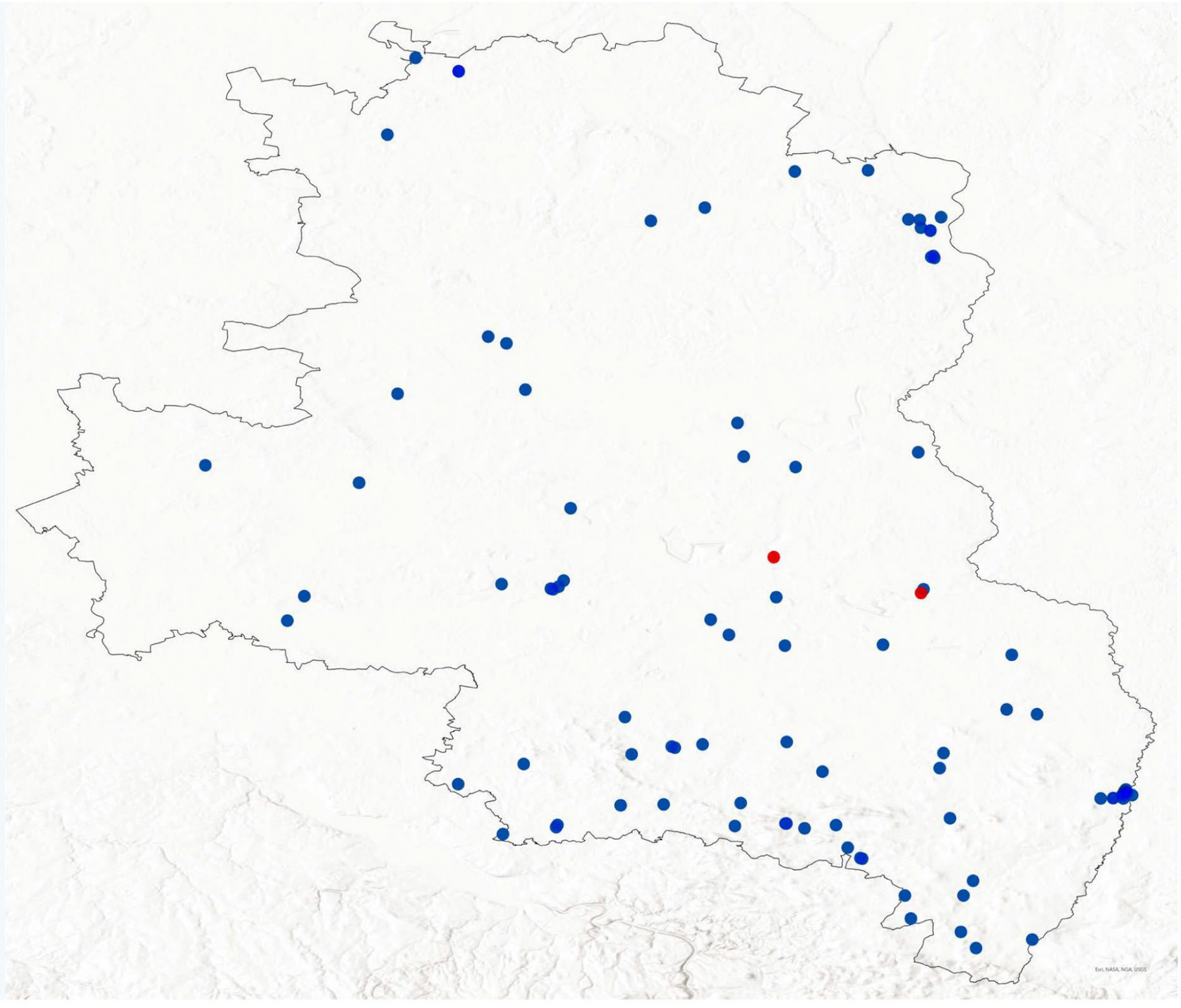


DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Lausitz, Germany (DE)

Map code:
DE_08

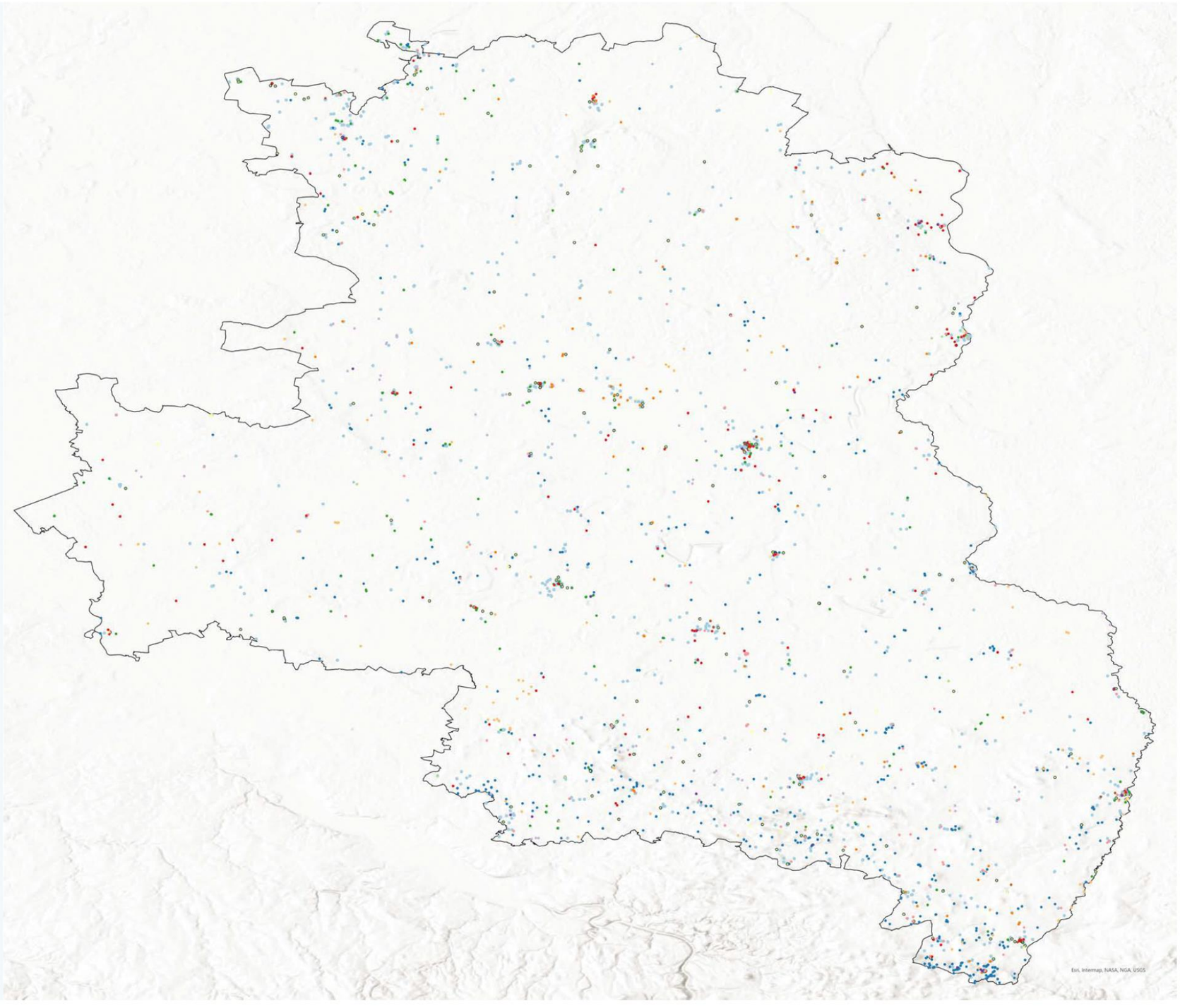
Scale: **1: 350,000**

Legend:

Points of intrest - HORECA
- **Restaurant (1083)**
- **Viewpoint (577)**
- **Hotel (195)**
- **Pitch (181)**
- **Museum (146)**
- **Pub (142)**
- **Ruins (125)**
- **Chalet (88)**
- **Archeological (83)**
- **Theather (28)**
- **Hostel (27)**
- **Nightclub (18)**
- **Castle (15)**
- **Theme park (13)**
- **Arts center (13)**
- **Zoo (13)**
- **Monument (8)**
- **Motel (6)**

Lausitz region outline

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



2.2.3 Katowice (PL)

2.2.3.1 TCC

Table 5 Territorial capital catalogue for the Katowice case study area.

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
PL	TJTP 2030	Built environment	cultural	fine arts	Locations that facilitate fine arts / community places that facilitate/
PL	TJTP 2030	Built environment	cultural	sports	Sports facilities
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	cultural	fine arts	Locations that facilitate fine arts / community places that facilitate/
PL	TJTP	Built environment	functional change	land use changes (post-industrial areas matching regional development purposes)	Former mining areas and post-industrial sites
PL	TJTP	Built environment	settlement structure	settlement grain size	Splitting index
PL	TJTP	Built environment	settlement structure	built density	Cross-space index
PL	TJTP	Built environment	settlement structure	ambiguous spaces - subcultural potential (p. 118)	Grey open spaces
PL	TJTP	Built environment	settlement structure	mineral construction sites	
PL	TJTP	Built environment	settlement structure	dump sites	
PL	TJTP	Built environment	settlement structure	categorization of settlement patterns (urban-rural)	
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	real estate market	attractive real estate/cadaster info age, price, characteristics, size	
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	real estate market	apartment size	Square meters----2014-2020
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	cultural facilities	high culture*	Cultural amenities

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CS	Policy	TC category	Aspects	Sub-aspect	Proxy
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	cultural facilities	event venues/event	Conferences centers,
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Built environment	health	medical facilities	Medical R&D
PL	TJTP 2030	Economic	green growth	# jobs in sectors alternative to mining and conventional energy.	# Of businesses jobs in green
PL	TJTP 2030	Economic	green growth	# companies in sectors alternative to mining and conventional energy.	# Companies
PL	TJTP 2030	Economic	green growth	# companies in mining and conventional energy.	# Companies
PL	TJTP 2030	Economic	energy	sites of renewable energy production (sites)	
PL	TJTP 2030	Economic	energy	rates of renewable energy production (how much)	
PL	TJTP 2030	Economic	green growth	economic diversification	Different types of business
PL	TJTP 2030	Economic	resources	# post-mining areas (typology and ha)	Land-use change
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Economic	green growth	service outsourcing, events industry, music industry	
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Economic	wealth	income	Average income per household
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Economic	cultural heritage	subsidies	Amount of restored buildings statues p9
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Economic	green growth	digital transition	Gaming diversity/industry

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Economic	health	digital descentralized care	Digital care is a growing sector - thanks to decentralized structure
PL	TJTP 2030	Human	cultural	religion	Places of worship
PL	TJTP 2030	Human	cultural	religion	Population - religious affiliation stats
PL	TJTP 2030	Human	population	density	The density of the residential population
PL	TJTP 2030	Human	population	household composition	Singles, married, couples, kids
PL	TJTP 2030	Human	population	age composition	Number of people in age classes
PL	TJTP 2030	Human	population	levels of education	People with higher degrees, #people with the highest level of education
PL	TJTP 2030	Human	population	women in work	Share of women with full/part employment
PL	TJTP 2030	Human	population	population growth/shrink	Population changes last ten years
PL	TJTP 2030	Human	population	creative economy	Share of creative professionals' training vs. Simple repetitive
PL	TJTP 2030	Human	population	green economy	# new vocational education development
PL	TJTP 2030	Human	population	green economy	# new higher education courses/institutes related to a green economy
PL	TJTP 2030	Human	population	density	Population density
PL	TJTP 2030	Human	population	high skilled workforce	# expats
PL	TJTP 2030	Human	population	commuting patterns	In and out commuting
PL	TJTP 2030	Human	safety	crime	Crimes
PL	TJTP 2030	Human	safety	road safety	# road accidents
PL	TJTP 2030	Human	education	student population	Locations of universities/ size/ population
PL	TJTP 2030	Human	engagement	public participation	Location of NGOs

