Deliverable 1.2: Methodological framework

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Abbreviation list

Term	Description
APES	Actor-Process-Event Scheme
LEC	Least Engaged Communities
RFFL	Regional Futures Literacy Lab
UNESCO	United Nations Educational, Scientific and Cultural Organization

Executive Summary

This report (Deliverable 1.2) provides the DUST research project with a methodological framework. It builds on the earlier methodology developed during preparation of the project proposal, updating, expanding, and refining it in line with the development of the DUST theoretical and framework (Deliverable 1.1) and the early insights from the research process. The purpose of this report is, first, to present the methodological approach of the DUST project to external audiences. Second, this deliverable aims to provide the DUST project team and the stakeholders and experts involved with methodological guidance on each of the components of the projects and on the ways in which the different methods and research tasks interrelate to produce the expected results. This report is a 'living document', subject to updates as the project unfolds and research methods to be used in the specific tasks are further detailed and fine-tuned.

The report outlines the overall methodological approach in the DUST project, including the workflow across its work packages. It also explains the strategy behind selecting the case study areas and briefly presents each of the regions studied. It then covers the research methods used in three phases of the project, namely, in the case study research, in the participatory experimentation following it, and in the exploration of affective communication with the communities engaged in the project. The report closes with a discussion on the synergies between the methods used and the measures taken to ensure validity of findings as well as an overview of the ways in which methodological innovation is delivered.

1. Introduction

1.1.   The DUST project's research design

The DUST project develops and operationalises novel participatory instruments for proactive and strategic citizen engagement in sustainability transitions in European regions. It combines case study research into the factors that affect the participation of the least engaged communities in multi-level policies that promote transitions away from highly polluting and energy-intensive industries with experimentation with design-led territorial tools and digital tools for citizen deliberation at scale. By this, the project contributes to addressing the defining societal and democratic challenge for Europe, which to engage the citizens whose voices are currently ignored in co-production of policies that are supposed to nudge structurally weak regions towards more sustainable futures.

The core objective of DUST is to improve our understanding of how territorial responses to just sustainability transitions can be democratised to maximise citizen participation and increase trust in democratic governance. The main aim is to develop a more sophisticated and innovative understanding of how policy processes and instruments can help anticipate, plan, and implement just sustainability transitions at regional and local scales in different institutional contexts, and undertake active, inclusive participation of citizens and communities, particularly structurally marginalised parts of society.

More specifically, first, the DUST project will develop a novel assessment framework, informed by the concept of active subsidiarity, which involves qualitative and quantitative measures to analyse the scale, scope, and form of citizen participation in deliberative and representative forms of democratic decision-making in place-based approaches to just sustainability transitions. Applied to multiple case studies from different regional institutional contexts across Europe, it will compare participation in policy decision-making arenas and processes under key place-based policy interventions at EU, national and sub-national levels.

Second, research using mixed methods will be undertaken in the case study regions to investigate the factors, digital and non-digital mechanisms, and institutional frameworks that have enhanced or hindered citizen participation as part of democratic life. Survey research, a social and traditional media analysis, and in-depth qualitative research will provide a deep understanding of how multi-level, place-based policy interventions are responding to the concerns of especially communities vulnerable to sustainability transitions, and how these communities perceive policymaking.

Third, following the multiple case study phase of the research, participatory experiments will be conducted in four of the case study regions (where just sustainability transitions pose the greatest challenges) to test the potential of a hybrid format that applies innovative design-led territorial and digital tools for citizen participation in just sustainability transitions. The experiments will focus on involving communities that are the most vulnerable in the face of the transitional challenge – e.g., ethnic minorities, youth groups, women, and specific sectoral workers communities (such as miners and employees of mining-related companies) - which are the target of EU, national and subnational policies (e.g., the EU Just Transition Fund, JTF). Results of the experiments will show how these novel instruments can empower communities by enhancing their ability to anticipate and envision regional structural change, build capacity

through consensus formation in a pluralistic and inclusive decision environment, and position themselves more strategically and forcefully in democratic life at scale.

To achieve this ambitious set of objectives, the DUST project builds on an innovative mix of diverse research methods, coupled with experimental citizen participation practices and non-visual communication methods geared towards stimulation of involvement of the least engaged communities in the project and the policies that it studies. The methodology designed for this purpose is outlined below.

1.2.   The purpose of this deliverable

The research methodology bringing together these methods and guiding the exploration conducted in DUST is described in this report. The purpose of this exercise is two-fold. On the one hand, the report presents and refines the methodological approach of the project to inform external audiences about how the research is organised to produce the expected insights and outputs, while ensuring high quality, richness, and validity of the findings. By this, we ensure transparency of the research methodology and provide researchers exploring similar issues with methodological insights for future research beyond DUST. On the other hand, the purpose of this report is also internal. It is supposed to provide the project partners, the researchers, experts, and stakeholders involved with guidance and clarity on how the research will be conducted in terms of coordination across the tasks and work packages (WPs), stressing the key interdependencies and synergies between the tasks, the methods used, and inputs/outputs produced through their application.

An important caveat is that for each of the WPs, methods are detailed in the early tasks for each WP. At the time of writing of this deliverable some of the research methods to be used in the DUST research are still being elaborated or will be elaborated at a later stage of the project. Therefore, this deliverable is a 'living document' which will be updated when the research methods are fully elaborated as the project unfolds.

1.3.   Reader's guide

The report is structured as follows. The following section outlines the methodological framework for DUST research, explaining the workflow between work packages, the strategy behind the selection of case study regions and some basic insights on the features of these territories from point of view of the just transitions policies, main transitions challenges, features of territorial governance and spatial planning systems. Then, the report covers the methodological framework for three parts of the DUST research project. Firstly, the multiple case study analysis, undertaken through a mix of quantitative and qualitative research methods in WP2 and WP3. Secondly, the focus shifts towards the experimental phase of the research, where, in WP4 and WP5, an array of spatial, design-based, deliberative, and participatory methods is deployed to set the scene for and implement the Regional Futures Literacy Labs (RFLLs) across four case study regions. Thirdly, the report covers research methods used to inform the affective communication approach, supporting the DUST research in reaching out to and engaging citizens in the research. Finally, the report closes with arguments on triangulation of research methods used and an overview of methodological innovation that DUST puts forward.

2. DUST methodology

2.1.   DUST workflow

The DUST project is structured around eight work packages (WPs). These are as follows:

- **WP1 Theory and methodology (lead: TUD)**. WP1 provides a theoretical, conceptual backbone for DUST. It also provides guidelines for the use of research methods chosen and interactions across tasks and WPs. At the end of the project, WP1 synthesises all the main messages from the project for diverse audiences.

- **WP2 Measuring the democratic quality of citizen participation in place-based policies for just sustainability transitions (lead: UZH).** Working in tandem with WP3, this WP measures the performance of participation in place-based policies for just sustainability transitions. WP2 will produce a tool for measuring and comparing the depth and intensity of citizen participation at multiple levels - the Stakeholder Engagement and Participation in Policy-Making Processes (STEP) index - and apply it in a comparative analysis. The quantitative research in WP2 will help identify social groups that face barriers in participation (least engaged communities) in place-based policies for just transitions at different levels of government and sched light on the factors that influence those barriers. Finally, synthesizing the findings, WP2 will identify opportunities for 'active subsidiarity' in multi-level policy-making processes, to be further explored in WP3.

- **WP3 Analysis of factors conditioning the deliberative participation of least engaged communities in place- based just transition policies (lead: STRATH).** WP3 first identifies and categorises the relevant policies at the regional, national and EU levels and the forms of participation they use (to be used in the quantitative analysis in WP2 and later in Regional Futures Literacy Labs in WP5). Second, WP3 builds on the findings from WP2 to investigate the contextual factors that facilitate or hinder the participation of least engaged communities in the diverse practices of deliberation implementation in said policies, using qualitative, face-to-face research methods. In this, particular attention will be paid to explore whether and how digital and design-based tools influence the extent and quality of participation by least engaged communities in deliberation over sustainability transitions initiatives. Then, WP3 will shed light on the role and impact of narratives on just sustainability transitions on the participation of the least engaged communities in the relevant place-based policies through a media analysis. Finally, a synthesis and key lessons from WP2-3 will be drawn to inform the DUST experiments (WP4-5).

- **WP4 Setting the stage for participation: Mapping, visualisation, and digitalisation (lead: TUD).** Building on research in WP2-3, WP4 prepares and supports the participatory experimentation with citizens, policymakers, and experts as part of 'RFLLs in WP5. A novel combination of design-led territorial and digital instruments for more proactive and strategic involvement of least engaged citizens and communities is elaborated to form a framework for the use of design-led territorial and digital instruments and enable a comprehensive comparative assessment of results. WP4 maps the policy context for the experiments in case study regions and envisions the impact of place-based policies, develops policy statements based on communities' visions contrasted with the forecasts

of policy impact, and deploys the Pol.is tool to engage citizens in deliberation on those statements. Finally, WP4 formulates recommendations and guidance for the use of design-led territorial and digital instruments to support active subsidiarity beyond the DUST project.

- **WP5 Regional Futures Literacy Labs: Testing design-led territorial instruments for participation (lead: NR).** WP5 focuses on the development and implementation of place-based citizen engagement strategies for sustainability transitions, focused on the proactive and strategic involvement of marginalised and vulnerable communities in RFLLs. These allow citizens to identify and imagine alternative scenarios for just transition and forecast the implications of these imaginations for themselves and their communities, empowering them to prepare and contribute towards policies for alternative just transition futures. RFLL experiments are conducted in four regions where sustainability transitions entail particularly acute social justice challenges, eligible for the EU's Just Transition Fund. Finally, WP5 draws lessons from this participatory experimentation, identifying citizen learnings.

- **WP6 Dissemination, communication and exploitation (lead: ISOCARP).** WP6 will deliver a range of dissemination and outreach tools and activities to ensure a wide impact of the project and uptake of its products. DUST will leverage the partners' policy and planning networks to directly engage practitioners from diverse European cities and regions in professional education geared towards transfer of knowledge, tools and good practice developed in DUST across diverse regions, while training current and future urban and regional leaders to develop skills for effective engagement of citizens in place-based policies. Communication approach will include intensive use of social media and visual storytelling materials (infographics, maps, visual abstracts), but also online deliberation and co-creation activities and a 'Community Champions' campaign to engage the typically marginalised social groups. In addition, an additional line of research on affective communication will be conducted in WP6, to inform non-verbal communication with citizens during the project and draw lessons from this process for application beyond DUST.

- **WP7 Ethics (lead: TUD).** The project involves citizens from vulnerable social groups in the research, not only as respondents but also as actors involved in co-creation of knowledge, therefore special attention needs to be paid to designing and observing sound ethical guidelines.

- **WP8 Project management (Lead: TUD).** This cross-cutting WP will ensure the overall technical and scientific coordination of the project. It will also develop and implement a data management plan.

In this report, the focus is on WP2-6, which form the core of the DUST case study research and experimentation.

Figure 1 DUST workflow across work packages

Figure 2 Overview of the core research tasks across WPs

WORK PACKAGE 1	WORK PACKAGE 2	WORK PACKAGE 3	WORK PACKAGE 4	WORK PACKAGE 5	WORK PACKAGE 6
TASK 1.1 Theoretical and conceptual frameworks	**TASK 2.1** Elaboration of an index for the comparative assessment of participation in multi-level just transition planning and implementation	**TASK 3.1** Identification and assessment of participatory processes in just sustainability transition measures in case study regions	**TASK 4.1** A framework for monitoring and assessing RFLLs	**TASK 5.1** Guiding the Regional Future Literacy Approach	**TASK 6.1** Communication, Dissemination, Exploitation Plan
TASK 1.2 Development of the project methodology	**TASK 2.2** Design, implementation and analysis of population survey on participation in sustainabiliy transition initiatives and factors determining this	**TASK 3.2** Factors impacting the scale and quality of participation of least engaged communities in deliberative governance of transition policies, including digital tools	**TASK 4.2** Context mapping: Forseeing the impact of ongoing policy	**TASK 5.2** Regional Futures Literacy Lab Planning and Citizen Engagement	**TASK 6.2** External Communication: project identity, website and social media
TASK 1.3 Synthesis: Drawing lessons from WP2-5	**TASK 2.3** Specification and application of APES	**TASK 3.3** Media analysis	**TASK 4.3** Regional design: Imagining the impact of community-led policy in regions	**TASK 5.3** Regional Futures Literacy Labs	**TASK 6.3** Scientific knowledge dissemination: publicatioin and conference participation
	TASK 2.4 Identify options for 'active subsidiary' in the policy-making process	**TASK 3.4** Synthesis of quantative and qualitative results	**TASK 4.4** Regional design: Imagining the impact of community-led strategic positions in policy co-creation	**TASK 5.4** Citizen Learning and capacity building/resilience	**TASK 6.4** The DUST Academy
			TASK 4.5 E-democracy (Pol.is): Enabling democratic life at scale		**TASK 6.5** Storytelling and community engagement with Digital Tools
			TASK 4.6 Assessing the performance of the design-led territorial and digital instruments		**TASK 6.6** Community Champion Network with Local Community Leaders
					TASK 6.7 Beyond DUST: Final Conference, Exhibitons, Online Handbooks, Videos, and Seminars

2.2. DUST case study regions

2.2.1. Case study selection and rationale

DUST multiple case study research covers eight European regions. Aiming to focus on parts of Europe where sustainability transitions pose the greatest challenges, we chose regions that are classified as structurally weak regions due to their strong reliance on energy-intensive industries, such as coal mining, gas extraction, cement, or steel industries. Furthermore, the regions chosen are eligible for the European Union's Just Transition Fund (JFT), a funding mechanism as part of EU Cohesion Policy designed to prevent regional inequalities across the EU from growing as a result of the transition towards climate neutrality. In other words, this reflects the magnitude of the challenge that sustainability transitions bring for those regions.

Beyond, this, all the case study regions are the locus of multiple policy interventions supporting place-based approaches to sustainability transitions. These include EU-led policies (JTF, Cohesion policy, and other EU-supported and innovation-related interventions), national regional policy (including programmes oriented at smart specialisation; innovation programmes; industrial programmes; rural development programmes; and programmes that support social innovation initiatives), and spatial planning interventions oriented towards mitigating the impact of sustainability transitions (for instance dedicated city or regional spatial, transport and mobility plans and brownfield regeneration interventions). The choice of policies to focus on for each of the case study regions will be informed by desk research conducted in T3.1 in WP3.