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
PL	TJTP 2030	Human	engagement	civic	National election turnout (percentage)
PL	TJTP 2030	Human	health	medical staff	
PL	TJTP	Infrastructure	transportation system	public transit	Lines and stops of public transport
PL	TJTP	Infrastructure	transportation system	unmotorized individual transport	Pedestrian and bike lanes
PL	TJTP	Infrastructure	transportation system	motorized individual transport	Street network - categories of speed
PL	TJTP	Infrastructure	local connectivity	connectivity	Cul-de sacs-point line ratio
PL	TJTP	Infrastructure	local connectivity	hierarchy	Betweenness centrality at 5km
PL	TJTP	Infrastructure	local connectivity	accessibility	Closeness centrality at 5km
PL	TJTP	Infrastructure	international connectivity	connectivity	International airports
PL	TJTP	Infrastructure	water treatment		
PL	TJTP	Infrastructure	digital infrastructure	fiber network	
PL	TJTP	Infrastructure	digital infrastructure	hotspots	
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Infrastructure	metropolitan form	level of policentricity	Policentricity index
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Infrastructure	international connectivity	connectivity	Trains
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Infrastructure	international connectivity	connectivity	Motorways
PL	CITY OF KATOWICE DEVELOPMENT STRATEGY 2030	Infrastructure	connectivity	intermodality	Traveling times between the airport and the central station
PL	TJTP 2030	Natural	biodevrsity	flora	Natura 2000 habitat
PL	TJTP 2030	Natural	biodevrsity	terrestrial fauna	Natura 2000 species
PL	TJTP 2030	Natural	biodiversity	avifauna	Natura 2000 directive
PL	TJTP 2030	Natural	biodiversity	ecosystem services	

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
PL	TJTP 2030	Natural	biodiversity	woody landscape features	
PL	TJTP 2030	Natural	biodiversity	small woody features	
PL	TJTP 2030	Natural	water	water quality (chemical)	
PL	TJTP 2030	Natural	water	water quality (biological)	
PL	TJTP 2030	Natural	water	water bodies	
PL	TJTP 2030	Natural	water	water usage by economic function	

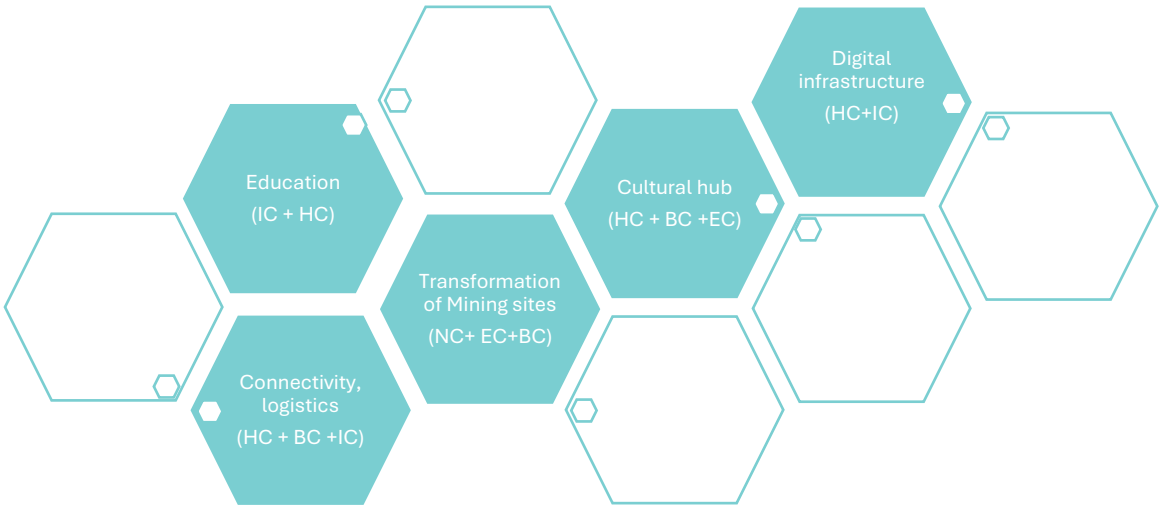
2.2.3.2 Thematic Clouds

The thematic clouds of the Katowice case evolve around three aspects, one of which is the presence of good infrastructure, both digital and logistical, as a foundation for a green economy.

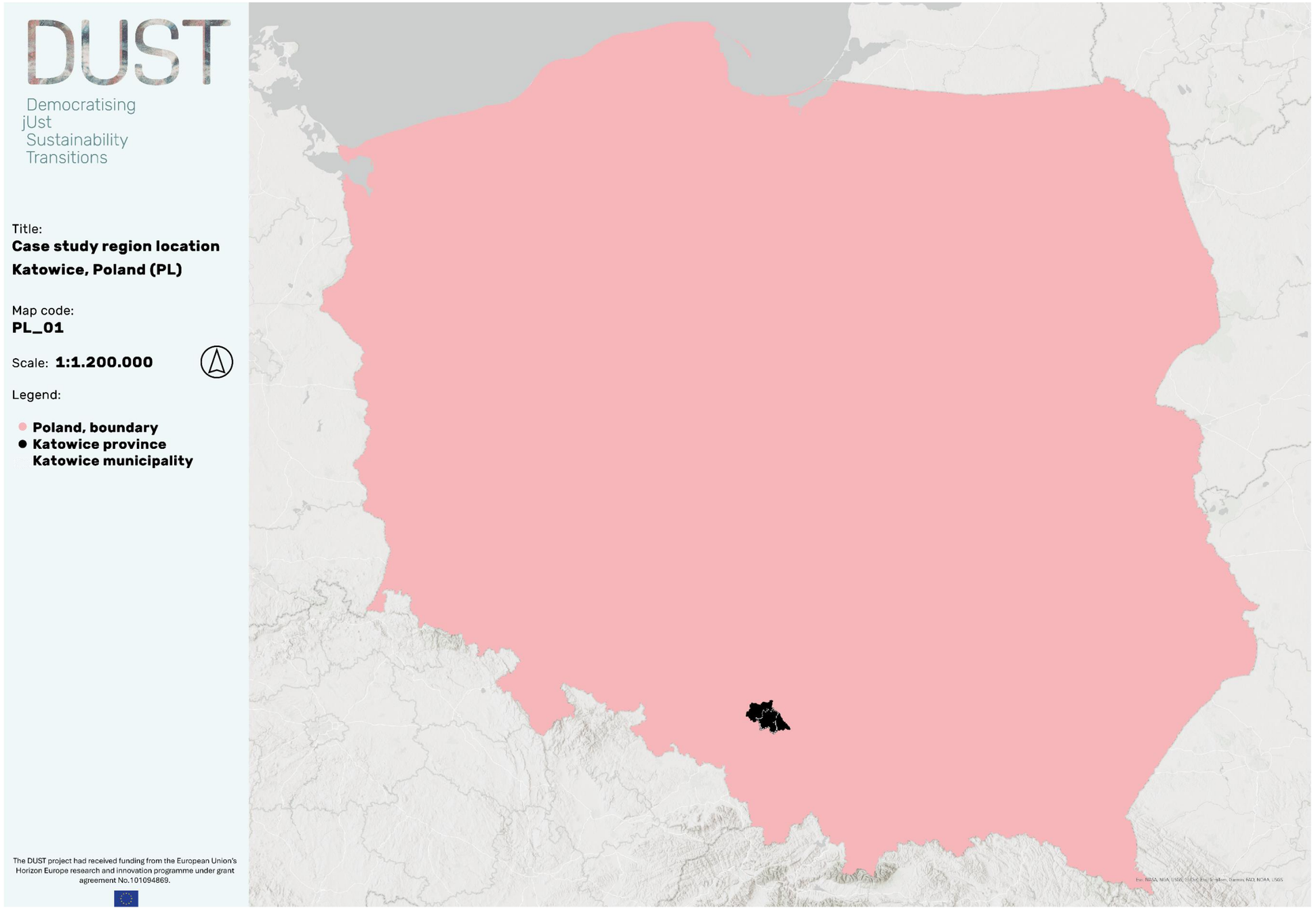
- Connectivity: geographic advantages including the polycentric structure of the area;
- Digital infrastructure, digital care and health sector as a growing sector

The second relates to the potential of the transformation of the mining sides (BC) and what they can mean in regenerating the water-, soil- and ecosystems (NC) and related economic potentials (EC).

The third one connects the two and includes educational facilities and networks (HC+IC) as well as cultural, sports and fine ats institutions and networks (HC+EC)



2.2.3.3 GIS mapping



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Katowice, Poland (PL)

Map code:
PL_02

Scale: **1:35000**

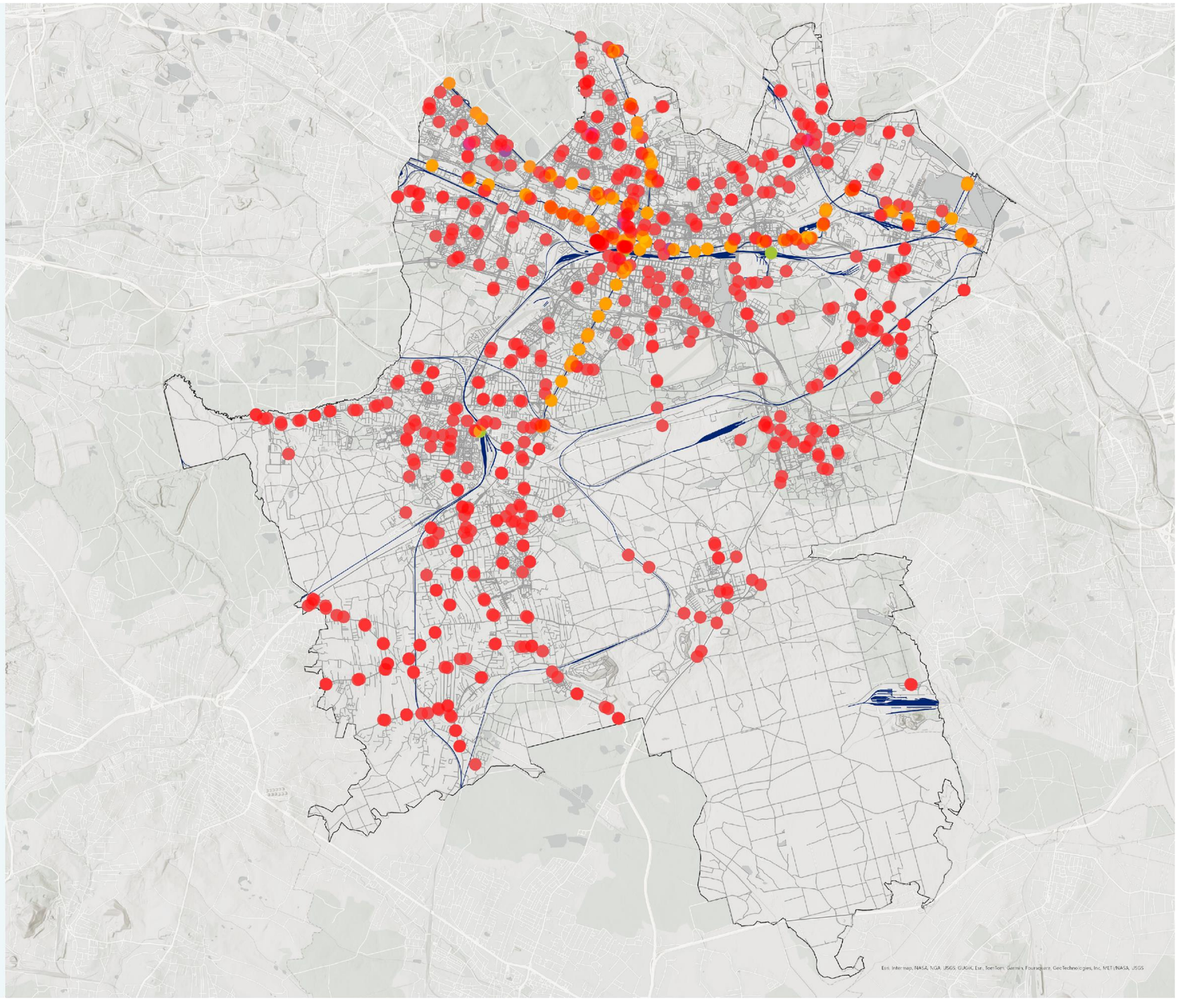
Legend:

Transport infrastructure

- **Bus stops**
- **Railway station**
- **Taxi**
- **Tram**

- **Railways**
- **Roads**

- **Katowice municipal outline**



Task 4.2 - Deliverable 4.1
Date: 08.08.2024

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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Katowice, Poland (PL)

Map code:
PL_03

Scale: **1:35000**

Legend:

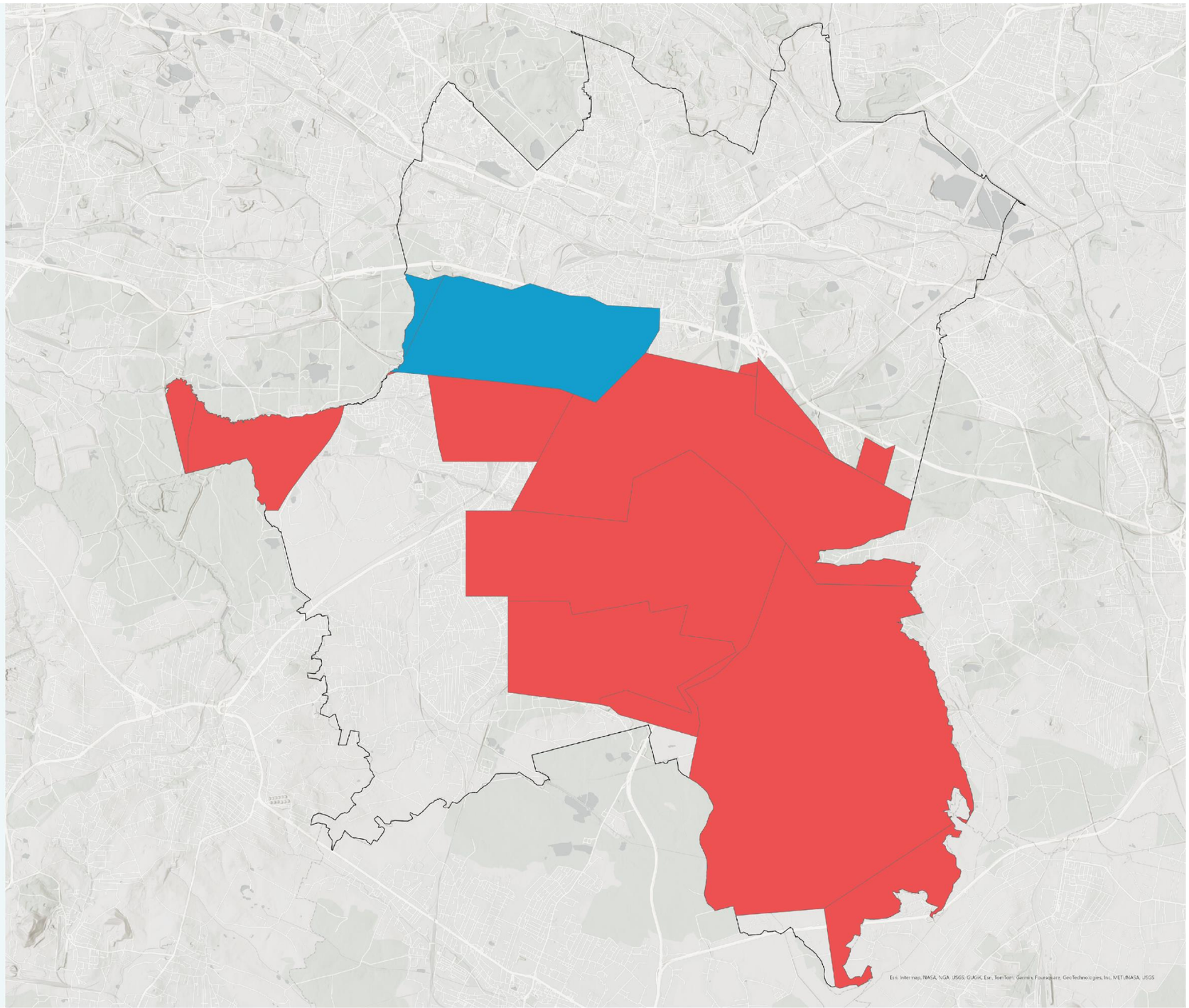
Mining sites

- **Coal, seam, methane**
- **Hard coal**

Katowice municipal outline

Task 4.2 - Deliverable 4.1
Date: 08.08.2024

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location Katowice, Poland (PL)

Map code:
PL_04

Scale: **1:35000**

Legend:

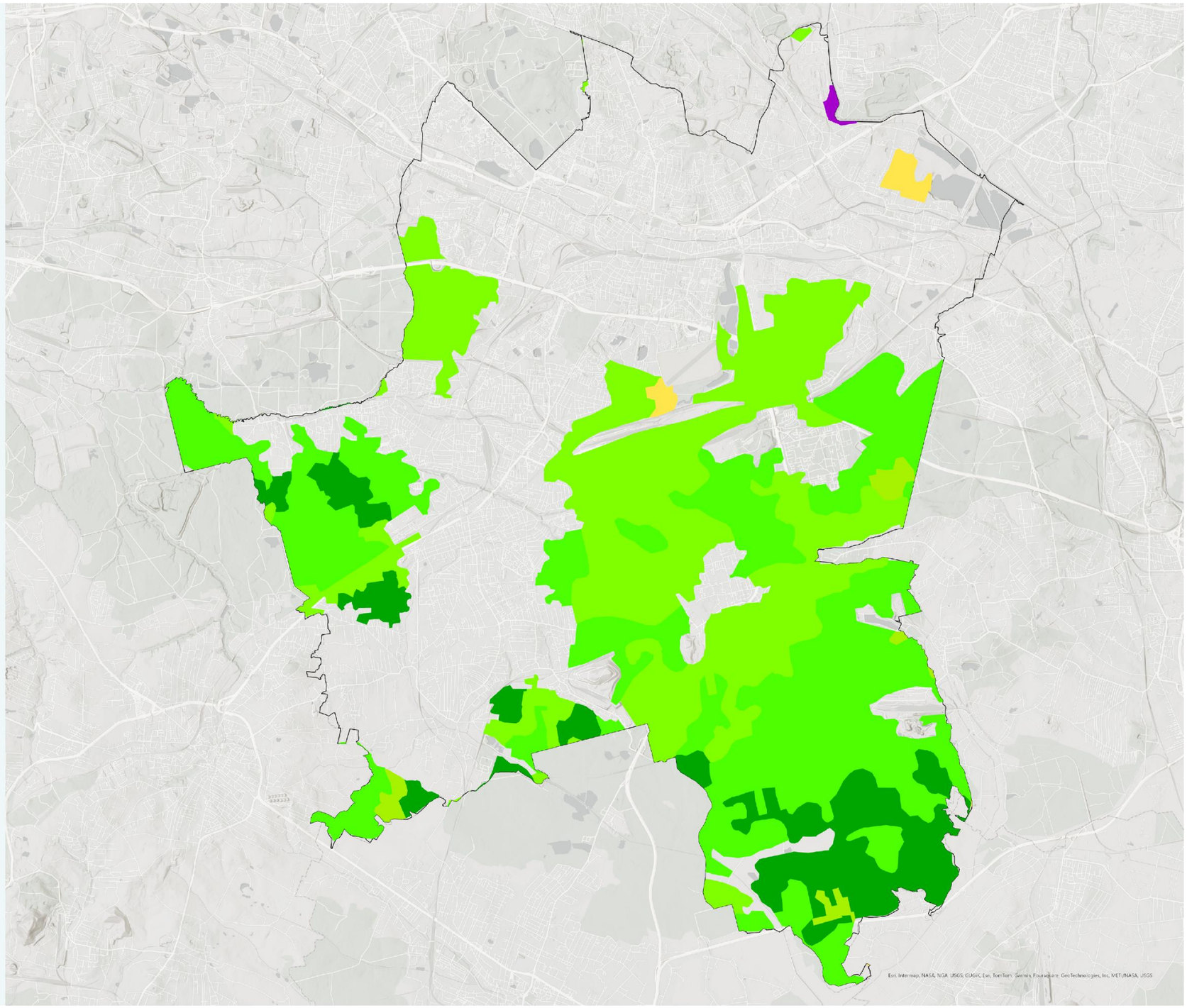
Kulturlandschaft from CLC

- **131. Mineral extraction site**
- **242. Complex cultivation patterns**
- **311. Broad-leaved forest**
- **312. Coniferous forest**
- **313. Mixed forest**
- **324. Transitional woodland-shrub**

- **Katowice municipal outline**

Task 4.2 - Deliverable 4.1
Date: 08.08.2024

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Katowice, Poland (PL)