Moreover, to ensure that our findings allow for drawing lessons beyond our case study areas and offer insights for Europe as a whole, the regions chosen differ strongly in (1) their socio-economic and territorial contexts; (2) the composition of the said multi-level policies; (3) national governance style and planning systems. The case study regions differ in terms of progress on the transitions away from the energy intensive industries, with some of them well advanced in this process, while others only being at an earlier stage of phasing out of these industries.

We also selected case study regions so that our research covers a diversity of European territories, including Western, Northern, Central, and South-Eastern Europe. Our case study areas fall into five countries that are assessed differently in terms of the maturity of democratic institutions, from the well-rooted democracies in Western and Northern Europe, to the 'younger' democracies in the post-communist Eastern part of the continent. While the case study areas do not include a Southern European region, we compensate for this by targeting policymakers and stakeholders in Southern European countries via the External Expert Advisory Board members, including experts from Italy and Portugal. We also designed adequate measures to reach out to Southern European policy circles through dissemination strategies defined in WP6.

The regions included in the DUST research are listed below, including a brief overview of the industries undergoing a transition, the key EU and national policy instruments implemented to assist that transition, characteristics of their planning systems and of the approach to governance of just sustainability transitions, and a brief overview of the core industrial sectors affected by the transitions.

Lusatian Lignite District (Germany): This Eastern German region undergoes a structural change, moving away from lignite mining, which was the foundation of the region's economy. The key EU-funded policy interventions in this area are related to the Territorial Just Transition Plan (TJTP) for Brandenburg's and Saxony's part of Lusatia (starting in autumn 2022) and other

programmes funded with Cohesion Policy. The key national policy interventions relate to funding for phasing-out of coal extraction in the country. Spatial planning is conducted through land-use planning at regional and municipal levels, alongside informal spatial planning instruments. The governance of just sustainability transitions focuses on the national level and the level of the federal states of Brandenburg and Saxony. Several attempts to strengthen more integral and decentral regional governance, hampered by territorial and administrative division between the two federal states (entailing competition for funds). The key industrial sector affected is mining of lignite coal. The currently planned phasing-out of the sector is part of a permanent and wide-ranging transition, that has been ongoing since the early 1990s.

Katowice Coal Region (Poland): The just transition process in this highly urbanised coal mining region is supported by the TJTP for the Silesia Voivodeship, and the Regional Operational Programme (ROP) for Silesia Voivodeship 2021-2027, funded via Cohesion Policy. This process is also supported by the National Just Transition Plan, the National Fund for Environment Protection and Water Management, and sectoral programmes funded via European Regional Development Fund (ERDF) and European Social Fund (ESF+). Spatial planning is conducted via regulatory local and regional land-use programmes and spatial plans; the region has a regional spatial plan for just transitions. TJTPs in Poland are under negotiation at the time of writing of this document. The governance of just transitions uses a hybrid model oriented at mediating tensions between national and regional levels of management of the JTF. Recent JTF planning involved the Silesian Marshal Office (regional authority). The main sector affected is coal mining. Katowice area is the largest coal mining region in Poland. The region's economy is diversified (with intra-regional disparities), but coal mining and related industries still provide most jobs.

Stara Zagora (Bulgaria): this is also a coal mining region, where EU-funded interventions related to the TJTP are under negotiation. The shift towards more sustainable future for the region is supported by the National Recovery and Resilience Plan, the Modernisation Fund, ESF+ and other programs funded through EU Cohesion Policy. The key national and regional interventions of relevance are the National Innovation Fund and the Smart Specialisation Strategy for Stara Zagora. Spatial planning in the region is conducted via the National Concept for Spatial Development and the general development plan for Stara Zagora. The JTF has not been allocated yet. The governance of sustainability transitions is steered at the national level. Parallel consultations with local and regional stakeholders are ongoing. Disputes between the EU and the national level cause political and regulatory uncertainty. The region hosts most lignite-fired energy plants in Bulgaria and hosts the largest lignite coal deposit in Bulgaria. Other industrial sectors are also present (mechanical engineering, food, and electronics), albeit the region remains heavily dependent on mining.

Norrbotten (Sweden): Norrbotten differs from the above three regions in terms of its peripheral location and focus on iron ore extraction and steel industry. EU-funded interventions related to EU TJTP are in place. In addition, the transition process is supported by the National Strategy for Sustainable Regional Development 2021–2030, the Smart Specialisation Strategy Norrbotten, and the Strategic Innovation Programme for mining and metal extraction. Spatial planning is conducted via local spatial plans, while the region has regional spatial planning strategies for mobility, employment, and energy. Draft EU territorial Just Transition plans are developed in collaboration between national government and agencies, sub-national authorities, and sectoral actors. Municipalities are important actors in collaboration among regional industries, businesses, and NGOs. The key industrial sectors in Norrbotten undergoing transitions concern cement, steel, and basic chemicals. The regional economy focuses on commodities with limited substitutability by fossil-free alternatives, which calls for transition policies. There is a need to

involve local communities that are economically dependent on these industries in decision-making on the future of the region.

Gotland (Sweden): a peripheral and insular area that remains dependent on fossil fuel industries and extraction of minerals. The transition process is supported by EU-funded interventions related to EU TJTPs that are currently under discussion. As for Norrbotten, the National Strategy for Sustainable Regional Development 2021–2030 is the key domestic policy instrument that supports further the socio-economic shifts in Gotland. Likewise, spatial planning and territorial governance in Gotland operate within the same framework as that in Norrbotten. The petrochemical and refining industries as well as minerals extraction are key for the island's economy. The dependence on these economic activities is especially challenging for smaller communities, where these sectors employ a large proportion of the population.

Rhenish Lignite District (Germany): this highly urbanised region remains highly dependent on the increasingly contested lignite mining. EU-funded interventions related to the TJTP for the Northern Ruhr Region and the Rhenish Mining Area are in place, supported by other programmes funded under EU Cohesion Policy. The national interventions of relevance are the same as those mentioned above for Lusatia and so is the spatial planning system. The governance of just sustainability transitions in the region emphasizes the national level and the level of federal state of North Rhine Westphalia, which directs the funds to two affected areas: the Northern Ruhr and Rhenish area. The region has experience with successful formats for the regional governance of place-based policies for sustainability transitions. The key industry sector affected by the transitions is mining of lignite coal, which remains a major economic sector in the region. Apart from that there is presence of several other sectors making the region's dependency on the mining industry moderate.

Groningen Province (Netherlands): the Groningen area is a peripheral, northernmost region of the Netherlands, heavily dependent on extraction of natural gas on land and the North Sea. As in other regions included in DUST, there are EU-funded interventions related to the TJTP, focusing on the wider area of the North Netherlands. Beyond that, the key nationally funded interventions include the National Programme Groningen, supporting the development of areas that are affected by earthquakes caused by gas extraction. Integrated spatial planning is conducted via local land use plans and national, provincial, and municipal 'environmental visions', while informal planning instruments are also in use. The transitions governance emphasises the regional level, with a mature organisational structure for the integration of interventions across provinces and municipalities and involves close cooperation with the adjacent regions. Gas extraction and industry based on fossil raw materials play a dominant role in the region. Cessation of gas extraction puts employment under pressure, fuelling the already present depopulation trend, while earthquakes remain a negative externality of gas extraction.

Bełchatów Area of Transition (Poland): this area is part of the Łódzkie region in Poland, hosting the biggest open coal mine in the country. Similarly as in Katowice region, the EU-funded interventions of relevance for the transitions include the TJTP for Łódzkie Voivodeship, and the ROP for 2021-2027, funded via ERDF, JTP, and ESF+ sources. The same national policy instruments also apply. Spatial planning is conducted via regulatory local and regional land use programmes and spatial plans, like elsewhere in Poland. The region has developed a regional spatial plan for just transitions, which is currently under negotiation. The same approach to governance transitions as in Katowice region applies here. The regional economy is dominated by the biggest conventional lignite coal power plant in Poland, with adjacent open pit mines. The

energy sector provides most jobs in the region, making it highly vulnerable to transitions away from fossil fuels.

Figure 3 Impressions of the extraction landscapes in the four case study regions where participatory experiments will be organised

Note: 1 – Lustatian Lignite District (DE), 2- Katowice Coal Region (PL), 3 – Stara Zagora (BG), 4 – Norrbotten (SE)

Sources: https://upload.wikimedia.org/wikipedia/commons/c/c1/Wjel%C4%8Danska_jama.jpg;
https://www.flickr.com/photos/ahorcado/5699872239/; https://upload.wikimedia.org/wikipedia/commons/a/a3/Galabovo.jpg;
https://commons.wikimedia.org/wiki/File:00_2800_Kiruna_-_Schweden.jpg

Note: 1 – Gotland (SE), 2 – Rhenish Lignite District (DE), 3 – Groningen (NL), Bełchatów Area of Transition (PL)

Sources: https://www.flickr.com/photos/hesim/6050277240/?map=1;
https://upload.wikimedia.org/wikipedia/commons/5/5d/Be%C5%82chat%C3%B3w_Lignite_Coal_Mine.jpg;
https://commons.wikimedia.org/wiki/File:Wildervank_natural_gas_field.jpg;
https://en.wikipedia.org/wiki/Ende_Gel%C3%A4nde_2017

Table 1 Main characteristics of the case study regions

Region	Location	Type	Key industries	Case study research	Participatory experiments
Norrbotten	Northern Europe, SE	Intermediate region, remote	Iron ore mining, steel	x	x
Lusatian Lignite District	Central Europe, DE	Intermediate region, close to a city	Lignite mining	x	x
Katowice Coal Region	Central Europe, PL	Predominately urban	Coal mining	x	x
Stara Zagora	South-East Europe, BG	Predominately urban	Lignite mining	x	x
Gotland	Northern Europe, SE	Predominately rural, remote	Minerals mining, cement	x	
Rhenish Lignite District	Central Europe, DE	Predominately urban	Bituminous coal mining	x	

Region	Location	Type	Key industries	Case study research	Participatory experiments
Bełchatów Area of Transition	Central Europe, PL	Intermediate region	Lignite mining	x	
Groningen	Western Europe, NL	Intermediate region	Natural gas extraction	x	

Figure 5 Geographical spread of the DUST consortium and its case study areas
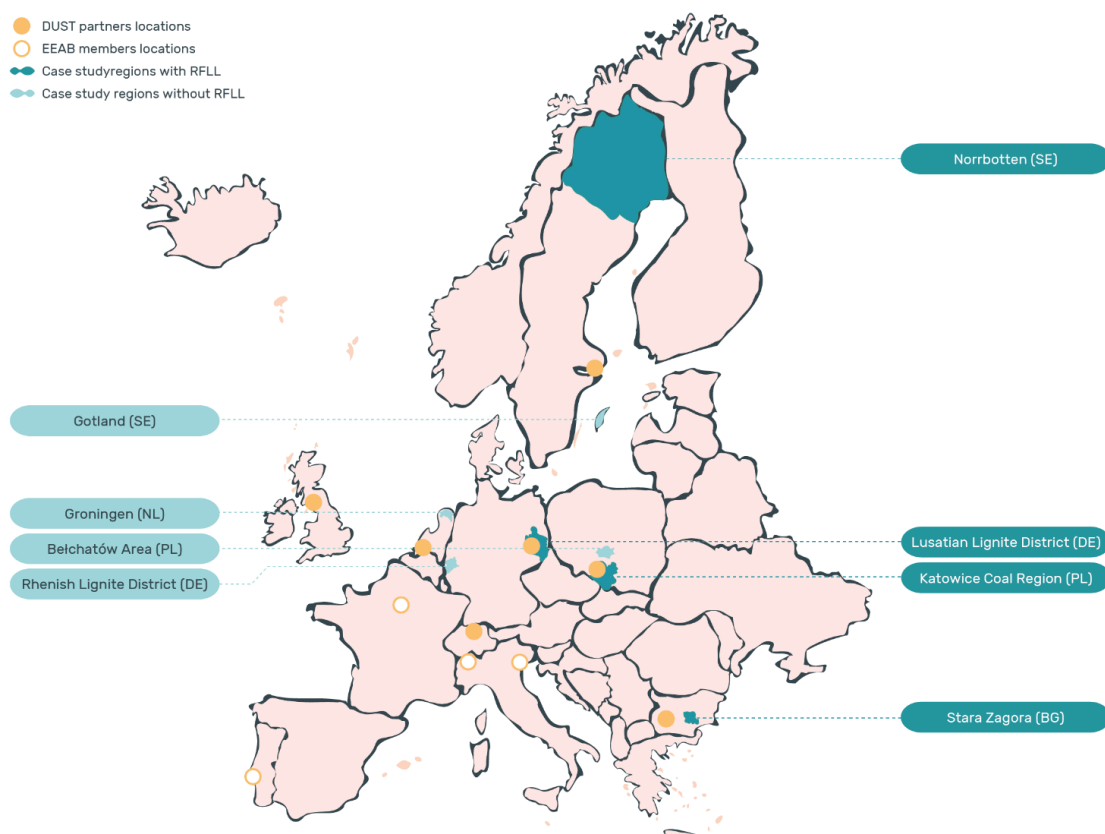
The least engaged communities in the case study regions share some characteristics, in line with how sustainability transition disproportionally affect elderly, workers (and their families) in the energy-intensive industries and supportive sectors, women, and youth. However, communities in the regions also differ as regions host specific ethnic minorities, communities that hold specific grievances and distrust in public institutions due to historic or recent experiences, and communities that – in addition to being affected by sustainability transitions – experience additional challenges due to residing in remote, rural regions. The regions also differ in terms of recent experiences with citizen participation in the implementations of policies. All these aspects will be investigated in great depth in the multiple case study analysis in WP2 and WP3.

2.2.2. Regions covered across the WPs: from multiple case study research, to focused experiment, and broad dissemination

Of the eight regions that are studied in multiple case study research (WP2-3), four have been selected for the locations of the Regional Futures Literacy Lab experiments organised in WP4 and WP5 (see Table 1 and Fig. 5 above). Criteria that were considered in this selection are the relatively high acuteness of the socio-economic and democratic challenges that regions face, and the way that ongoing and upcoming policy interventions are offering true 'lab' conditions: all regions know a series of upcoming important policy interventions, often including relatively delayed JTF allocations, which leaves space for inputs through citizen participation and new research insights guiding the process of engagement of diverse communities in the debate and decision-making on the sustainable futures of those regions. The case study areas selected for participatory experimentation in DUST are also in particular need of enhanced and expanded citizen participation in place-based approaches to just sustainability transition, evidenced by expressed discontent about ongoing negotiations, and the exclusion of communities during earlier policy processes. Finally, the regions to host the DUST Regional Futures Literacy Labs experiments were also selected due to the strong commitment of civic society organisations who have access to least engaged communities in regions and are partners in DUST.

The regional focus in DUST research design can be compared to an hourglass structure, ranging from broad, to narrower, and then broadening again (see Fig. 6 below). We begin the research with a relatively broad range of eight diverse case study areas from across different parts of Europe. This multiple case study research, conducted in WP2 and WP3, will inform the participatory experimentation in a narrower set of four regions, for which DUST will implement Regional Futures Literacy Labs and combine design-based tools for engagement with digital deliberation at scale.

Subsequently, we will strive to promote learning and uptake of knowledge and results from the four experiments among all the eight regions covered in DUST. Then, building on this, and the earlier results of the multiple case study research, DUST will broaden the range of targeted region going beyond the eight case studies to include regions in Southern and other parts of Europe, taking advantage of the networks of the External Advisory Board Members, and deploy a set of dissemination, outreach and exploitation actions (WP6) to reach out to practitioners at the European, national and regional levels, diverse citizen groups, students (future urban and regional leaders). These will include, for instance, engagement of practitioners from a diversity of contexts in the DUST academy, a professional education package designed to promote the uptake of the DUST research results.

Figure 6 Case study research focus along the DUST's work packages
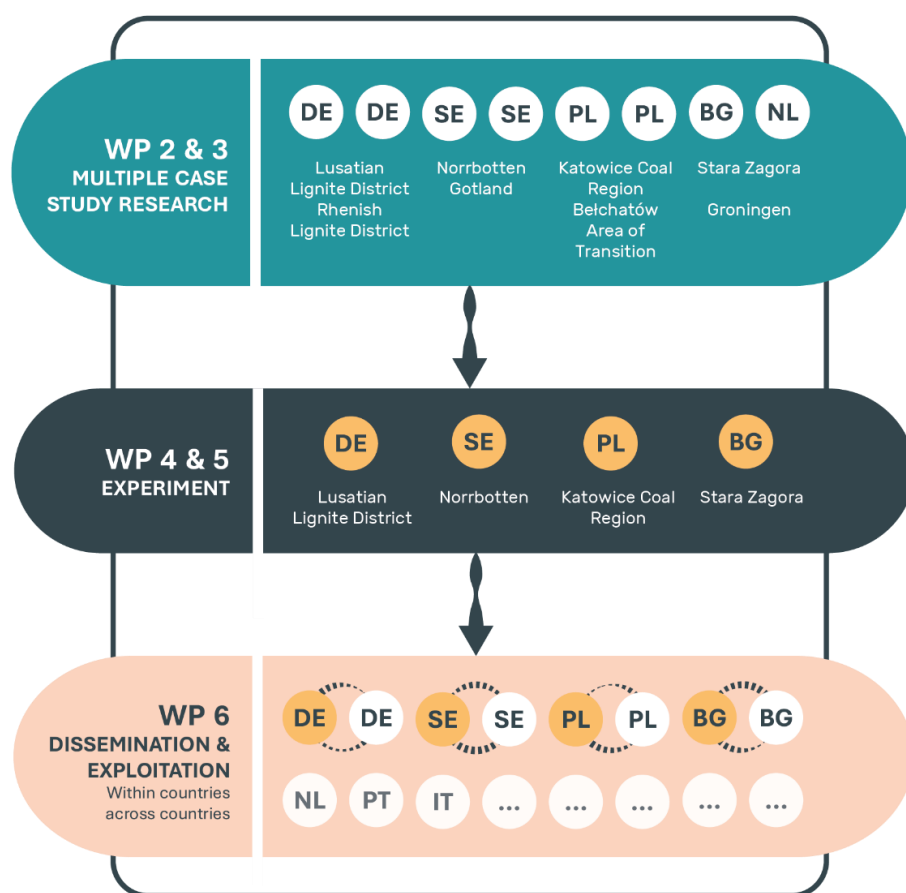
3. DUST case study research: analysing the scope, depth and determining factors of participation in just sustainability transitions

The DUST methodological approach is designed to increase our understanding of how territorial responses to just sustainability transitions can be democratised to maximise participation of the least engaged communities and increase trust in democratic governance. To reach the intended depth of knowledge and viable recommendations concerning this challenge, the project's methodology has two principal elements: multiple methods and multiple case study research in the first phase of the project (WP2-WP3) and experimental participatory research in the second phase (WP4-WP5).

In this chapter, we explain the methodological approach for the multiple case study research delivered in WP2 and WP3. Building on theoretical and methodological foundations developed in WP1, this part of the project evaluates quantitatively the state of plan citizen engagement in the context of the relevant multi-level place-based policies intended to steer just sustainability transitions in DUST's case study regions (WP2) and sheds light through qualitative research and media analysis on the factors that determine the participation of the least engaged communities in these policies. The multiple case study research will inform policy through recommendations, provide a framework for assessing citizen engagement in multi-level place-based sustainability transitions policies, and inform the instrumental dimension of the DUST research related to participatory experimentation in WP4 and WP5 with design-based tools, digital deliberation at scale based on the Pol.is software and participatory and co-creative interaction with the least engaged communities and other stakeholders in the Regional Futures Literacy Labs (covered in Chapter 7 of this document).

We begin this chapter by explaining the methodological approach to case study research in DUST, followed by an overview of the research methods used in the analysis and evaluation of participation of the least engaged communities in territorial policies promoting just sustainability transitions across our eight case study areas.

3.1. Methodological approach in the DUST case study research (WP2 and WP3)

3.1.1. Description and motivation of methodology

WP2 and WP3 work in tandem on the multiple case study research, generating complementary insights on the performance of citizen participation in place-based just sustainability transitions and allowing for cross-validation and triangulation of findings from different perspectives and

using different research methods. In a nutshell, WP2 asks the 'what' question: what is the depth and intensity of participation in the design and implementation of sustainability transitions policies in a multi-level setting? To answer this question, the STEP-Index (STakeholder Engagement and Participation in Policy-Making Processes) is developed. The index will be used to evaluate the quality of stakeholder and citizen participation in policy processes at different levels of government. Given that this part of the research will be based on quantitative research methods - including, for instance, a citizen survey covering a large sample of respondents and a quantitative relational analysis of the participation of different groups along the policy cycle - it will allow for assessing the state of play, compare the performance of participation across territories and refine our understanding of barriers to participation of the different social groups and identifying opportunities for advancing the 'active subsidiarity' in multi-level policy-making processes.

WP3, in turn, asks the 'why' question: why is there variation in the depth and intensity of participation across territories and communities? In other words, what factors shape citizen participation in place-based sustainability transitions policies? To answer this question, WP3 builds on a qualitative research approach, first, identifying the relevant policies in consultation with societal partners and stakeholders, and then exploring the factors that facilitate or impede the proactive participation of the least engaged communities in eight case study regions. This analysis includes an assessment of how digital tools influence the extent and quality of participation by least engaged communities and of how participation is affected by narratives of the sustainability transitions across a range of traditional and social media. Using focus groups organised with local communities and interviews with policy practitioners at multiple levels, it identifies and analyses political, policy, environmental and socio-economic variables that facilitate or constrain deliberative participation of the least engaged communities in sustainability transition measures.

The methodological approaches used in WP2 and WP3 and their implementation are coordinated to strengthen understanding of the depth of participation in sustainability transition initiatives and the factors that explain the variation in this process across territories and communities. The innovative mix of diverse quantitative and qualitative research approaches is designed to shed light on the topic from in a comprehensive way, capturing both the 'big picture' and the granularity of the interplay of factors that influence participation of citizens in just transitions policies in a multi-level context of the European Union. This also allows for ensuring the robustness of the research. Combining multiple methods across WP2 and WP3 to explore the performance and factors that shape citizen participation in this context allows for cross-validating and triangulating the findings, while ensuring both sufficient breadth and depth of the insights produced. By this, WP2 and WP3 methods combined provide a sound evidence base to inform and support the experimental stage of the research (WP4-5).

3.1.2. Workflow and interaction across WP2 and WP3 and relations for other WPs

The activities undertaken in WP2 and WP3 feed into each other across several tasks, as shown on Fig.7. The identification and assessment of participatory processes taking place in the first stages of WP2 (T3.1), informing the formulation of the STEP Index (T2.1), refining of the design of the citizen survey (T2.2) and the application of the APES method (T2.3). The survey results will shed light on the citizens' perceptions on just sustainability transitions policies and their prospective participation therein, while the application of the APES tool, in turn, will help refine

the initial understanding of which communities are engaged in the policy process across different levels of government and stages of the policy cycle. These results will provide inputs into further qualitative exploration in WP3, for instance by informing selection of interviewees and focus group participants. Finally, the synthesis of findings from WP2, including identification of options and opportunities for active subsidiarity, will feed into the final task of WP3 (T3.4) to synthesize the main take-aways from the combination of quantitative and qualitative findings across WP2 and WP3, to produce policy recommendations, a starting point for the spatial analysis and experiments conducted in WP4 and WP5 and valuable insights for (affective) communication towards the least engaged communities conceptualised and operationalised in WP6.

Figure 7 Methodological approach to DUST WP2-3 and interactions with other WPs
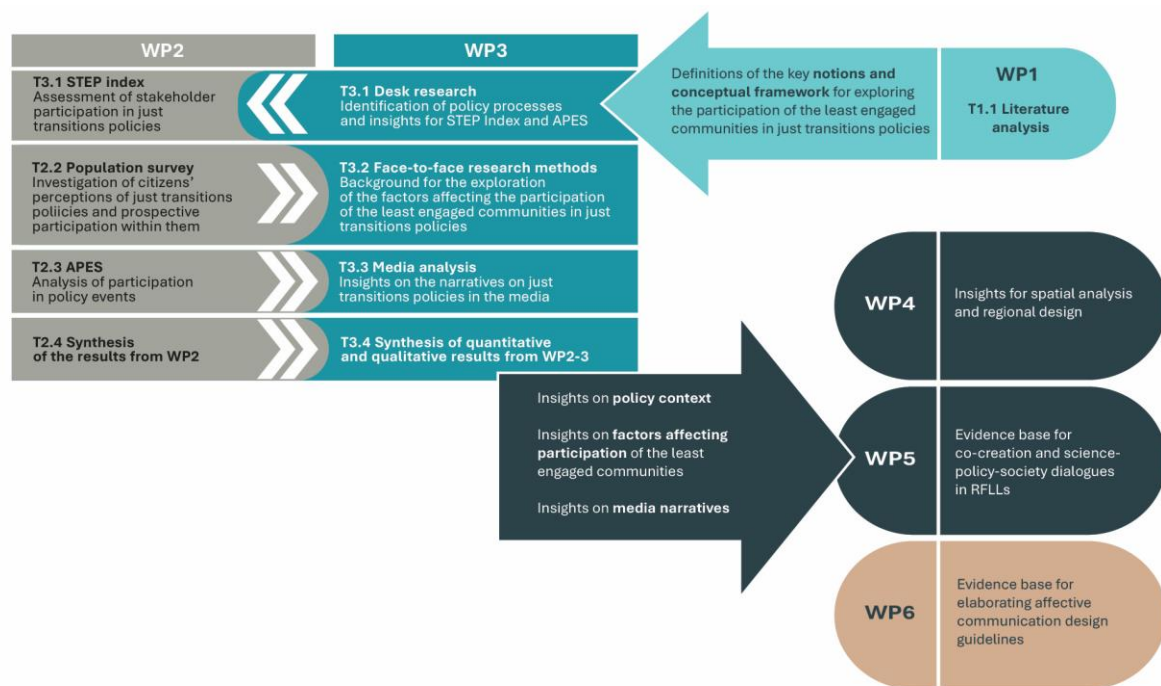
The multiple case study analysis carried out in WP2 and WP3 applies an innovative methodological research design combining quantitative and qualitative methods to analyse and evaluate the participation of the least engaged communities in just sustainability policies at the regional level. The following methods are used to collect and analyse data in the multiple case study analysis:

- Desk-based research, including literature review and policy documents analysis;
- Stakeholder Engagement and Participation in Policy-Making Processes (STEP) Index developed in DUST and applied to measure participation in just sustainability transitions policies;
- Population survey in case study regions;
- Actor-Process-Event Scheme (APES) analysis of participation of different groups at the different stages of the policy process;
- Semi-structured interviews with policy experts;
- Focus groups with citizens representing the least engaged communities;
- Media analysis, including traditional and social media.

The use of these methods is closely intertwined to ensure a balance between breadth and depth of the research. Quantitative methods in WP2, like the survey, will give insights on the 'big picture', investigating the perspectives on just transitions policies among diverse citizen groups based on a large sample of respondents in WP2. This will provide a broad perspective on the issue. By contrast, qualitative methods used in WP3, like expert interviews and focus groups discussions, will allow to 'go in-depth' to understand the performance of citizen engagement practices in practice and investigate the factors behind low engagement of certain specific groups in multi-level place-based transitions policies.

The research will begin with desk research (see Fig. 7) to identify the relevant multi-level place-based policies, both European and domestic, that support the regional transitions towards more sustainable futures and away from the energy-intensive industries. Desk research will inform the selection of policies to evaluate with the STEP Index in WP2. The survey conducted in WP2 will generate insights on the perceptions and expectations of citizens with respect to just transition policies and their needs/ capabilities to participate in policy planning and implementation, which will then provide background for further exploration in WP3. In the latter, focus groups will be organised, involving the least engaged communities to understand their perspective on transitions, how they affect them and whether and how they perceive the engagement in the policies that are to drive those transitions. In parallel, the APES analysis in WP2 will map the participation of representatives of social groups in the events related to the different stages of the policy cycle, providing a basis for further exploration through interviews with policy practitioners in WP3 to identify the explanatory factors behind the patterns of participation identified. On top of that, the media analysis in WP3, will offer an additional perspective on the how the depth of engagement in these policies is conditioned by media narratives about sustainability transitions and their regional impacts, completing the comprehensive study of citizen participation operated across WP2 and WP3. More details on each of the methods used in the multiple case study analysis in WP2 and WP3 are provided below.

3.1.3.   Expected results

WP2 quantitative analysis will produce the following deliverables:

- **D2.1 STEP Index: a comparative assessment tool for measuring stakeholder engagement and participation in just sustainability transition policies** (Month 7, Lead: CSD): this deliverable will present the STEP index that enables `to measure the performance of citizen participation in just transitions policies in our eight case study regions and beyond. It is custom-tailored to assess engagement and participation in just sustainability transition policies from a comparative perspective. Within the scope of DUST, it will allow assessing the state of play in participation and set the stage for participatory experimentation with design-based tools and digital deliberation, which in turn is expected to generate knowledge and recommendations on how to rethink the involvement of the least engaged communities in the multi-level just transitions policies.