Map code:
PL_05

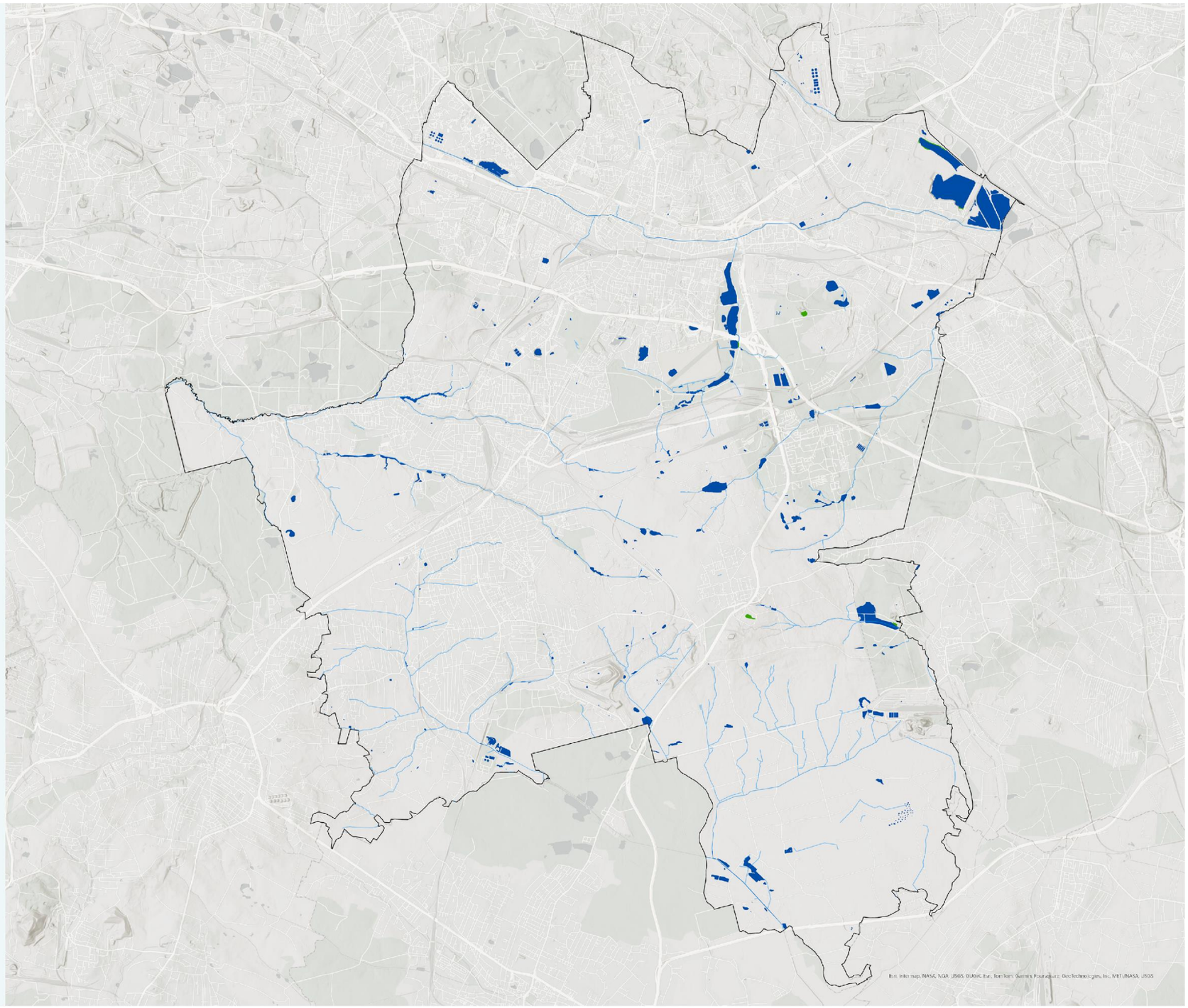
Scale: **1:35000**

Legend:

Biodiversity - Waterways and green areas

- **Waterbodies**
- **Nature areas**
- **Waterways**

- **Katowice municipal outline**



The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.

DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Katowice, Poland (PL)

Map code:
PL_06

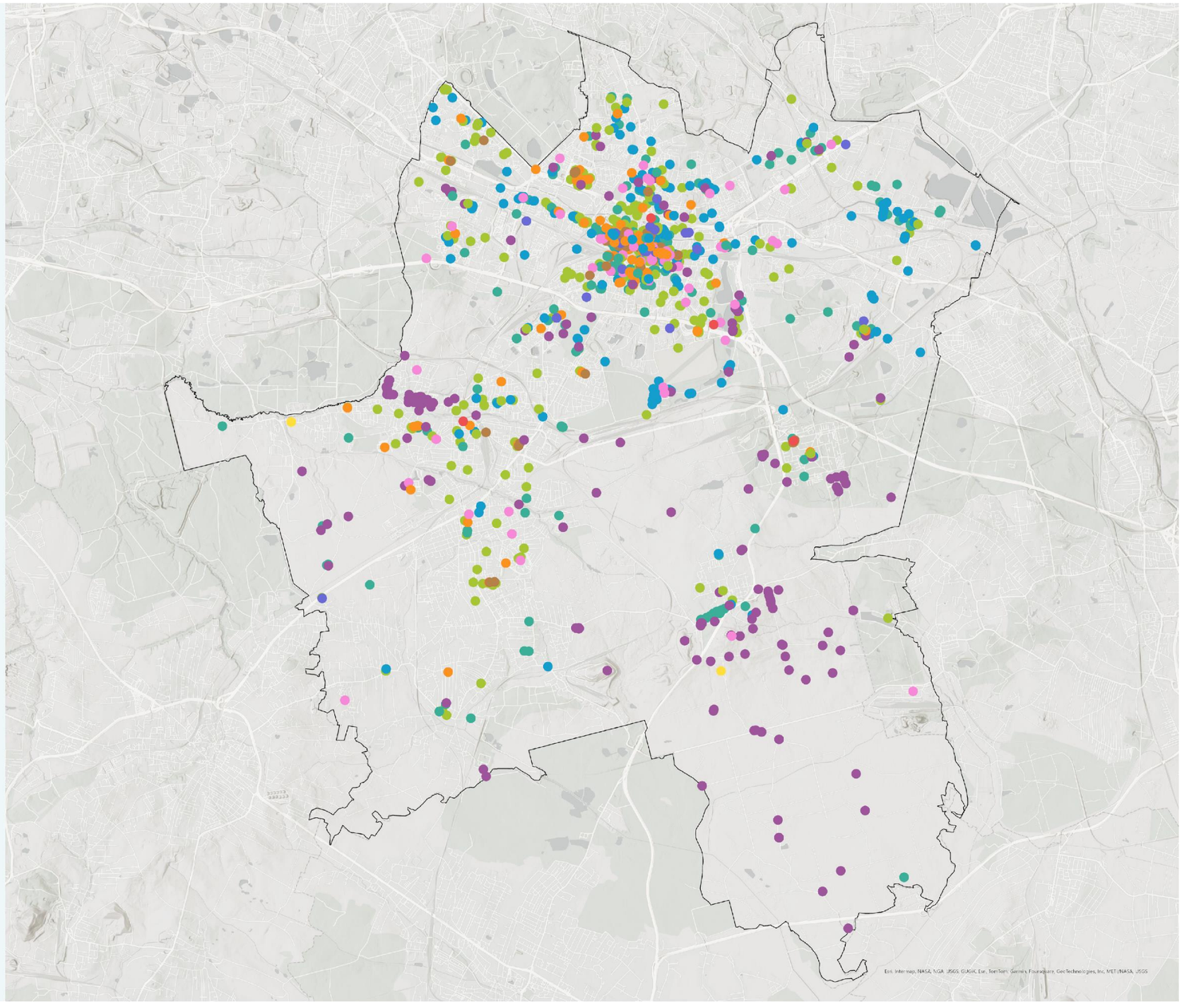
Scale: **1:35000**

Legend:

Points of intrest - HORECA
- **Restaurant (126)**
- **Cafe (97)**
- **Memorial (79)**
- **Monument (61)**
- **Viewpoint (55)**
- **Tourist info (42)**
- **Hotel (40)**
- **Museum (14)**
- **Attraction (13)**
- **Archeological site (12)**
- **Ruins (10)**
- **Chalet (8)**
- **Pub (7)**
- **Guest house (5)**
- **Castle (3)**
- **Theater (2)**
- **Observation tower (2)**
- **Hostel (2)**
- **Cinema (2)**
- **Wayside cross (1)**
- **Zoo (1)**

Norrbotten outline

The DUST project had received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101094869.



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Katowice, Poland (PL)

Map code:
PL_07

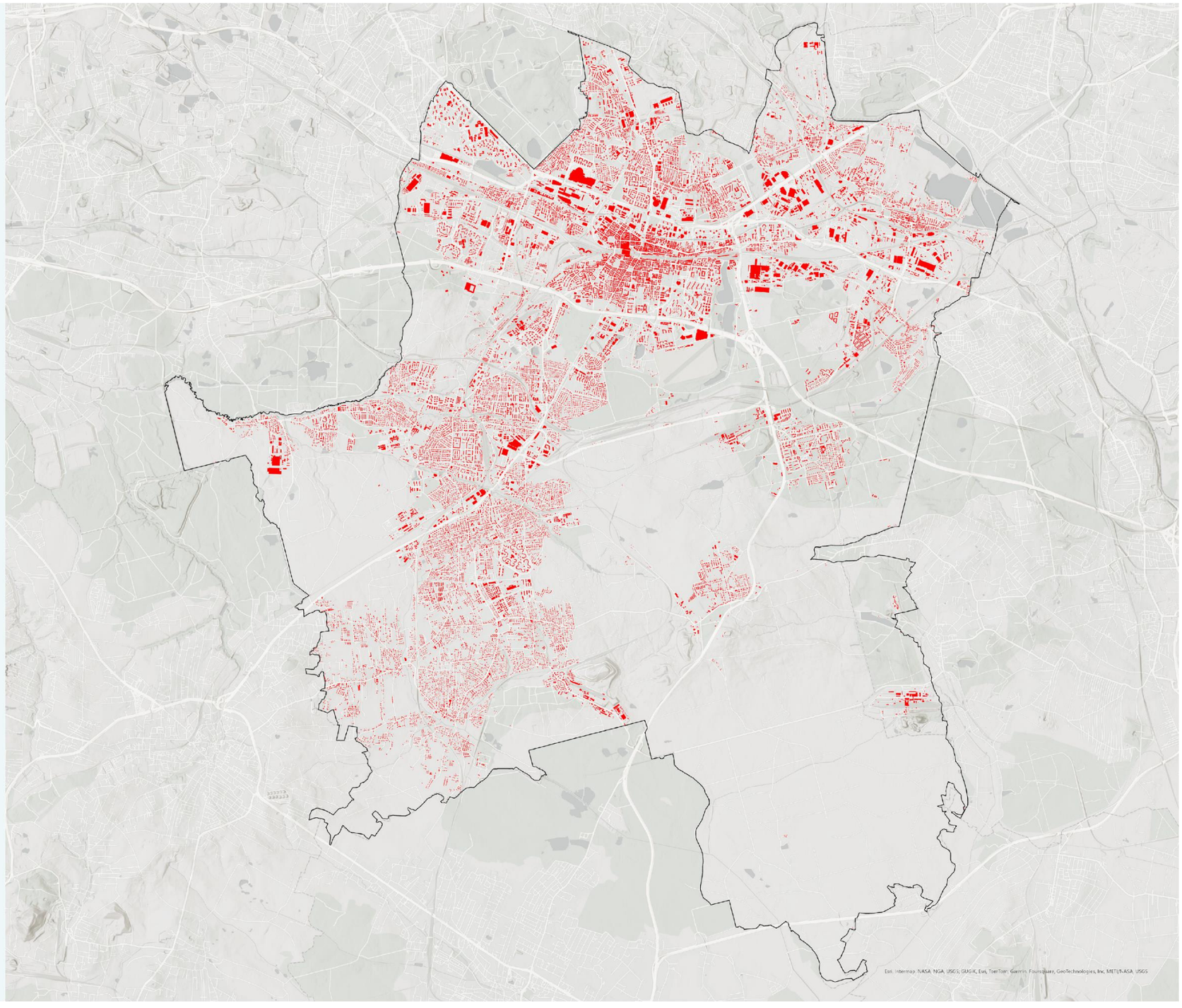
Scale: **1:35000**

Legend:

Policentricity

Buildings footprint

Stara Zagora outline



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2.2.4 Norrbotten (SE)

2.2.4.1 TCC

Table 6 Territorial capital catalogue for the Norrbotten case study area.