- **D2.2 Citizen survey: measuring participation** (Month 8, Lead: UZH): this deliverable will summarise the results of the citizen survey conducted across the eight DUST case study regions, offering a 'big picture' perspective on citizen engagement in place-based sustainability transitions and feeding into further analysis of the factors explaining that engagement (or lack thereof) through qualitative methods in WP3. In particular, the survey will provide quantitative insights into which groups are able/unable or

willing/unwilling to be engaged in the transitions policies, which will refine the understanding of the least engaged communities in each case study region and thus inform further investigation through focus groups in WP3. By this, the DUST citizen survey delivers original empirical knowledge on citizens' participation in the deliberative governance of place-based policies for sustainability transitions.

- **D2.3 APES: Mapping of process and actor networks** (Month 10, Lead: UZH): this deliverable, building on the results of the application of the APES method to measure who, when and to what extent is involved at the different stages of the policy cycle for the policies explored in DUST. This method will show processes of event participation as well as networks of involved actors in the planning and implementation of multi-level place-based policies for sustainability transitions in eight case study regions. Like the survey, it will raise questions to investigate further through qualitative methods (interviews, focus groups) in WP3.

- **D2.4 Factors influencing participation: opportunities and barriers for active subsidiarity** (Month 12, Lead: CSD): this report will synthesize the findings from the quantitative research in WP2 through the prism of the active subsidiarity concept. The report will feed into further analysis in WP3, provide insights on the context for the participatory experimentation in WP4 and WP5, and identify opportunities for deepening participation of the least engaged communities in just transitions policies in the DUST case study regions.

- **D2.5 Stakeholder Engagement and Participation (STEP) Index: user manual** (Month 12, Lead: CSD): building on the experience of the application of the STEP index in WP2, this final deliverable of WP2 will support the uptake of the index beyond the DUST project. This methodological handbook will provide the practitioners and researchers willing to measure the performance of citizen participation in place-based multi-level policies (not necessarily those related to sustainability transitions) with a clear, step-by-step guidance on how to apply the STEP index for that purpose.

- **D2.6 Policy briefing: Opportunities and barriers for active subsidiarity in just sustainability transition policies** (Month 12, Lead: CSD): this policy briefing identifies opportunities and barriers for promoting active subsidiarity in just sustainability transition policies as well as factors that enhance or hinder the participation of least engaged communities in related policymaking.

Building on the insights from and deepening the quantitative research insights from WP2, the qualitative research and media analysis in WP3 will produce the following deliverables:

- **D3.1 Assessment of representative and deliberative forms of participation in just sustainability transition measures** (Month 6, Lead: STRATH): this deliverable will recap the main findings from the desk research exploring how citizen participation is organized in just sustainability transitions policies across the eight case study regions. As such, this interim report summarises the results of initial research into participatory processes in eight case study regions. It prepares further in-depth analysis by identifying key place-based policy measures, key characteristics of least politically engaged communities, methods, and arenas where representative and deliberative participation takes place, and different outcomes of these forms of participation.

- **D3.2 The participation of least engaged communities in deliberative governance of transition measures: facilitators and barriers, including digitalisation** (Month 15, Lead: STRATH): informed by the citizen survey, and building on the insights from interviews with experts and focus groups involving the least engaged communities, this deliverable will identify and compare the factors that facilitate and hinder the participation of the latter in place-based sustainability transitions in the case study regions. A particular emphasis will be placed on exploring whether and how design-based and digital tools for participation could increase the engagement of the currently marginalized groups, to inform policy and digital participatory experimentation in WP4 and WP5 respectively.

- **D3.3 Media analysis: the role of social and traditional media for the participation of communities in just sustainability transitions** (Month 15, Lead: CSD): completed in parallel to D3.2, this deliverable will summarise the results of the analysis of narratives on transitions in the eight case study regions in both the traditional (press) and social media, providing additional insights into the factors explaining the depth of participation of specific citizen groups in just sustainability transitions policies. Based on insights into how relevant content pieces are circulated, it identifies the role of media for the participation of communities in just sustainability transitions. This will feed into policy recommendations produced in WP3 and the negative media narratives on transitions will also provide a basis for co-creating counter-narratives with the least engaged communities and other stakeholders as part of the RFLLs.

- **D3.4 Citizen participation in just sustainability transition initiatives among least engaged communities: scope, depth and determining factors** (Month 16, Lead: STRATH): this deliverable concludes the research done in WP2 and WP3. The report will extract the core take-away messages from quantitative and qualitative research conducted across the eight case study regions. It will identify the scope, depth and determining factors that influence the participation of least engaged communities in the deliberative governance of sustainability transition initiatives. This will entail formulating recommendations for addressing deficiencies in citizen participation and promoting deliberative engagement of the marginalised groups in just sustainability transitions policies at the European, national, and regional levels.

The deliverables of WP2 and WP3, and especially the final synthesis of the findings in D3.4, will provide guidance for the further spatial analysis and participatory experimentation in WP4 and WP5 in the Stara Zagora, Norrbotten, Katowice Coal Region, and Lusatian Lignite District. The identification of the least engaged communities and their perspectives, first through desk research, then the survey, later deepened through focus groups, will be critically important for engaging the right citizen groups both in the application of the Pol.is software to enable online deliberation of sustainability transitions at scale (WP4). By the same token, this will enable to target and engage the relevant least engaged community members in participatory workshops as part of the Regional Futures Literacy Labs (WP5).

Furthermore, the insights from focus groups on the perspectives of the least engaged communities will inform the design of visual and artistic means to represent sustainable regional futures through community-led regional design (WP4). Moreover, the identification of the relevant policies in WP3 will inform the process of mapping of the spatial contexts in which these

policies are implemented and visualise their implications for spatial changes in the regions (WP4). Finally, the identification of options for enhancing active subsidiarity in WP2 and the synthesis of policy implications and recommendations in WP3 will help to calibrate the policy focus of RFLLs in each of the four regions and inform the definition of policy briefs on participation of the least engaged communities in place-based just sustainability policies in WP5.

3.2. Methods in DUST case study research

The DUST multiple case study research, conducted in WP2 and WP3, will employ a combination of diverse quantitative and qualitative methods, allowing for gathering a rich set of different kinds of data and for triangulation of insights produced across those methods. The different research methods used are outlined below, highlighting the complementarities and relations between them within the process of research on the eight case studies.

Table 2 Methods DUST case study research

Name of method	What is measured	Type	How is it measured
Literature analysis	Academic literature, legislative documents, guidelines, and policy reports related to just transition policies, citizen participation, and other relevant concepts for DUST research	Qualitative	Thematic literature study structured around the key concepts for DUST, shared Zotero library used to manage references
STEP index	Performance of participation	Quantitative	Indicators to be defined, verified, and weighted
Population survey	Perceptions and expectations of citizens with respect to just transition policies and their needs/ capabilities to participate in policy planning and implementation	Quantitative	Indicators to be defined
APES	Comprehensiveness of participation across the policy cycle	Quantitative	Participation of organisations representing least engaged communities in events related to the different stages of the policy process, analysed using APES software

Name of method	What is measured	Type	How is it measured
Desk research	Multi-level territorial policies for just transitions and the participatory tools used as part of their design and implementation	Qualitative	Selection of place-based policies according to key features of the place-based approach incl. territorial focus, inclusion of strategic objectives, multi-level governance, etc. Analysis of participatory tools covers the policy arenas involved, stages of the policy making process covered, depth of participation, outcomes and communities involved.
Face-to-face research methods (Interviews)	factors that hinder or facilitate participation that are triggered by the political/policy domain; roles of different levels of government in the deliberative governance	Qualitative	Policy-based variables (accountability, accessibility, time, information, incentives to participate, etc.)
Face-to-face research methods (focus groups)	Factors behind the participation of the least engaged communities	Qualitative	Community-based variables (related to discursive norms & power dynamics, social capital & feeling of powerlessness, capacities, apathy, etc.) and policy-based variables (as described above)
Media analysis	Media narratives on sustainability transitions	Quantitative	Media narratives in traditional and social media clustered and visualised based on intelligence tools SENSIKA and NewsWhip

3.2.1.   Literature analysis

As all research projects, DUST builds on literature review and analysis to position the work in the wider scholarly debates and against the background of the ongoing policy development. The core of that work, covering both academic literature and policy reports, was conducted in the first four months of the project to inform the refinement of the conceptual and theoretical foundation of the project (D1.2) and the fine-tuning of the methodological framework (D1.2). The systematic review of the literature was structured around the lines of inquiry of the project, that cut across the work packages. The literature review was done in a collaborative way, with inputs from multiple consortium members and several feedback rounds to sharpen the focus of the review and align the terminology. In addition, further smaller scale literature reviews related to WP2-3 and WP4-5 will be conducted to keep track of newest developments in the research on the themes and concepts of relevance for these work packages and to further enhance theory formation based on the results generated in the course of the research.

Table 3 Outputs from literature analysis

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
-	-	All research tasks	Literature analysis sets the stage for the entire research design as part of DUST, defining the key concepts and relations between them

3.2.2.   STEP index

The STEP (Stakeholder Engagement and Participation in Policy-Making Processes) index will allow for evaluating the performance of citizen participation in just transition policies across the eight case study regions. The index builds on the already tested frameworks developed by CSD (Trifonova et al., 2021) and UZH (Widmer et al., 2008). The STEP index will assess intensity, effectiveness, and depth of participation in transition planning processes. However, the proposed set of almost 20 indicators measuring 14 variables is generic, so that they could be applied to evaluate the performance of other place-based policies.

The initial set of six indicators draws upon prior research conducted by CSD on transitions away from coal in Central and Eastern European countries. This research involved extensive consultations and workshop discussions with experts from Czech Republic, Romania, Hungary, Greece, and Bulgaria, who observed closely and/or participated in the process of Territorial Just Transition Plans' (TJTPs) preparations for the coal-dependent regions in these countries. In 2022, the applicability of these indicators was tested through a pilot study focused on the preparation process of the TJTPs of three coal-dependent regions in Bulgaria. The preliminary identified six indicators were structured in three groups, measuring the adequacy of the objective, the inclusiveness and balance of stakeholder influence, and the depth and proper timing of the engagement method. These indicators were tested for measurability by evaluating draft versions of Bulgarian TJTPs through interviews with over 25 key stakeholders involved in their development across three case study regions. For DUST, additional indicators on intensity and

comprehensiveness of participation were added (see table below). The STEP index will also be designed in a way to enable quantitative assessment and cross-case comparisons. The indicators are in development at the time of writing of this deliverable.

The following systematic approach to develop the STEP index as comprehensive and robust measurement tool is planned, divided into nine steps:

1. Defining purpose and scope of the STEP index (see D 1.1. for more details);
2. Identification of key variables and indicators (initial set proposed in the Table below);
3. Determining the source of data and initial scanning of possible evidence sources;
4. Stakeholder workshop to test applicability of the indicators and to discuss weights;
5. Final confirmation of the indicators;
6. Assigning appropriate weights to each indicator based on their relative importance;
7. Validation and calibration - only if comparable results with external benchmarks or existing measures are available;
8. Ensuring usability as an Excel-based tool;
9. Developing guidelines for interpretation and communication of the results as well as for continuous improvement.

The following variables are proposed to be measured through the STEP index. They related to the dimensions of the Comparative Evaluation Framework and integrate the data on composition of stakeholder groups as well as the intensity of participation which is obtained through the APES tool:

Table 4 Main dimensions of the STEP index and the means of measurement

Dimension	Variable	Possible indicators
Objectives of stakeholder participation	1) Clear allocation of roles and responsibilities	Existence of a written document that clearly identifies the planners and their roles and responsibilities.
	2) Governance responsibility in front of the local community	Level of governance responsibility in front of the local community; External consultant representing lowest level of governance responsibility; National authority – intermediate level; Local authority – high level; Local community (self-organization)- highest level.
	3) Purpose of the stakeholder participation	Existence of a written document that explicitly defines the purpose of the stakeholder engagement activities.
	4) Adequacy of the objective	Level of adequacy of the stakeholder engagement for the planning objectives; Meeting legal requirements - lowest level of adequacy; Improving transparency - intermediate level; Acquiring local knowledge - high level; Ensuring democratic legitimacy - highest level.

Inclusiveness (Composition of the stakeholder groups)	5) Representation of different economic sectors	Measures taken (planned or reported) to ensure the representation of both incumbent and alternative economic sectors (expert evaluation based on extensive list of pre-defined measures; possible integration with APES).
	6) Balance between different professional categories	Measures taken (planned or reported) to ensure the representation of professional categories such as academia; civil society/ local communities; local government; regional government; SMEs; large enterprises; trade unions; financial institutions (expert evaluation based on extensive list of pre-defined measures).
	7) Inclusion of vulnerable groups	Available definition of vulnerable group in the policy document; Appointed inclusive and accessible communication channels for vulnerable groups (expert evaluation based on policy documents review); Existence of targeted outreach and engagement efforts specifically designed to include vulnerable groups (expert evaluation based on predefined checklist); Proportion of vulnerable groups represented in decision-making bodies, committees, or advisory groups or any other participation arenas (possible integration with APES).
	8) Balance between different age groups	Proportion of participants in citizen participation processes from each age group (possible integration with APES); Inclusion of age-specific recommendations or policies in the outcomes of citizen participation initiatives (expert evaluation).
	9) Balance of stakeholder influence measured as frequency of the participation	Stakeholder input by specific groups in shaping policy outcomes or project implementation; (Input from the APES evaluation tool).
Engagement methods in the planning process	10) Depth of the engagement method used	Types of methods and intensity of their use (evaluation matrix to be developed including the methods listed below).
	11) Usage frequency	
	12) Proper timing of the engagement methods and adequacy	
Engagement methods in the implementation	13) Comprehensiveness of the engagement strategy	Existence of a written document that explicitly defines the engagement strategy during the implementation phase.

| phase | 14) Depth of the engagement methods | Types of methods and intensity of their use (evaluation matrix to be developed including the methods listed below). |

The data for use of the STEP index will be provided by expert evaluation, review of region-specific policy documents and the application of the APES software to explore the process of engagement of different groups in the policy process. STEP Index will be tested and refined as part of a workshop with regional stakeholders. Upon completion and testing, the STEP index will be made available for application beyond the DUST research, including detailed guidelines on how to use it in further research.

This approach offers several advantages. Firstly, it allows for the inclusion of data from a wide range of sources, including academic literature, government reports, and statistical data. Secondly, the index can be updated and adapted over time to reflect changes the policy landscape and progress on the transition pathways. Finally, it enables the index to be applied in different geographic areas with varying levels of local stakeholder engagement, as the indicators can be defined and measured using consistent criteria. Upon its validation and finalisation, the STEP index will serve as evaluation tool that could assist local and regional authorities in gaining insights into their performance and facilitating comparisons with other territories when it comes to involving and empowering citizens to participate in the decision-making process. Using the index they could apply evidence-based method to report partnership arrangements and practices applied during the process of TJTPs development and implementation. Moreover, the STEP index might support non-governmental organisations and external observers to monitor different aspects of citizens participation in place-based policies.

The STEP index does have some limitations. Usually, the indicators included in indexes are often derived from literature reviews rather than being informed by the perspectives and needs of stakeholders in rural areas. Although the DUST tries to overcome this issue by carrying out verification measures involving local experts and stakeholders, many of the indicators in the STEP index also draws upon stakeholder engagement methods listed in the literature. As a result, these indicators may not fully capture the factors that are most relevant for the multi-level just transitions policies. Additionally, the calculation of index values relies on different methodological approaches, and the validity of these approaches has not been thoroughly tested. To address these limitations, consultations with experts very well familiar with the development of the JTF planning process in the carbon-intensive regions will be arranged. Furthermore, the STEP index will also be informed by the results of the desk research on policies of relevant conducted in WP3. Overall, this approach strikes a balance between incorporating the insights of local stakeholders and ensuring the sustainability and replicability of the index over time.

Table 5 Inputs to and outputs from the STEP index

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 - Literature analysis (M1-M4)	Literature analysis conducted in T1.1 informs the design of the index, especially in terms of understanding of the drivers of participation in sustainability transitions and definition of the least engaged communities	T3.2 – Face-to-face research methods	Provides additional insights on the performance of participation to inform the focus of the discussions with stakeholders and members of the least engaged communities
T3.1 - Desk research (M6)	Informs the choice of multi-level policies for which the STEP index will be designed, provides data for application of the index		
T2.3 – APES (M10)	Provides data on the actors and intensity of the participation as part of just transitions policies in the case study region		

3.2.3.   Population survey

A population survey will be fielded in the five case study countries. Its purpose is three-fold: (1) uncover insights on the factors that affect the quality of democratic participation, both actual and prospective; (2) explore citizens' awareness of the major sustainability transition challenges affecting their regions, including their understanding of the policy context, self-perceived influence on policy, and the perceived responsiveness of political institutions and actors to their input; (3) identify citizen attitudes towards, and preferences regarding, different potential modes of democratic participation to deal with the transition challenges.

The original data derived from the population surveys will allow for within and across case comparisons, yielding generic answers to DUST's broader research objectives that are applicable beyond specific the case study regions. By leveraging the broader potential of a population survey, the analysis will shed light on attitudes and preferences among individuals not only in the case study regions but across the broader Just Transition Fund regions. This is achieved by fielding a population survey that will oversample the just transition regions. In doing so, it can shed light on sub-group heterogeneity across the just transition regions (including the case study regions) as well as within country differences. In other words, do citizens from just transition regions differ significantly from their national peers in terms of their attitudes and preferences regarding modes of democratic participation.

The research findings will subsequently inform the in-depth qualitative research within WP3. The methodologies employed in WP3 are perfectly suited to investigate and elaborate on the general insights regarding individual perceptions of internal and external political efficacy revealed by the survey, particularly when applied to low engagement communities.

Additionally, the population survey findings will facilitate the refinement and further development of the STEP Index. This includes an improved understanding of 'supply side' or policy-based factors (such as awareness of challenges, commitment to active subsidiarity, communication and visibility, incentives to participate), and 'demand side' or community-based factors (like trust, social capital, accountability, accessibility).

Apart from the typical limitations of quantitative large-n population surveys, one notable limitation of the survey in the DUST context is that it is unlikely to adequately sample some of the very least engaged community members. This, however, is not a DUST-specific issue but rather a general limitation of the survey instrument as a method for collecting data on hard-to-reach individuals and it is why WP3 uses different methodologies to address this question. Furthermore, it is unlikely that a large share of randomly selected respondents would have had a direct experience of participatory activities related to multi-level just transitions policies. To address this specific issue, the survey will incorporate an experiment to measure prospective participation. By varying different dimensions of a prospective participation scenario, the survey experiment will shed light on individual preferences regarding the optimal configuration of participatory practices. For instance, how should such processes be convened (by citizens, civil society, or politicians); what is the preferred method of recruitment (random selection or self-selection); what is an optimal group size (small or large); what is the preferred mode (online, hybrid or physical meetings); what type of outcomes (recommendations or binding outputs). Such complex survey experiments are ill-suited for telephone surveys and will therefore be integrated into an internet survey.

Ultimately, the survey will be able to shed light on citizen preferences regarding different modes of engagement in the policy process, perceptions that the citizens may have of the transitions and the related policies, as well as on how these differ within and across countries. This in turn will allow for validating and refining our understanding of which social groups and communities are indeed the least engaged in the just transitions policies. The survey will not only provide data for the STEP index but will also offer valuable insights to be further explored in the face-to-face research in WP3, while simultaneously allowing for the refinement of the thematic focus of interviews and focus groups.

Table 6 Inputs to and outputs from the population survey

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 - Literature analysis (M1-M4)	Literature analysis conducted in T1.1 informs the purpose and design of the survey		

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.1 – Desk research (M6)	Informs the choice of hypotheses and variables to explore the participation in specific just transition policies	T3.2 – Face-to-face research methods	Information on the citizen perceptions and expectations with respect to participation inform the content of interviews and focus groups to deepen those insights

3.2.4.   Actor-Process-Event Scheme (APES)

The Actor-Process-Event Scheme (APES) method will be used to study the comprehensiveness of participation and stakeholder engagement in just transition policy process. APES is a tried and tested software tool for tracing and mapping participation of various actors in the policy-related events over time (Widmer et al., 2008). Detailed event participation data will be collected from publicly (sometimes upon request) available sources at the relevant levels of government. Participation networks with metrics for the respective phases as well as actor groups of the selected multi-level policy processes will be established and used for the STEP-Index. Once the indicators are constructed, their applicability in the specific case study context and suitability to cover region-specific multi-governance participation arenas will be tested and refined as part of a workshop with all project partners and regional stakeholders. For each policy process studied, one APES dataset and graphical mapping will be established.

APES investigates the actor dimension and the events dimension, looking at whether participation of actors in specific events over time was characterised by simply providing information, an information exchange between public administration and civil society or a deliberation process allowing for some co-creation. The events can be aggregated into phases displayed on the time axis, for instance the planning phase or implementation phase. To run the analysis, actors, and actor groups (including the organisations representing the least engaged communities) as well as the relevant policy events still have to be determined, which will be done in Task 3.1 through desk research.

The APES tool not only delivers analytical output for the process of event participation over time, but also allows for generating visualisations of the actor networks (see Fig. 8 and Fig. 9). By this, both the process dynamics and the structure of the network of actors involved in the process can be mapped, allowing to measure the centrality of certain nodes or the density of groups of nodes in the network. The insights on the participation networks - with metrics for the respective phases as well as actor groups of the selected multi-level policy processes - will be used as indicators within the STEP index. By this, qualitative case study data can be prepared in a more systematic way, supporting a comparative assessment of processes and networks. The APES Tool as a software will be updated to the specific needs for the project, in particular regarding the actor and event specification agreed upon as well as the defined indicators.

One of the main limitations of the APES method is that the validity and relevance of the results depends on the validity of choices made with respect to selection of the actors and policy-related events to include in the analysis. More specifically, the validity of the policy network elaborated via APES depends on the determination of the boundaries of the policy process studied, of the criteria to consider the events within that policy process, and the availability of data on these events and participation of the actors therein (Hirschi et al., 2007). For this reason, the

application of APES relies critically on the results of the desk research in WP3, which will determine policy focus, which in turn will dictate the choice of actors and events. By the same token, the initial identification of the least engaged communities through desk research and discussions with the societal partners and stakeholders taking place in the first months of the project implementation is critical for identifying the relevant organisations representing these communities and including them as actors in the analysis.

Table 7 Inputs to and outputs from the APES tool

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 - Literature analysis (M1-M4)	Literature analysis conducted in T1.1 informs the use of APES tool	T2.1 – STEP Index	Feeds data on performance of participation into the STEP Index
T3.1 - Desk research (M6)	Choice of policies to focus on in the application of the APES tool	T3.2 - Qualitative face-to-face research	Provides insights on performance of participation to be deepened in the face-to-face research

Figure 8 Example of visualisation of networks of participants of the policy process developed with the APES tool
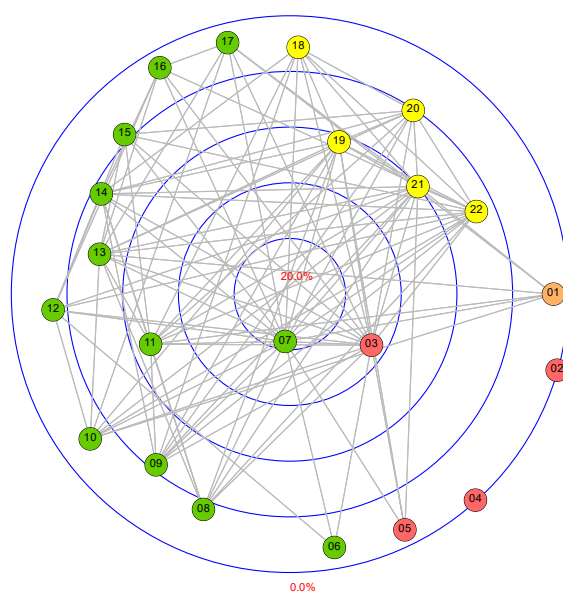
Source: APES, 2020 (courtesy of Uwe Serdült)

Figure 9 Example of visualisation of participatory activity over time developed with the APES tool
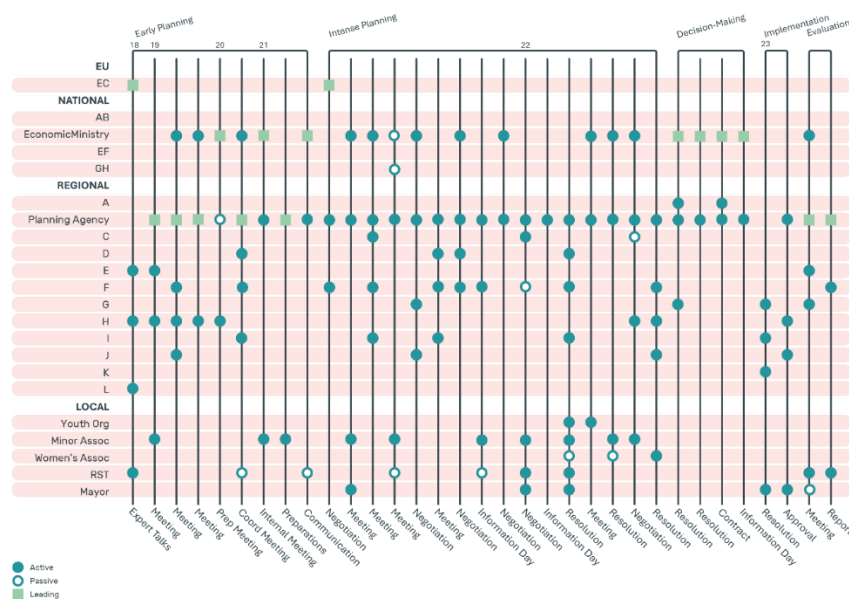
Source: adapted
from APES, 2020 (courtesy of Uwe Serdült)

3.2.5. Desk research: literature and policy analysis

Desk-based literature and policy analysis will be used in WP3 to assess the existing representative and deliberative forms of participation in policy measures for just sustainability transition in multiple case study contexts. This method will enable 1) identifying key sustainability transition measures in case study regions from a 'place-based' perspective, including EU Cohesion policy, domestic and EU- funded innovation interventions and spatial planning measures; 2) identifying participatory practices 3) analysing the arenas where these practices take place (national, regional, local, community); 4) setting out the stages of the policymaking process open to participation (policy design, implementation, monitoring and evaluation); 5) evaluating the outcome of participation; 6) identifying key characteristics of least politically engaged communities (mining communities, indigenous communities, youth, women, ethnic groups, low-income citizens, etc.). Desk research will entail exploring academic and grey literature and policy analysis, based on secondary sources (e.g., policy reports and documents, evaluations, academic research).

Desk-research results will be critical for informing the design of the STEP Index and of the survey as well as the application of the APES method in WP2. In particular, this early state research will determine the choice of policies to include in the quantitative research in WP2. It will also identify issues to further deepen through other qualitative research methods in WP3, namely through expert interviews and focus groups with members of the least engaged communities. Finally, the identification of the policies through desk research will also inform the spatial analyses in WP4 and the focus of the RFLLs.

Desk research has several limitations, including that the data used, for instance from policy documents produced by governmental institutions may be incomplete or biased. Moreover, when studying secondary sources, one lacks control over how data was collected and analysed. Finally, desk research may not produce insights on new emerging issues, which may require producing primary data. These drawbacks are acceptable insofar as desk research sets the stage

for further exploration through quantitative and qualitative methods. They will be minimised by triangulation of the insights with those from interviews, the survey, APES analysis, etc.

Table 8 Inputs to and outputs from the desk research

| Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 - Literature analysis (M1-4)	The review of academic literature informs the definition of multiple concepts applied in the desk research such as place-based policies; deliberative governance, participatory instruments, groups of least engaged communities, etc.	T2.1 - STEP Index	Identification of place-based sustainability policies and initial identification of depth of participation to feed into the design of the STEP Index
		T2.2 - Population survey	Identification of place-based sustainability transition policies to understand public awareness on these
		T2.3 - APES	Initial identification of actors and participatory processes under the JTF to feed into the APES
		T3.2 - Qualitative face-to-face research	Identification of policies, participatory practices, and least-engaged communities to guide the performance of interviews and focus groups
		T4.1 - Spatial analysis of the territoriality of multi-level place-based policies	Identification of place-based sustainability transition policies to select as a focus in the RFLLs

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
		T6.1 - Art-based research	Insights on least engaged communities to inform design guidelines for affective communication

3.2.6.   Qualitative face-to-face research methods

Qualitative face-to-face research methods will be used to produce in-depth qualitative insights on the factors conditioning the participation of the least engaged communities in just sustainability transitions policies, complementing, and deepening the findings produced via quantitative research methods used in WP2. First, semi-structured interviews with officials responsible for the key sustainability transition initiatives implemented in the case study regions will explore their perspectives on the inclusion of least engaged communities in the policy design and delivery process. Interviews will be conducted based on a loose structure consisting of open ended pre-planned questions covering the variables identified earlier in WP3 through desk research, with options for the researcher or participant to diverge in order to pursue an idea in more detail. This will allow further exploration of the perceptions and experiences of the officials in as much detail as possible and uncover new issues or ideas that were not previously anticipated.