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
SE	Regional development strategy (2019), OECD, (2019),	Built environment	countryside	space (vastness)	land minus buildings
SE		Built environment	countryside	rurality	level of rurality OECD
SE	Utveckla Norrbotten, (n.d.),	Built environment	2 green transition “hot spots”		
SE	Regional development strategy Norrbotten 2030.	Economic	tourism	landscape based tourism	Important tourism destinations
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Economic	green growth	manufacturing	locations of this plants
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Economic	industrial	industrial foundations	location of high tech industries
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Economic	industrial	industrial foundations	location of high tech industries
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Economic	industrial	start-up incubators	locations of start-up incubators
SE	Norrbotten: The industrial transition and its socio-economic impact	Economic	industrial	resources	deposits locations
SE	Norrbotten: The industrial transition and its socio-economic impact	Economic	industrial	renewable energy	energy plants locations (https://www.h2greensteel.com/boden H2 Green Steel's location in Boden — H2 Green Steel Manufactured with clean energy, we will produce 5 million tonnes of green steel annually in Boden by 2030. With an ambitious timeline and high standards for environmental and social safeguards duri...)

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
SE	Norrbotten: The industrial transition and its socio-economic impact	Economic	location factor	energy cost	energy rates in different regions /
SE	Strategy for Smart Specialisation, (2020), Utveckla Norrbotten, (n.d.)	Economic	industrial	foundations	state owned companies locations
SE	OECD (2021); Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Utveckla Norrbotten, (n.d.)	Economic	2. high level of innovation		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021)	Economic	3. mining and steel production		
SE	Trionomics, (2023), Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021)	Economic	regional economy		
SE	Strategy for Smart specialisation	Economic	4.large public sector		
SE	Regional development strategy Norrbotten 2030.	Economic	tourism	landscape based tourism	tourist attractions/horeca
SE	Regional development strategy Norrbotten 2030.	Economic	tourism	ethnic based tourism	sami locations
SE	Regional development strategy Norrbotten 2030.	Economic	green growth	local food	wishful todo! :)
SE	Regional development strategy Norrbotten 2030.	Economic	industrial	aerospace	companies locations
SE	Regional development strategy Norrbotten 2030.	Economic	bussiness	sme	SME locations
SE	Regional development strategy Norrbotten 2030.	Human	social	capacity to collaborate	regional collaboration projects/maps check table in industrial transition file!!!
SE	Regional development strategy Norrbotten 2030.	Human	cultural heritage	ethnical	settlement maps/
SE	Regional development strategy Norrbotten 2030.	Human	crossborder	capacity to collaborate	map neighbors boundaries/in relation with minorities
SE	Regional development strategy Norrbotten 2030.	Human	population	creative economy	
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Human	education	levels of education	# highest level of education
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, (2020), Regional development strategy, (2019)	Human	1. strong triple helix cooperation		

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, Regional development Strategy, (2019)	Human	2. engaged civil society		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation	Human	3. horizontal cooperation		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Regional Development Strategy	Human	4.social trust and strong institutions		
SE	Regional development strategy, CSIS & Climate Investment Funds, (2020),	Human	5.large labour union movement	collaboration	
SE	OECD, 2019	Human	6.indigenous sami traditions		
SE	World value survey	Human	7. culture – majority swedes	identity	ratio people affiliated(not) to religious groups
SE	Hela Sverige Ska Leva	Human	8. small business owners		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, (2020), Regional development strategy, (2019)	Human	9. competence		
SE	Regional development strategy Norrbotten 2030.	Infrastructure	education	education facilities	# universities/school
SE	Regional development strategy Norrbotten 2030.	Infrastructure	smart city	data infrastructure	data centers locations
SE	Regional development strategy Norrbotten 2030.	Infrastructure	green growth	energy	data centers locations/ power plants/
SE	Regional development strategy Norrbotten 2030.	Infrastructure	green growth	energy	sites of bioenergy production---
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Infrastructure	education	r+d+i	locations of education facilities
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Infrastructure	research	collaboration	education sectors + industries types
SE	Potential Territorial Impacts of the Transition to a Climate Neutral Economy in Gotland, Norrbotten, and Västra Götaland	Infrastructure	industrial	industrial foundations	...

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
SE	Norrbotten: The industrial transition and its socio-economic impact	Infrastructure	green growth	collaboration	
SE	Norrbotten: The industrial transition and its socio-economic impact	Infrastructure	green growth	foundations	
SE	Regional development strategy Norrbotten 2030.	Infrastructure	industrial	steel	find plant location polygon
SE	Regional development strategy,	Infrastructure	1. access to fast broadband		
SE	Strategy for Smart specialisation, Utveckla Norrbotten, (n.d.), Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021),	Infrastructure	2. renewable energy		
SE		Infrastructure	transportation system	airports	airports locations
SE	Regional development strategy Norrbotten 2030.	Natural	landscape	kulturlandschaft/	Rural areas as an extension of natural areas
SE	Regional development strategy Norrbotten 2030.	Natural	landscape	kulturlandschaft/	locations
SE	Regional development strategy Norrbotten 2030.	Natural	green growth	resources	locations bits
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, (2020), Utveckla norrbotten, (2019), Trionomics, (2023), OECD (2021)	Natural capital	1.metals and minerals		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, (2020)	Natural capital	2.forest		
SE	Strategy for smart specialisation, (2020), Utveckla Norrbotten, (n.d.)	Natural capital	3.water courses (rivers, lakes, sea)		
SE	Skyddad natur | Länsstyrelsen Norrbotten (lansstyrelsen.se)	Natural capital	4. biodiversity		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation, (2020), Utveckla Norrbotten, (n.d.)	Natural capital	climate	cold climate	average feeling temperature
SE		X Capital	4. cross border collaboration		
SE	https://www.svt.se/nyheter/lokalt/vasterbotten/unik-kartlaggning-av-kompetensbehovet-i-norra-sverige-45-000-personer-behovs	X Capital	5. regional challenges		

CS	Policy	TC category	Aspects	Sub-aspect	Proxy
SE	https://www.boverket.se/contentassets/7e90cd3df8f346e88d1d4a1ad70d5f2f/norrbottens-lan-2022.pdf	X Capital	5. regional challenges		
SE	https://utvecklanorrbotten.se/nyheter/2024/vaga-sarbehandla-satsningarna-maste-ske-har-och-nu/	X Capital	5. regional challenges		
SE	OECD, (2023)	Built environment	2.attractiveness		
SE	Tapia, Cedergren, Löfving, Moodie, Sanchez-Gassen, (2021), Strategy for Smart Specialisation	Infrastructure	1.excellent research environment		
SE	Utveckla norrbotten, n.d.	Infrastructure	defense	logistics	military bases

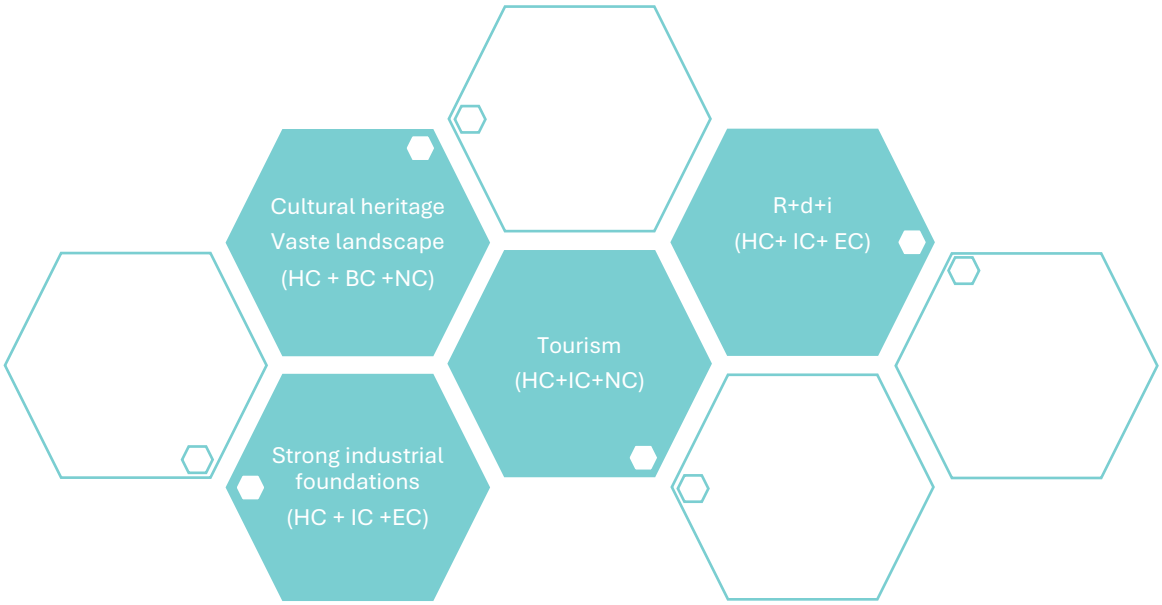
2.2.4.2 Thematic Clouds

The thematic cloud in Norrbotten comprises two themes that, considering a just sustainable transition, have both high potential and a high potential for conflict. The first is the sheer vast extent of the area and its large unbuilt (not empty) landscape with its specific natural and human TCs:

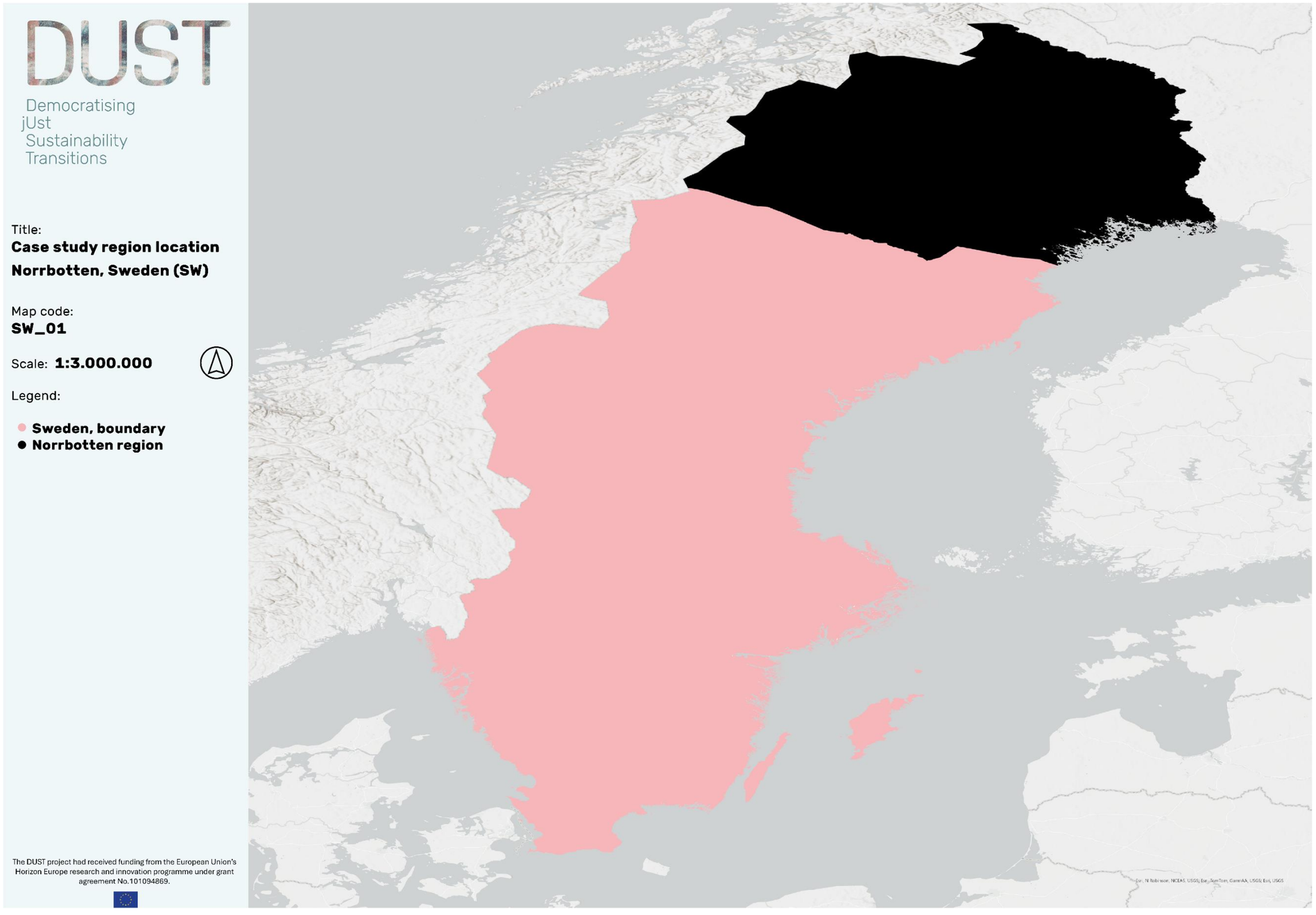
- Cultural Heritage: Sami People and their knowledge based on living in vast nature and extreme climatic (H+N+B);
- Tourism: (H+I+N) eco-tourism and Indigenous hub
-

The second aspect is the abundance of cheap energy and raw materials, both renewable and non-renewable, supported by a highly developed network of research education and manufacturing.