Second, community focus groups with civil society will be organised in WP3 to gather qualitative insights through group interaction among representatives of least engaged communities and between these representatives and public policy practitioners. Focus groups will elicit details on experiences, actions, perceptions and attitudes towards the impediments and facilitators of deliberative participation in sustainability transition initiatives. The selection of participants will be supported by the survey carried out in WP2 and the semi-structured interviews that will precede them. Guided discussion and interaction among participants will elicit details on experiences, actions, perceptions and attitudes towards the impediments and facilitators of deliberative participation in sustainability transition initiatives.

This will allow for refining the understanding of the factors affecting participation in place-based policies for sustainability transitions including digitalisation and other participatory innovations. Discussions in focus groups will thus cover the perceptions of design-based and digital tools in terms of how they can increase or constrain the breadth and depth of participation in deliberative processes on just transitions policies. Inclusion of policy and civil society stakeholders in the second round of the focus groups will introduce elements of experimental governance and examine options for effective feedback mechanisms.

While focus groups and interviews are widespread research methods, the research may face certain limitations. First, this relates to the recruitment of participants in focus groups, which in our case are the least engaged communities. Given the small size of the groups, research can fail if several people do not appear eventually. To overcome this limitation, the networks of the regional societal partners and the stakeholder advisory board will be utilised. Sampling strategy will be defined as well to ensure a representative sample and participants will be over-recruited.

Ethics issues may arise as well including disclosure of personal information outside the focus group, silencing particular participant(s), creating silence around particular topic(s). To avoid such issues, a briefing will be performed with the moderators of the focus groups in the case study regions and supporting materials will be provided to ensure moderators have the appropriate skills and seek clarification and emphasize distinctions and tensions which have analytic promise. When it comes to the analysis of focus group data, one issue is that data are generated within specific context and have interactive nature that one can lose sight of during the analysis. To mitigate this limitation, the objective is to use mix-methods combining content and discourse analysis. When it comes to interviews, key limitations are the subjectivity of interviewees, their incomplete knowledge or unwillingness to reveal their full perceptions of an event or opinions. The research will aim at using partners' networks to reach out to policy experts with whom they have established links while the interviewee well be assured that their anonymity will be fully preserved to feel more at ease and thus talk freely.

Table 9 Inputs to and outputs from the face-to-face research methods

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 – Literature analysis (M1-M4)	Informs the definition, identification and involvement of least engaged communities and other relevant stakeholders in the face-to-face research	T5.3 - Regional Futures Literacy Labs	Identified experiences, perceptions and attitudes towards the impediments and facilitators of deliberative participation inform the design of RFLLs/ Pol.is aiming to overcome these barriers
T3.1 – Desk research (M6)	Informs the focus on the relevant policy stakeholders and involvement of least engaged communities and other relevant stakeholders in the face-to-face research	T6.5, T6.6 – Art-Based Research	Validating affective communication design guidelines
T2.1 – STEP Index (M7)	Provides additional insights on the performance of participation to inform the focus of the discussions with stakeholders and members of the least engaged communities		

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T2.2 - Population survey (M8)	Information on the citizen perceptions and expectations with respect to participation inform the content of interviews and focus groups in order to deepen those insights		
T2.3 – APES (M10)	Provides insights on performance of participation to be deepened in the face-to-face research		

3.2.7.   Media analysis

Social and traditional media analysis, conducted in WP3, will complement the qualitative research in WP3 by exploring the narratives on sustainability transitions in online social and traditional media through the application of AI-based tools for real- time and historical monitoring of narratives disseminated online in case study regions in their local languages. This innovative method combines the power of two tools, SENSIKA and NewsWhip. SENSIKA is Bulgarian media-monitoring company, which provides tailored media monitoring, analytics and reporting solutions for enterprises, public sector organizations and agencies. Its dashboards have been used for identifying misinformation and interpreting geography and language-based specifics of media items by applying qualitative and quantitative data-driven methods. NewsApp offers real-time media monitoring out of the traditional media. It combines real-time feeds of web & social content with public engagement data, to identify & predict the content that matters. These tools, piloted by CSD, were previously used for studying foreign disinformation in Central and Eastern Europe through the use of online content intelligence tools. In DUST this method will be employed to shed light on how policies to promote just sustainability transitions are portrayed in the media, both in the traditional news outlets and influential social media channels.

First, a manual coding of up to 50 pre-selected content pieces per region will produce a common dataset for identification of narratives. Second, different socio- economic, environmental, gender-related and technological aspects will be encompassed and integrated into the final common taxonomy of narratives. Third, a selection of online sources will be analysed in a historical perspective. Finalised queries, based on the taxonomies elaborated in local languages, will be used to extract the relevant content pieces, to analyse and visualise their spread, potential reach, timing, main actors, and events, etc., using the in-built powerful data analytical dashboard of SENSIKA. CSD will provide training to the local teams responsible for the different case study regions and carry out the bulk of the analysis, building on a preselection of media outlets done by the local teams.

The main limitation with respect to media analysis in DUST relates to the time and budget constraints. In fact, media analysis may be very time- and resource-consuming. For this reason,

a limit to the number of narratives included in the taxonomy will be said to ensure feasibility and comparable depth of the analysis across the case studies. Moreover, content analysis as this one alone cannot serve as the basis for making statements about the effects of content on an audience, thus it will merely provide more insight on the narratives and media context in the case study regions for a better understanding of the performance of participation in just transition policies. By this, the media analysis will complement and further contextualise the quantitative and qualitative research in WP2-3, while providing inputs to co-production of alternative citizen-driven statements on the just transition process in the RFLLs (WP5) and for calibrating the affective communication design guidelines (WP6) towards the least engaged communities.

Table 10 Inputs to and outputs from the media analysis

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.1 – Desk research (M6)	Informs the focus on the relevant policies in the media analysis	T5.3 - Regional Futures Format	The media narratives inform the co-production of alternative narratives in RFLLs together with the least engaged community representatives
		T6.5, T6.6 – Art-Based Research	Informing affective communication design guidelines to adapt them to the regional media contexts

4. DUST experiments: testing design-led territorial and digital tools for citizen participation

4.1.   Methodological approach to the DUST experiments

The experimental phase of the DUST research will be conducted as part of WP4 and WP5. The latter will put an emphasis on the interactions with citizens, policy actors, and experts in the Regional Futures Literacy Labs (RFLLs). WP4, running in parallel to the RFLLs, will support this interaction via spatial analysis, foresight, and regional design. This combination allows for a deep engagement with the specific conditions in case study regions, while providing a comprehensive, comparative perspective on the performance of the experimental tools used to stimulate citizen participation in multi-level territorial policies to promote just sustainability transitions.

4.1.1.   Description and motivation of methodology

The DUST experiments in RFLLs will test the potential of (1) design-led territorial and (2) digital deliberative instruments to enhance participation of the least engaged communities in deliberative, place-based approaches to just sustainability transitions. Place-based design-led instruments allow citizens and communities to: (1) identify and imagine alternative futures for just sustainability transitions; (2) reflect on the implications of these imaginations for policymaking at supra-local levels; and (3) formulate strategic statements that express their concerns in pertinent deliberation on these policies. Meanwhile, the online tool Pol.is will be used to investigate how digital deliberation on these statements among a wider public can help to build consensus and elaborate statements with greater political weight, which is expected to favour the uptake of citizen concerns within multi-level governance policy-making interventions.

The experimental phase of DUST entails two work packages, namely WP5 'Regional Futures Literacy Labs', and WP4 'Staging Regional Futures Literacy Labs'. Figure 10 shows how these two experimental WPs interact. The methodological approaches in WP4 and WP5 are designed to support a co-design process that iterates interaction and reflection. WP5 focuses on interaction with citizens, civic society organisations, experts, and policymakers in case study regions. WP4 focuses on (1) producing a consistent representation of the policy context in the case study regions; (2) the envisioning of the impact of a wider, regional uptake of community-led policy initiatives; and (3) the development of an evidence-base for policy statements through comparing the communities' visions with foresight on the impact of ongoing policies. WP4 also guides, facilitates, and assesses the use and output of the e-democracy-tool Pol.is.

The methodological approach of WP4 and WP5 is designed with the central ambition to empower the vulnerable, least engaged communities to cope with the challenges of sustainability transitions, and to build trust and social capital between policymakers, experts, and citizens. The experiment conducted across these two work packages employs a set of specific research methods, the use of which is closely intertwined, namely:

- Spatial analysis;
- Regional Futures Lab format (including participatory workshops, focus groups and other methods);
- Regional design;
- Digital deliberation via Pol.is software;
- Science-policy-society dialogues.

Each of those methods is described in more detail below.

4.1.2. Positioning the DUST experiments in case study regions

The experimental phase of the DUST project builds on earlier case study research conducted in WP2 and WP3. Thus, WP2 paints the 'big picture' on the participation of the least engaged communities within which participatory experimentation happens, measuring quantitatively the depth of citizen participation in just sustainability transitions policies across the case study regions, including the four case study areas in which the experiments in RFLLs take place – the regions of Lusatia, Norrbotten, Katowice, and Stara Zagora. Meanwhile, WP3 provides a more nuanced and in-depth understanding of the extent to which the least engaged communities participate in multi-level just transitions, including the factors which facilitate and hinder participation, both those pertaining to the policies, design of participatory activities and institutional contexts and those related to the features and capacities of the communities. WP3 qualitative insights also enables the choice of the policies to focus on in the RFLLs, meanwhile the media analysis provides an understanding of how sustainability transitions are portrayed in the narratives across the traditional and social media. This in turn offers a more fine-grained understanding of the context in which participation in just transitions policies takes place and informs the process of co-creation of policy statements and counter-narratives on these policies and their goals together with the communities affected.

4.1.3. Workflow and interactions between WP4 and WP5 and relations for other WPs

Like the two WPs in the multiple case study research phase, in the experimental phase of the DUST project, WP4 and WP5 operate in tandem. In a nutshell, the first of the two work packages provides a knowledge base, design, and digital tools to animate deliberation with the least engaged communities, while the latter focuses on orchestrating deliberative co-creation process within the RFLLs.

More specifically, WP4 aims, firstly, to develop a framework for the use and assessment of design-led territorial and digital instruments in RFLL experiments. This task builds on the quantitative and qualitative research from WP2 and WP3 to produce a monitoring and assessment framework to compare results that are produced during the RFLLs in the four case study regions (T4.1). This framework is closely aligned with the guidance provided for the implementation of the RFLLs in WP5 (T5.1).

Secondly, WP4 endeavours to map the foreseen impacts of policies in the case study regions (spatial analysis in T4.2). This entails delivering a consistent and comprehensible spatial representation of the policy context for the just transition measures studied. The analysis

produced will inform the development of action plans for the RFLLs (T5.2.1) and feed maps and other visualisations into T5.2.3 to support participants interactions within the RFLLs.

Thirdly, WP4 also supports the proactive participation of the least engaged communities in the co-creation of just transitions policies through the anticipation and imagination of alternative regional futures using regional design method (T4.3). The results of the spatial analysis are thus juxtaposed with the sustainable futures that are anticipated by the least engaged communities in the case regions, reflecting their expectations and hopes, anticipatory assumptions and questions about the transitions outcomes expressed in the RFLL workshops (T5.3.3).

Fourthly, WP4 operationalises deliberative citizen participation at scale, using the Pol.is tool. A combination of the spatial insights on just sustainability transitions policies and the anticipations of these transitions by the least engaged communities is used to support proactive and strategic positioning of communities in deliberation and policy co-creation (T4.4). This allows for identifying potential consensus or divisions that stem from alternative anticipated futures, highlighting the differences between foresights through a categorisation of alternative territorial interventions, synthesised into a series of plausible, concise, and evidence-based policy statements. Draft statements are fed into knowledge co-creation in the RFLL (T5.3.4) to be further discussed and elaborated with the representatives of the communities. Building on the statements this way, a consensus-oriented deliberative decision-making software Pol.is is deployed to experiment with deliberation at scale, involving larger amounts of citizens. The 'seed statements', composed of questions and initial opinions that were co-produced with the communities in the RFLL as well as the visual material supporting these statements are used for this.

Finally, the last objective of WP4 is to assess the performances of instruments tested in RFLLs and formulate policy recommendations (T4.6). Thus, quantitative assessment in each case study region is done, including an evaluation of the representativeness of participation and identification of places in the regions where discussion on statements is highly relevant. A summary of the assessments feeds into policy co-creation processes in WP5 and evaluation of the performance of Pol.is as a facilitator of deliberation on regional futures at scale. The results from the RFLL experiments will be synthesised and compared across the four case study regions and, on that basis, recommendations for increased ownership of and co-creation as part of place-based transition policies, supported by informative and attractive visualisations, will be produced.

Closely intertwined with the work in WP4, WP5 defines the parameters of the RFLLs in the four selected case study regions, oversees the implementation of the RFLLs, and, finally, draws lessons from this participatory experimentation, identifying citizen learnings. Thus, the first task in WP5 (T5.1), builds on the UNESCO Futures Literacy Framework, regional design, and other foresight approaches to develop methodological guidelines for implementing RFLL experiments. This work is carried out in conjunction with T4.1.

Second, WP5 ensures RFLLs planning and citizen engagement. There is no one size fits all RFLL model. Each case study region will use a place-tailored RFLL approach to meet the specificities of their own socio-spatial contexts. To this aim, RFLL Action Plans will be developed (T5.2.1). The leaders of each of the RFLL will work with the societal partners to prepare a tailored regional agenda for each RFLL workshop outlining the key issues to be addressed during the experiment. This planning phase builds on key findings on the just transition policies and participation patterns therein conducted in WP2-3 to ensure that the experiments consider the regional specificities and focus on issues most prescient to local citizens. The RFLL Action Plans will then

be used as a guide for conducting the experiments in T5.3. Moreover, citizen groups of relevance of the RFLLs will be mapped for each of the four regions (T5.2.2). Drawing on the results of T3.1 and T3.2, RFLL leaders will work closely with the societal partners and regional stakeholders to (1) identify the most vulnerable transition groups; 2) detail the interlinkages and differences between these groups; 3) outline current community-led sustainability transition initiatives ; 4) assess citizen engagement barriers, including challenges related to digital divisions; and to 5) develop solutions to stakeholder engagement barriers identified. At the same time, proactive engagement of policymakers, experts, and local citizens to participate in RFLL experiments will also be organised (T5.2.3), using networks of civil society partners/project stakeholders and tailored outreach activities, based on affective communications guidelines (T6.1).

Third, WP5 coordinates the RFLLs in four case study regions (T5.3). The experiments are broken down into four key stages conducted in 4 physical workshops in each case region. Across those stages, close coordination with WP4 is ensured, while affective communication design guidelines are used to help engage participants (T6.1). The four stages are as follows:

1. Awareness-building and knowledge building (workshop 1, T5.3.1): Workshop 1 helps raise the level of awareness and knowledge of both policymakers and local citizens regarding their respective views and positions on transition processes. Firstly, case study leads will introduce participants to the concept of just transition and the potential impacts of transitions for the region using findings from T3.4 and T4.2. Secondly, participating EU, national and local level policymakers, and sector representatives, will outline their proposed transition policies. As part of this workshop, building trust will be ensured through science-policy-society dialogues (T5.3.2): participants are placed into groups and given the opportunity to openly discuss (1) the main regional transition challenges identified in T5.4.1; and (2) the different policy options and ideas for overcoming these challenges. The main goal is to build social capital and trust between the participants.

2. Citizen Anticipation of futures (workshop 2, T5.3.3): the UNESCO Futures Literacy Lab format is applied to give citizens the opportunity to reframe future developments via new anticipatory assumptions and questions on just sustainability transitions. Participants will discuss alternative future scenarios for transitions, which will be fed into T4.3 and T4.4 where they will inform regional designs and forecast the impact of ongoing and upcoming sustainability transition measures. Visual storylines about community-led just transition policies and draft evidence-informed policy statements will be the output of this sub-task.

3. Citizen proactive positioning (workshop 3, T5.3.4): participants will reflect on and amend the scenarios and statements produced in T5.3.3 during citizen focus groups and interviews, discussing the benefits and weaknesses of each different scenario. On that basis, seed statements will be produced for the Pol.is application in T4.4.

4. Knowledge and policy co-creation (workshop 4, T5.3.5): The final workshop will bring policymakers, experts, and citizens back together in a co-creation process. Different views gathered during T5.3.3 and T4.5 are discussed, highlighting areas of consensus. On that basis, participants deliberate on how to reflect better the communities' views and needs in the EU, national and regional/local policy. The aim is to produce co-created policy recommendations that can proactively position local communities in transition policy debates across multi-levels of governance, thereby enhancing local adaptive capacity and regional resilience.

Fourth, WP5 closes with citizen learning and capacity building activities (T5.4). The aim of this work is to evaluate the learning effects from the RFLLs by assessing citizens perspectives on the experiments conducted. Assessment is carried out via interviews to capture participants level of interest, motivation, and readiness to engage in just transition initiatives after lab completion, in conjunction with the elaboration of policy recommendations (T4.6).

Finally, it is important to stress that the spatial exploration and design as well as the participatory experimentation in WP4-5 will also be coordinated with the research on affective communication and design for non-verbal communication with the participants of the RFLLs delivered by WP6. The iterative process of coordination and exchange of insights between WP4-5 and WP6 is detailed in the section of affective communication research.

Figure 10 Methodological approach to DUST WPs 4&5
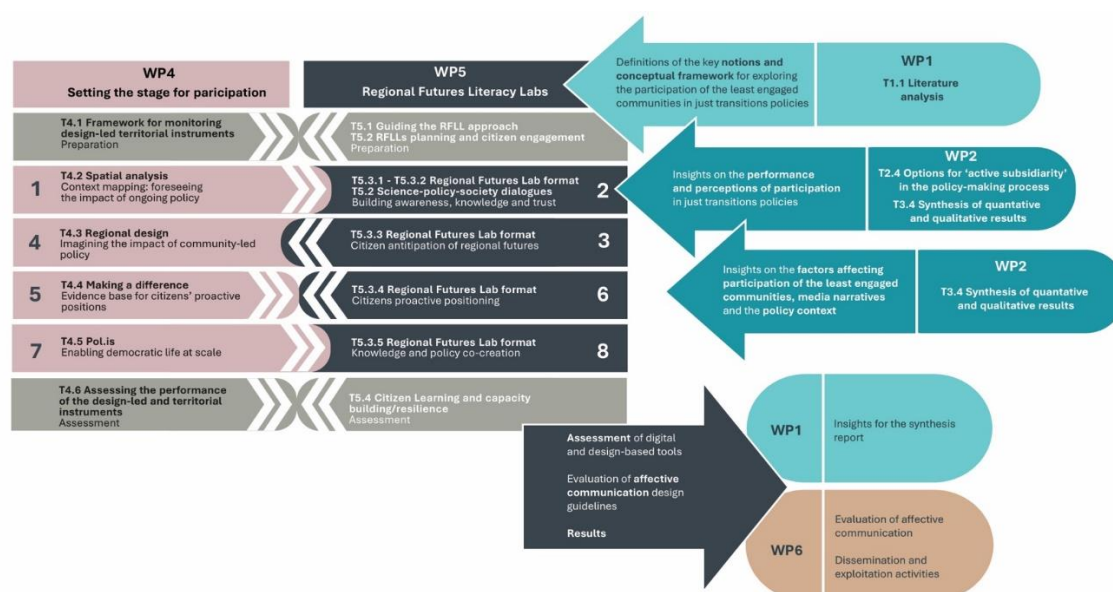
4.1.4. Expected results

The experimental phase of the DUST research in WP4 and WP5 will produce the following deliverables:

- **D4.1 Spatial representation of the just sustainability transition policy context in case study regions (Month 18, Lead: TUD):** This deliverable is a geographic data base that combines information on the spatial implications of ongoing and upcoming just sustainability transition measures in the four case study regions where the DUST Regional Futures Literacy Labs (RFLL) happen. To support interaction with actors in the labs, data on the policy context is consistently and comprehensibly summarized in visual and brief textual representations.

- **D4.2 Regional designs: Imagining community-led just sustainability transition policies (Month 23, Lead: OOZE):** The DUST regional designs imagine the impact of community-led just sustainability transitions policies on the development of four regions. Designs draw on input from the four DUST Regional Futures Literacy Labs (RFLL) – the identified expectations and hopes, anticipatory assumptions and new questions of the least engaged communities in regions – and are presented in visual representations

and story lines that are meaningful for communities and support their positioning in policy debate.

- **D4.3 Pol.is output: Rated statements on alternative community-led just sustainability transition policies (Month 27, Lead: TUD):** This deliverable is in the output of the use of the consensus-oriented deliberative decision-making software Pol.is in four case study regions. During the application of Pol.is, statements on alternative just sustainability transition policies by representatives of least-engaged communities are set out among a wider public. The deliverable presents the public rating and proposed refinements of the initial statements, as well as a qualitative and quantitative assessment of these results.

- **D4.4 Evaluation and handbook of Regional Futures Literacy Labs (RFLLs): Design-led territorial and digital instruments for citizen participation in just sustainability transitions (Month: 30, Lead: TUD):** This handbook presents an evaluation of the design-led and digital territorial instruments for citizen participation that were tested in the Regional Futures Literacy Labs (RFLLs). Drawing on a comparison of the qualitative and quantitative results from the experiments, it formulates recommendations for increased ownership of and co-creation in place-based just sustainability transition policies.

- **D4.5 Imaginations of community-led just sustainability transitions: Curated visualisations of the results of the Regional Futures Literacy Labs (RFLLs) (Month: 30, Lead: TUD):** This deliverable is a curated selection of the visual results that were produced during the course of WP 4 and 5 (the Regional Futures Literacy Labs, RFLLs). The compilation of spatial representations, regional designs, and visual story lines is suited to form part of a public exhibition.

- **D5.1 Position papers: Community-led just sustainability transition policies (Month: 28, Lead: NR):** This deliverable will consist of a series of position papers promote the alternative policies, co-designed by least-engaged communities during the Regional Futures Literacy Labs (RFLLs), in the context of ongoing deliberation about multi-level place-based approaches to just sustainability transitions. Addressees are policymakers, and Civil Society Organisations (CSOs) in the case study regions where the labs happen.

- **D5.2 Policy briefs: Expanding the participation of least engaged communities in just sustainability transitions (Month 28, Lead: NR):** The policy briefs on expanding the participation of least engaged communities in just sustainability transitions provide practical co-created policy recommendations for proactively and strategically positioning communities in debates on multi-level transition policies, thereby enhancing local adaptive capacity and regional resilience. Addressees are policymakers, Civil Society Organisations (CSOs) and other facilitators of participatory processes across Europe.

- **D5.3 Citizen Learnings Report: On involving least engaged communities in just sustainability transition policies (Month 31, Lead: NR):** The DUST Citizen Learnings Report presents an evaluation of the learning effects that were generated during the Regional Futures Literacy Labs (RFLLs). It draws on an evaluation of the labs by

participating citizens and captures their level of interest, motivation, and readiness to engage in just sustainability transition initiatives.

4.2.   Methods in DUST experiments

As in the first phase of the project focusing on case study research, the experimental phase of DUST combines a range of research and engagement methods (see Table 11). These are not only complementary, but also very tightly interwoven and synergised to support the participatory experimentation with evidence, visualisations of regional futures and inputs based on online citizen deliberation. The features of each of these methods are described below, along with an outline of how each of them interacts with other methods used in the project. The caveat to stress is that the details of the application of the methods outlined for the DUST experiments are subject to changes and fine-tuning, as they will be applied in a later stage of the research project.

Table 11 Methods and measurements in DUST experiments

Name of method	What is measured	Type	How is it measured
Spatial analysis / the territoriality of multi-level place-based policies	Development potential, socio-economic and spatial conditions that shape sustainability transitions in case study regions	Qualitative / quantitative / spatial	For instance, indicators used in environmental assessment; territorial capital indicators (in GIS format); land use and land cover; basic statistical information.
	Territorial, legal, and regulatory frameworks that affect place-based approaches	Qualitative / quantitative / spatial	For instance, administrative boundaries; boundaries of soft planning schemes (such as boundaries of the Territorial Just Transition Plans)
Regional design	Imagined impact of community-led just sustainability transitions policies	Quantitative / qualitative / Artistic/ Co-creative	visual representations and story-lines; informed by expectations and hopes, anticipatory assumptions and new questions of LECs
Pol.is	Rated policy statements	Qualitative / co-creative / digital	Citizen statements debated through online deliberation tool

Name of method	What is measured	Type	How is it measured
Regional futures literacy labs	Citizen perspectives and anticipations concerning just transitions; comparison with expected territorial impact of proposed policy interventions	Qualitative / co-creative	Diversity of inputs and interactions with the least engaged communities and other stakeholders gathered through co-creative workshops; follow questionnaires on experienced capacity-building from engaging in the FLL method
Science-policy-society dialogues	Perspectives on the regional transition challenges and the different policy options and ideas for overcoming these challenges	Qualitative / co-creative	Implementation of recommendations from the dialogue into local, regional and/or national policy processes

4.2.1. Spatial analysis: exploring the territoriality of multi-level place-based policies

Spatial analysis is an analytical approach widely used in geography, spatial planning, spatial design, urban studies, regional science, and other disciplines concerned with space and territory. Spatial analysis is concerned with exploration and interpretation of patterns, trends, and relationships within geographic data, pertaining to specific locations. It is employed to study processes, networks, events that unfold in geographical space, using diversity of techniques, including spatial statistics and Geographic Information Systems (GIS). In the DUST research, GIS-based spatial analysis will be initially used to produce spatial representations of the policy context that is constituted by the ongoing and upcoming just sustainability transition measures in the case study regions. More specifically, spatial analysis will explore and map the following: (1) the structural socio-economic and spatial conditions that shape these regions; (2) the development potential and expected territorial impact that is considered in place-based policy approaches; and (3) the territoriality of legal and regulatory frameworks that affect place-based approaches to just sustainability transitions.

Spatial analysis will be informed by the insights from quantitative and qualitative exploration of the just transition policies and participation patterns therein (WP2-3) as well as insight about the current spatial conditions. However, because WP2 and 3 study past policy processes while the experiments will engage with ongoing policymaking, additional desk research will be necessary for producing the representations. The output of the initial spatial analysis will be a spatial representation of the policy context in the form of maps and brief textual descriptions. Representations will provide a base for the deliberation on the just transitions and related policies within the RFLLs (WP5). They will inform the regional design processes, which will compare representations of the policy measures to the anticipations of the regional futures co-created with citizens in the RFLLs (WP5). It is important to note that the method of regional design

(see section 9.2.2) also uses spatial analysis. However, analysis in the context of design is serving an exploration of future development.

The main limitation of spatial analysis in the DUST project relates to availability and quality of data for the specific regions studied, which may vary per case study, for instance incomplete coverage of the territories under investigate within the data sets available or differences in terms of spatial data resolution (related to geographic scale at which data is recorded) across the eight regions. This in turn, may hinder comparability and negatively affect the precision of the spatial evidence feeding into regional design activity and the experiments in RFLLs. The approach to spatial analysis will, thus, be carefully calibrated to minimise those limitations. Another limitation is that readily available quantitative data usually over-emphasises an economic perspective in place-based policy approaches, at the cost of a social, environmental, and/or cultural perspectives. To mitigate this risk a carefully balanced mapping approach, with consideration for qualitative criteria, needs to be developed in advance.

Table 12 Inputs to and outputs from the spatial analysis

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.4 – Synthesis of quantitative and qualitative results (M16)	Insights from the quantitative and qualitative research in WP2-3 inform spatial analysis on policy context and issues to explore through mapping	T4.3 – Regional design	Policy context mapped, providing a base for the regional design
		T5.3 – Regional futures literacy labs	Providing a base for citizen engagement and anticipation of sustainable futures in regional experiments
		T5.3 – Science-policy-society dialogues	Representation of regional impacts of just transition policies

4.2.2. Regional design: mapping the communities' hopes and expectations

'Regional design' is a type of foresight methodology that emphasises the concepts of space', 'place', and 'territory' as culturally produced social constructions. Theoretical and conceptual foundation of the design-based territorial instrument are discussed in D1.1. As noted above, spatial analysis in Task 4.2 will deliver a consistent and comprehensible spatial representation of the policy context that is constituted by ongoing and upcoming sustainability transition measures in case study regions. In Task 4.3, the method of regional design will be used to compare these representations with imaginations of sustainable futures that are anticipated by the least-engaged communities in the regions (input on expectations and hopes, anticipatory assumptions and new questions of communities from T5.3.3). To facilitate the comparison,

imaginations are first examined on their territorial implications and potential for wider regional uptake. Results of the comparison will be visually represented and turned into story lines that present communities' positions in ongoing policy deliberation. Story lines will also purposefully aim at the reframing of dominant transition narratives, and thus built up upon results from the media analysis (Task 3.3). An artistic director (OOZE architects or an entity with similar capacities) supports Task 4.3 through design explorations, and the definition of visual languages, formats, and styles. Output from T4.2 and T4.3 will then be used to support the proactive and strategic positioning of communities in deliberation and policy co-creation. The task results in a series of plausible, concise, and evidence-based policy statements that will be set out in deliberation at scale, using the e-democracy tool Pol.is.