- Industrial foundations: tradition and high-quality manufacturing and cheap energy (I+E)
- Strong research design and innovation ecosystem (R+d+i_: (H+I+E) people with technical skills, education facilities and industries behind them (e.g. space research, polar hub)


Cultural heritage
Vaste landscape
(HC + BC +NC)
R+d+i
(HC+ IC+ EC)
Tourism
(HC+IC+NC)
Strong industrial
foundations
(HC + IC +EC)

2.2.4.3 GIS mapping



DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_02

Scale: **1:1.500.000**

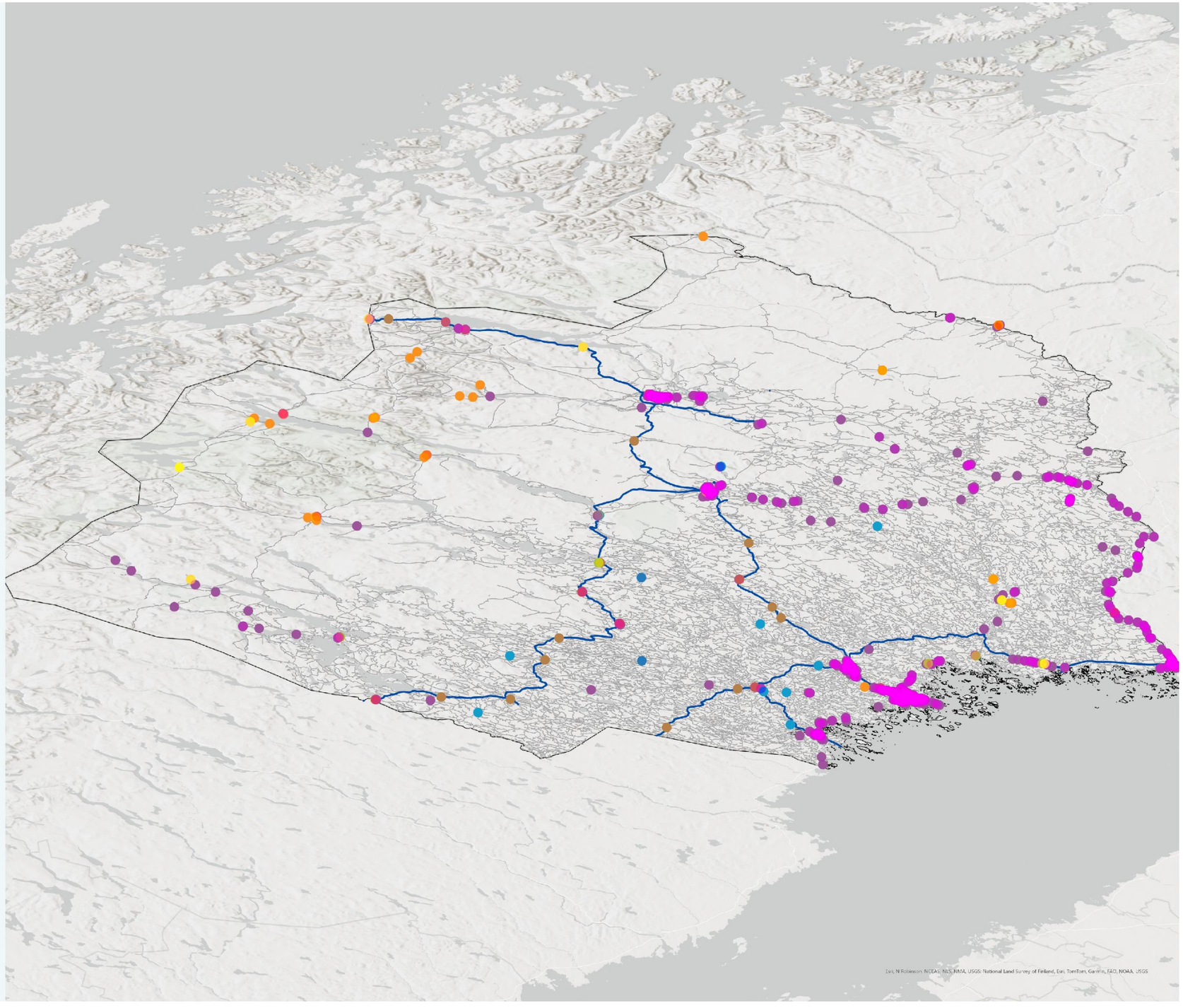
Legend:

Transport infrastructure

- **Bus stops (927)**
- **Railway station (28)**
- **Ferry terminal (26)**
- **Airport (12)**
- **Helipad (9)**
- **Bus station (7)**
- **Airfield (2)**
- **Taxi (1)**

- **Railways**
- **Roads**

- **Norrbotten outline**



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_03

Scale: **1:1.500.000**

Legend:

Mining sites and power plants

- **Ore to concentrator**
- **Produced concentrate**
- **Tailings**

- **Copper, Lead**
- **Gold**
- **Zinc, lead, gold**
- **Vanadium, Iron, titanium**
- **Iron, phosphorus**
- **Iron, manganese**
- **Copper**
- **Copper, gold**
- **Iron**

Power plants

- **Wind**
- **Hydro**

- **Norrbotten outline**

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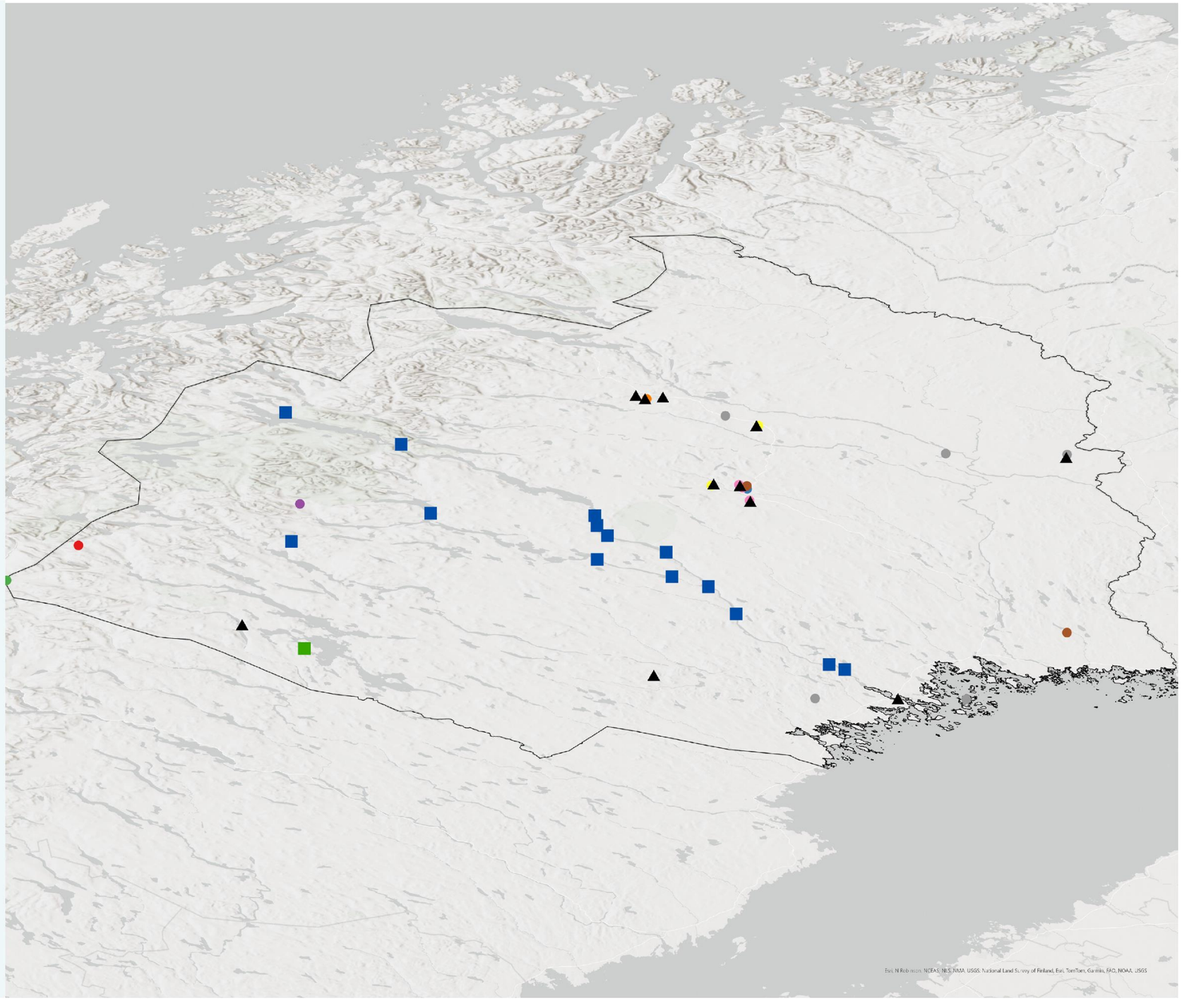


DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_04

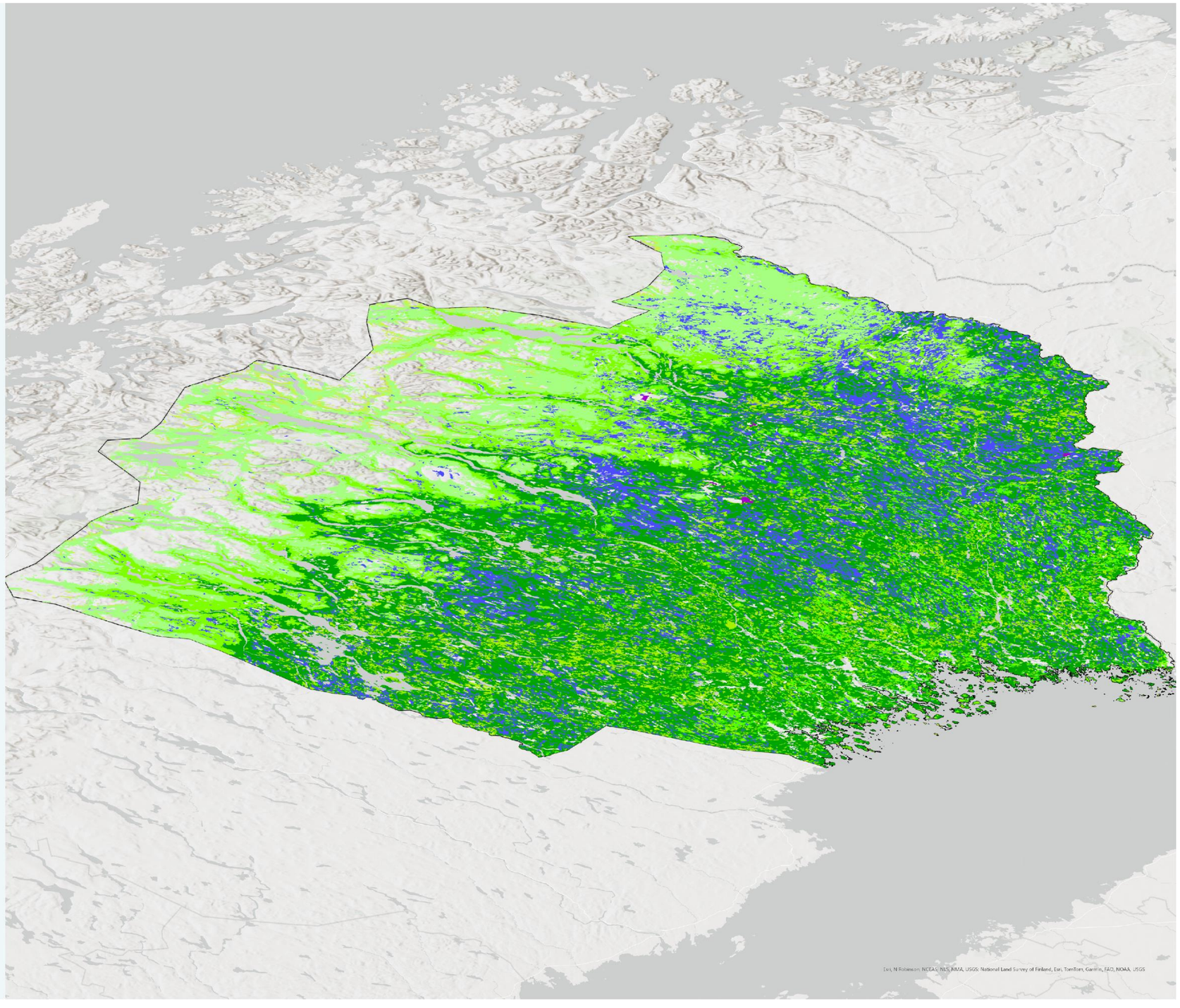
Scale: **1:1.500.000**

Legend:

Kulturlandschaft from CLC

- **131. Mineral extraction site**
- **242. Complex cultivation patterns**
- **311. Broad-leaved forest**
- **312. Coniferous forest**
- **313. Mixed forest**
- **321. Natural grasslands**
- **322. Moors and heathland**
- **324. Transitional woodland-shrub**
- **411. Inland marshes**
- **412. Peat bogs**

- **Norrbotten outline**



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_05

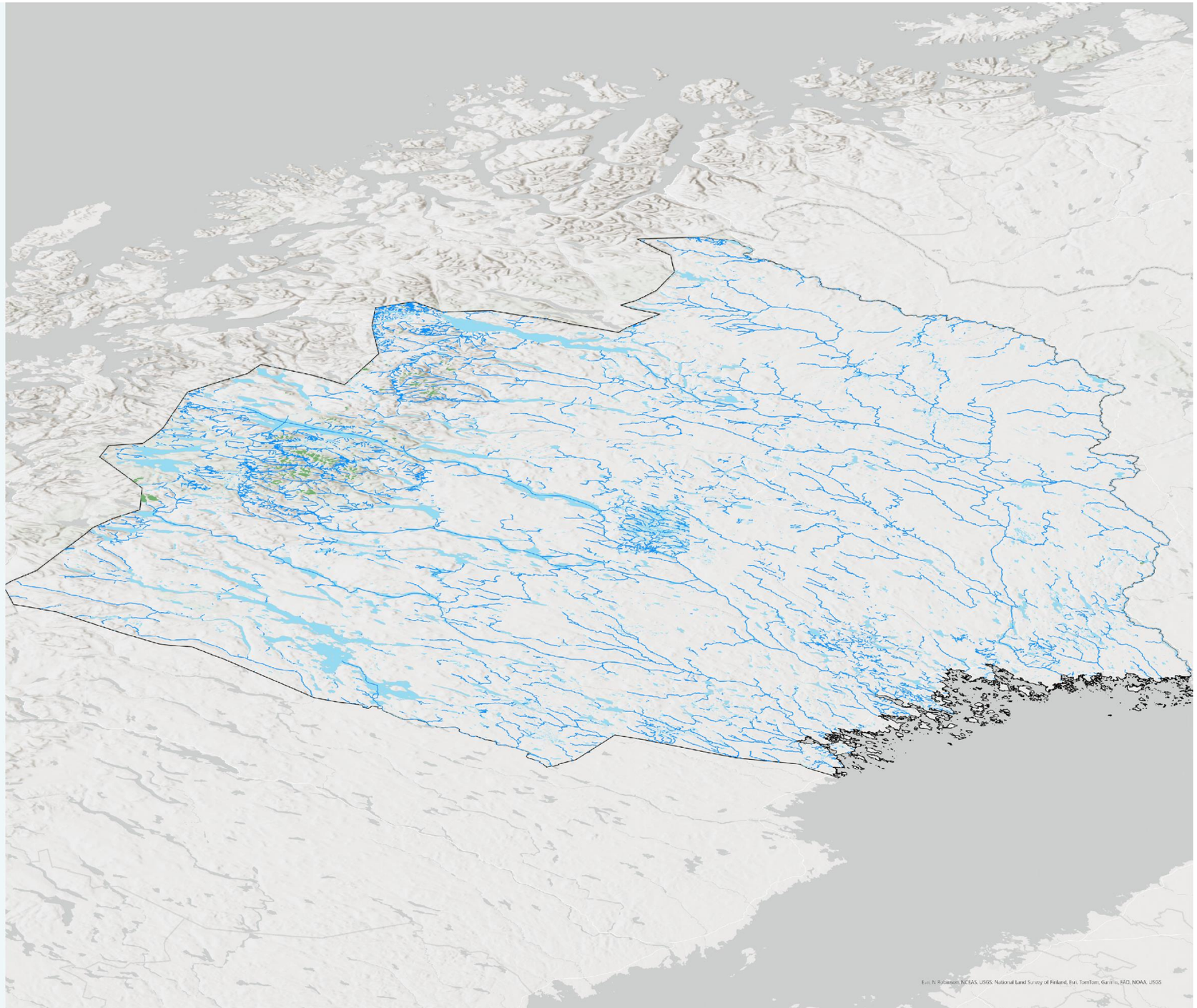
Scale: **1:1.500.000**

Legend:

Biodiversity - Waterways and green areas

- **Waterbodies**
- **Nature areas**
- **Waterways**

- **Norrbotten outline**



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_06

Scale: **1:1.500.000**

Legend:

Points of intrest - HORECA
- **Restaurant (171)**
- **Viewpoint (73)**
- **Cafe (65)**
- **Archeological (63)**
- **Hotel (52)**
- **Museum (31)**
- **Alpine hut (35)**
- **Hostel (31)**
- **Guest house (13)**
- **Chalet (13)**
- **Ruins (10)**
- **Monument (8)**
- **Motel (2)**

Norrbotten outline

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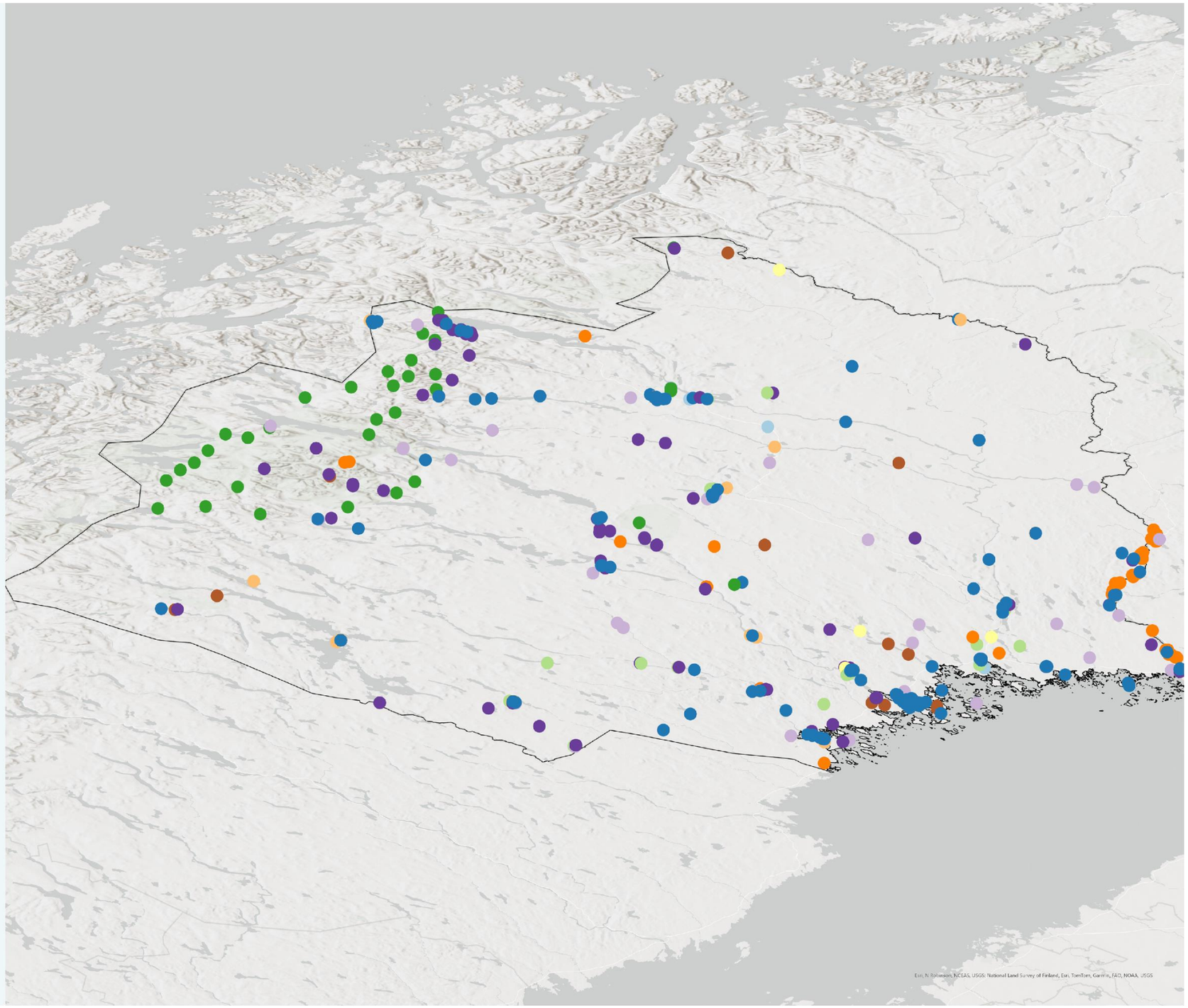


DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_07

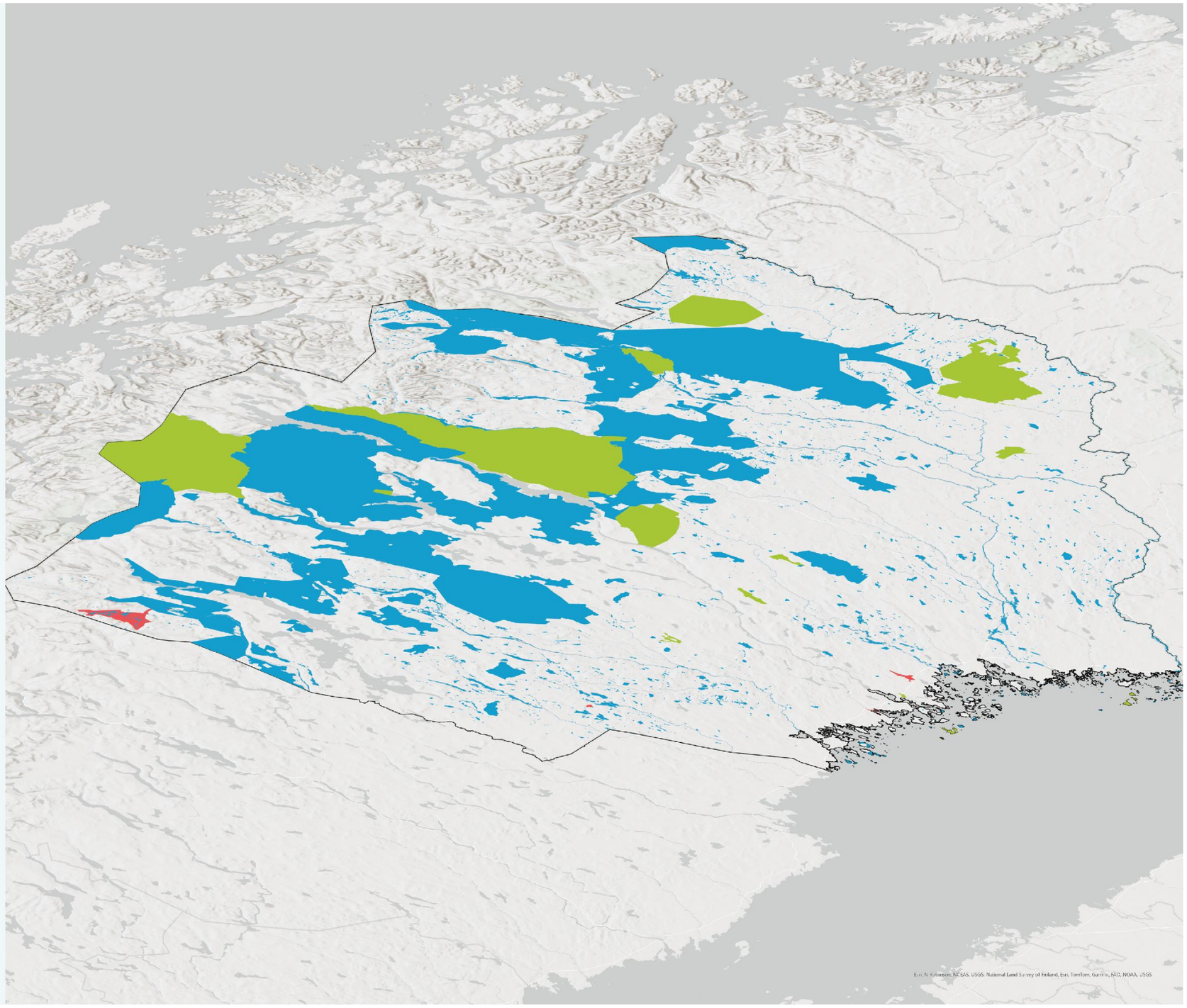
Scale: **1:1.500.000**

Legend:

Biodiversity - NATURA 2000

A: designated under the Birds directive
B: designated under the Habitats directive
C: Both

Norbotten outline



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_08

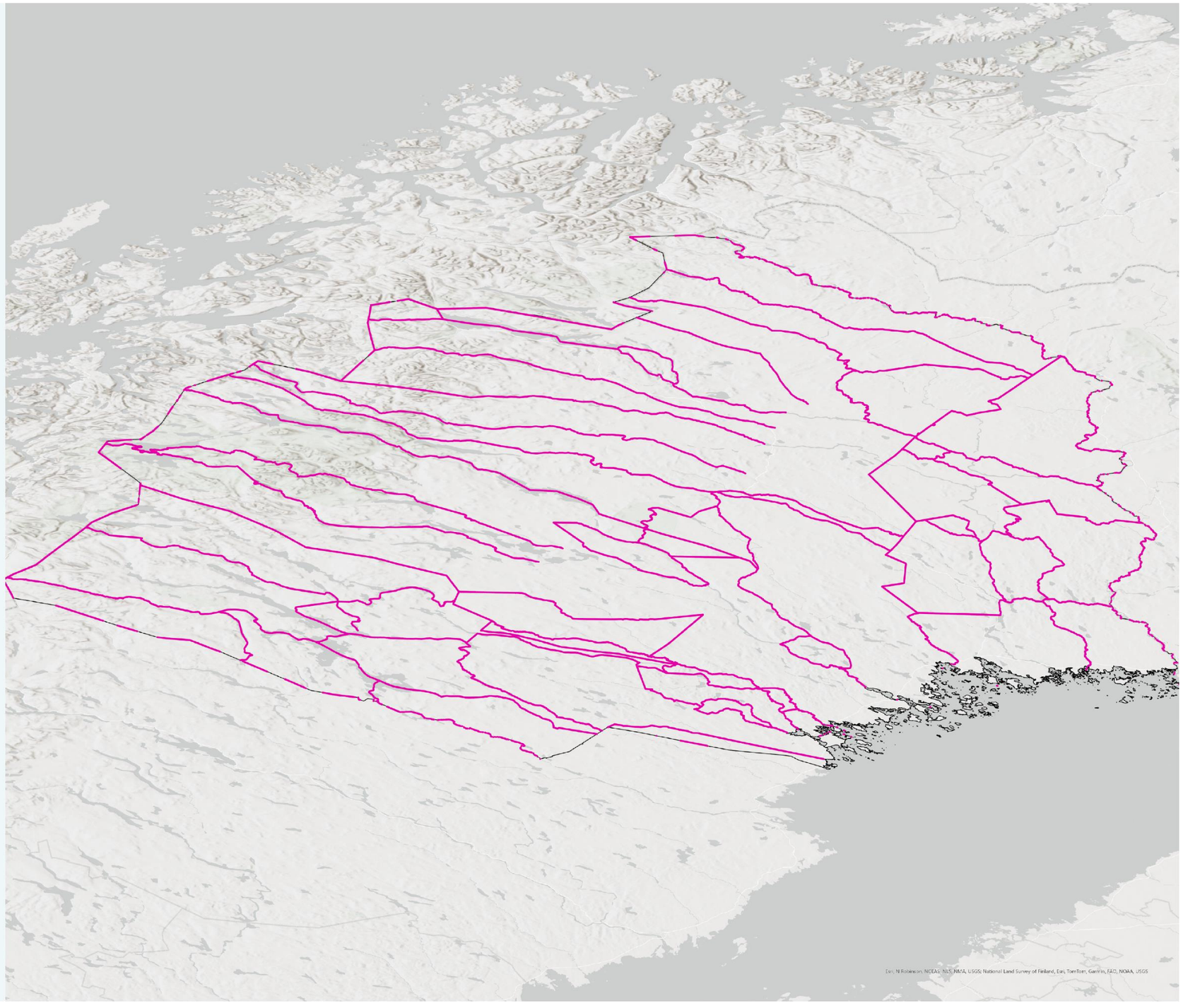
Scale: **1:1.500.000**

Legend:

Cultural heritage

Sami village borders

Norrbotten outline



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DUST

Democratising
jUst
Sustainability
Transitions

Title:
Case study region location
Norrbotten, Sweden (SW)

Map code:
SW_09

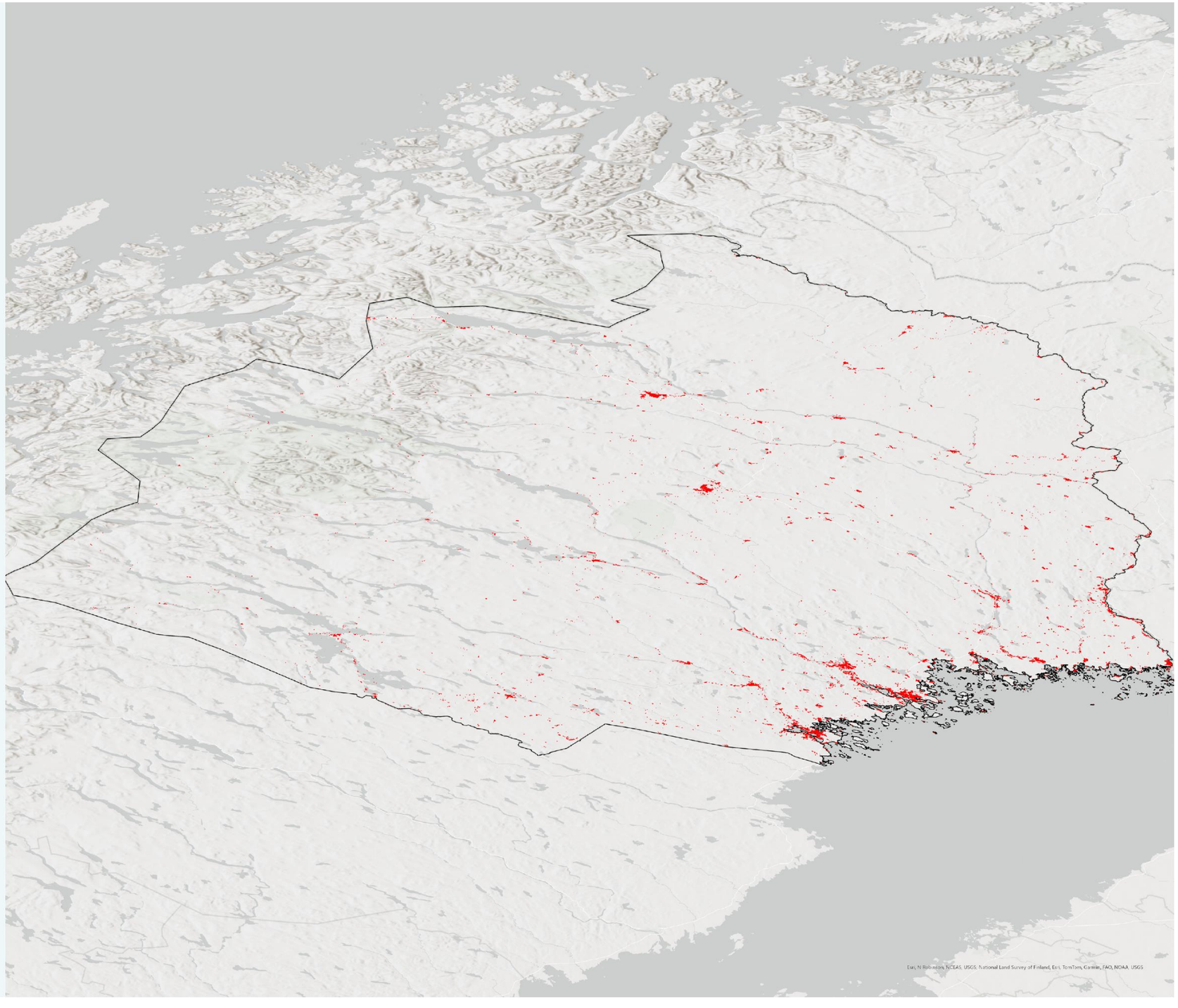
Scale: **1:1.500.000**

Legend:

Policentricity

Buildings footprint

Norrbotten outline



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