The most important limitation to the application of regional design as it is foreseen in the DUST project is established by the distance between the location where the design processes will happen (the Netherlands), and the locations where design ideas will originate and where designs will be used in policy deliberation. This distance can lead to misunderstandings in communication about often complex design rationales. To mitigate this risk, a simple visual language will be developed for individual design processes. The language, which will also be studied as part of WP6, will be tested and further developed throughout the design process. Other limitations of the regional design method are in biases that can occur via, for instance, the availability of data, and the individual preferences or knowledge of designers. The multi-actor co-design process that is followed in the project is expected to mitigate these risks that typically occur in complex decision-making settings.

Table 13 Inputs to and outputs from regional design

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T6.1 – Art-based research	Research into affective communication informs the visual language that is used in design	T5.3 – Regional futures literacy labs	Participants will reflect on and amend the scenarios and statements during citizen focus groups and interviews, discussing the benefits and weaknesses of each scenario.
T3.3 – Media analysis	Dominant transition narratives form the institutional context of alternative story lines	T4.4 – Pol.is	Opinions derived from discussing regional designs and visual material are used for seed statements in the pol.is application

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T4.2 – Spatial analysis	Spatial representations of the policy context form a base to compare alternative designs	T6.1 – Art-based research	Visual representations and least engaged communities' storylines inform narrative expression and communication design guidelines; reflection on and assessment of the use of affective communication design guidelines
T5.3 – Regional futures literacy labs	Citizen anticipations on regional futures to inform regional design most crucially		

4.2.3.   Pol.is application: rating statements on alternative just sustainability transition policies

The e-democracy tool Pol.is is an open-source consensus-oriented deliberative decision-making software for addressing controversial issues within potentially large groups of social media users (see https://pol.is/home). The tool is designed to address diverse types of publics and is oriented at second-order decisions on the exchange and synthesis of opinion. Pol.is enables consent formation at scale in situations where there is a low level of trust in pre-existing social networks. It makes low-cost participation possible in such a context via a series of embedded strategies and rules that reduce participants' burden of decision and counteract flaming (provocative responses to posts).

The tool is designed to inform agenda-setting by promoting organisation. It uses predefined 'seed statements' – also called 'prompts' - as input for the identification of clusters of consent (and dis-consent) around these policy statements. It allows people to first add nuanced comments on these prompts. Conversation then proceeds with ordering added comments around algorithmically structured themes which are then used to build a matrix that organizes comments around themes quantitatively. The use of the tool will be prepared by extensive interaction between citizens, policy-makers, and experts in the RFLLs (WP5). Usage across digital divides will be supported by the civil society organisations that are partners in DUST and purposefully target barriers to digital participation identified through focus groups research involving the least engaged communities' members (WP3).

There are several issues with participatory platforms such as pol.is. Firstly, the use of the tool itself does not excuse lack of planning and forethought going into the participatory approach. It is essential to consider how the process of selection, moderation and analysis is designed and conducted, in conjunction with the tool being used to gather, analyse, and understand data of citizens' opinions in their own words.

Second, the co-creation process of reflecting on policy options using machine learning and data analysis at a large scale will not coincide with the opinions and values of experts or stakeholders with power asymmetry in the process of decision-making. These differences have to be taken into account when contrasting the insights from the use of Pol.is with those from expert interviews conducted in WP3, for instance.

Third, it might be necessary to provide adequate education about the topics that the statements used in Pol.is will concern to the communities being involved in the participation process. Often the most disadvantaged being asked to participate are burdened with understanding collective or systemic processes and offer opinions in an environment that is not conducive to scaling up for deliberation. Thus, special attention will have to be dedicated to effective (or rather affective) communication to the participants of the Pol.is deliberation (see WP6 and section on affective communication).

Fourth, platforms like Pol.is pose barriers to several communities who are not digitally savvy enough to participate meaningfully. For example, elderly, children, or communities with disadvantages where more labour is required to maintain minimum levels of well-being. Engaging them through participatory tools is crucial yet must be thought through with care, which, again, highlights the importance of carefully designed affective communication to facilitate engagement of these groups. Moreover, it is expected that the societal partners within the DUST consortium will support reaching out these disadvantaged communities, building on their knowledge and networks within the case study regions.

Fifth, Pol.is is built around shaping participation and deliberation using machine learning. Such methods are biased to sample selection and subsequently propagate those biases into results, often side-lining or erasing certain opinions and realities. To maintain effective and responsible participation processes, it is essential to design the collection of data, the community selection process, and the analysis carefully, creating moments of inference and reflection with the communities themselves.

Finally, Pol.is does not provide a map-based functionality. Maps delineate the use of space differently for various communities and help highlight differences in our lived experiences, the effects of neighbourhoods, the access and mobility concerns for communities, and a birds-eye view for all participants to understand the distribution of experiences, opinions, and realities. This shortcoming will be, to some degree at least, minimised by combining the use of Pol.is with design-based tools for engagement and deliberation with the communities in the RFLLs.

Table 14 Inputs to and outputs from Pol.is

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T1.1 – Literature analysis	Conceptual framing on deliberative processes at scale, especially those involving digital tools	T5.3 – Regional futures literacy labs	Online deliberation results feed into RFLLs to inform policy co-creation

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T5.3 – Regional futures literacy labs	Citizen anticipation of regional sustainable futures; statements elaborated prepared by citizen focus groups with the LECs		

4.2.4. Regional Futures Literacy Labs: deliberating and co-creating perspectives of regional sustainable futures

The futures literacy framework (FLF) is an analytical tool for describing the alternative futures (Miller, 2018b). FLF builds on a process that activates the 'collective intelligence for knowledge creation' (CICK). It is a core design element that is reflected in the methodology that encompass four dimensions: (1) properly co-designed CICK have a diversity in the representation of stakeholders; (2) CICK are designed in a way that is inspiring the participants to apply their creativity identifying new alternative, inclusive and green pathways for the region they live in; (3) CICK processes have the virtue of integrating existing procedures and build upon local momentum to create change; and (4) CICK is purpose driven by bringing in the topics people are occupied with locally.

The method has been widely used across the world, it is, thus, adaptable across different regional and national contexts. This method can improve the capacity of local communities to 'use-the-future' by opening up new ways of framing solution that can be applied locally. The process also builds social capital by enhancing the local participants professional networks. The CICK design process is considered a means to overcome 'poverty of the imagination' and provide a sustainable source of hope for a 'better life' in the future. In the DUST context, the method will be used in a novel combination with regional design and digital deliberation at scale (Pol.is) within the framework of RFLLs in four case study regions selected for the experiment.

Building trust with the participants is a crucial challenge for the FLF work. While the original UNESCO approach often involves a symbolic working phase of one year before engaging in direct dialogue, the experimental phase of this project does not allow for such a prolonged engagement with symbolic meaning before addressing the participants' experiences and future trajectories. What is more, in the context of a Horizon Europe project, such as DUST, one needs to develop tangible outputs from participatory activities to inform policy recommendations. This need for policy relevance and delivering tangible outputs in a relatively short time also presents a certain challenge, which will require fine-tuning the original method and paying special to careful communication with the participants, based on affective communication approach developed in WP6.

Table 15 Inputs to and outputs from RFLLs

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.1 – Desk research (M6), T3.2 Face-to-face research methods (M15)	Insights on the participation of the least engaged communities inform the planning of engagement of these communities in the RFLLs, ensuring that the experiments are guided by case region specificities, dealing with issues most prescient to local citizens	D6.1 – Art-based Research	Feedback via interviews and reflection on the application of affective communication design guidelines in RFLLs
D6.1 – Art-Based Research (M1-M29)	Affective communication guidelines are applied to engage citizens in RFLLs	D4.4 – Regional design	Input on expectations and hopes, anticipatory assumptions from the LECs informing regional design
D4.2 – Spatial analysis (M18)	Evidence base on regional impacts of just transition policies for citizen engagement and anticipation in RFLLs	D6.1 – Art-based research	Reflection on the use of affective communication design guidelines in the RFLLs
D4.5 – Pol.is (M28)	Online deliberation results feed into RFLLs to inform policy co-creation		

4.2.5. Science-policy-society dialogues

Science-policy-citizen dialogues will be organised as part of the RFLL workshops (T5.3.3). They will build the foundation for an open and transparent deliberative engagement of citizens in deliberation on just sustainability transitions in the case study regions alongside the researchers involved in DUST and the relevant policy stakeholders. The dialogues will be informed by the research conducted in WP2-4.

The dialogues will entail the use of various participatory techniques. The participants will work in groups and be given the opportunity to openly discuss the main regional transition challenges and the different policy options and ideas for overcoming these challenges. The dialogues are

expected to develop trust among the transitions stakeholders and help develop capacities of the communities involved as the foundation for further participatory processes for sustainability transitions and other policy fields. The output of the science, policy, citizen dialogue will be a workshop summary that can support each of the participant in their work advancing the democratic participation. The format and the invitation to set up these dialogues will be part of the guidelines developed for the RFLL workshops.

The primary challenge for this activity may lie in the busy schedules of the most desirable participants. In fact, such dialogues may be perceived as a "nice-to-have" rather than a "must-have" activity. Thus, it is essential to convince all participants of the value of the dialogue and ensure that it is connected to their agenda and work, making it relevant and meaningful for them.

Table 16 Inputs to and outputs from science-policy-society dialogues

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.1 – Desk research (M6), T3.2 Face-to-face research methods (M15)	Insights on the participation of the least engaged communities	T5.3 – Regional futures literacy labs	Engagement method for animating dialogue on science, policy, and social perspectives on the just transitions as part of RFLL
T4.2 – Spatial analysis (M18)	Evidence base on regional impacts of just transition policies		

5. Affective communication: exploring the role of non-verbal expression

Research on affective communication has been added as an additional component of DUST after acceptance of the proposal. The development of the methodology for affective communication remains in progress at the time of writing of this document and is described in more detail as part of Deliverable D6.1. This component of the project will build on the work conducted in WP6 geared towards communication with the least engaged communities in the case study areas, and use a combination of the insights generated by the research methods used in WP3, WP4 and WP5. Beginning with a review of the relevant literature on communication, continuously deployed art-based research methods and other methods will inform the design of communication processes, and reflect on the orientation of project communication to forms of community knowledge, particularly the use of visual and storytelling tools in interactions with the communities in DUST.

5.1.   Methodological approach in the DUST WP6

5.1.1.   Description and motivation of the methodology

The communicative dimension of DUST orients itself around ideas of two-way affective communication, informing non-verbal approaches in the project. The purpose of this research strand is to support the construction of new narratives in the least engaged communities (LECs) and ensure that communicative activities do justice to the voices of LECs. We argue that the efficacy of narrative construction is heavily impacted by chosen modes of delivery, with visualisations and non-verbal communication playing a large part in the way that information is absorbed and understood. As such, there is a need for research to enhance our understanding of how forms of community knowledge are fed into approaches for engagement and the production of material that supports the regional experiments conducted in WP5. This seeks to address knowledge gaps in scientific approaches to community-based research where cognitive understanding is often elevated above affective modes of learning. To ensure that visual material is sensitive to the form and function of LECs, and thus impactful in its relaying of message, an iterative process of defining design approaches is enacted.

The research process on affective communication (see Table 4 for below) begins with a review of the relevant literature pertaining to scientific communication, engagement and understanding of arts, and cognition and development studies. This review covers a variety of literary perspectives and serves to generate an initial orientation for affective communication through exploration of relevant questions to adapt communicative material to the affective domain of learning. The review will inform the first structure of design guidelines for affective communication, with a first set of areas to be considered in non-verbal interactions with the LECs.

These guidelines are then to be consistently aligned with research activities in the project as they occur, in particular WPs 3, 4 and 5. To do so, processes of iteration are combined with methods

from arts-based research. Iteration is used to evaluate the efficacy of design guidelines with project partners. Design guidelines are applied by researchers in different tasks, through collaboration with partners in WP6. Through survey, semi-structured interviews and observation of the workshops conducted as part of the RFLLs, the efficacy of the design guidelines is then consistently evaluated, allowing the content to be subsequently adapted to the needs of DUST partners.

Art-based research (ABR) is used in tandem to this, as a means to evaluate the efficacy of design guidelines with the LECs. Methods will be used to analyse embodied impact, mediation, and value creation, to gain an understanding of how non-verbal communication is received by the LECs. By evaluating the impact of visual material and non-verbal approaches, design guidelines can be consistently adjusted to work towards the best fit of material to affective modes of understanding in the LECs. At the same time, this component of the project will allow for lessons to be drawn from the application of design guidelines in DUST, to produce learnings beyond the project.

Table 17 Methods and measurements in DUST's exploration of affective communication

Name of method	What is measured	Type	How is it measured
Literature analysis	Strategies for affective communication from various scholarly perspectives	Qualitative	Collection of literature, extraction of guiding questions and queries, structuring of questions by affective communication framework
Iteration	Efficacy of affective communication design guidelines for researchers in other WPs through qualitative research methods	Qualitative	Survey, semi-structured interview, observation in collaboration with partners in other WPs
Art-based research (ABR)	Impacts of non-verbal communication on the least-engaged communities	Qualitative / artistic	Analysis of non-verbal communication material by embodied impact, mediation, and value creation with least-engaged communities

5.1.2.   Workflow / interaction between WP6 and other WPs

As outlined previously, research into affective communication relies on the integration of design guidelines into research tasks in other WPs, particularly those where interactions will occur with the LECs (WP3-5). Equally, the iterative design of guidelines for affective communication must occur drawing on the feedback and learnings from other WPs. This two-way exchange of

information will allow for research into affective communication to develop throughout the project.

Research into affective communication in the project targets mainly the experimental phases of DUST in WP4 and WP5, outlined in previous sections. Thus, the production of design guidelines is oriented towards interactions between researchers and community-members in case study regions, primarily in regions where RFLLs take place (Lusatia, Norrbotten, Katowice, and Stara Zagora). Considering the range of narratives and modes of affective understanding that exist in different regions, the need for research methods that can adapt to the unique forms of community expression is pronounced.

As such, the construction of design guidelines must consider the unique characters of LECs in case-study regions and avoid generalising forms of expression and understanding. The explorations of the experiences and perceptions of just transitions policies among the LECs in WP2 and WP3 are utilised here to build an idea of the key communicative characteristics of least-engaged communities in each case-study region. Further to this, during regional experiments in WP4-5, the collection of data pertaining to the impact of non-verbal communication with least-engaged communities should also make sure not to generalise the reception and understanding of material, working towards regionally distinct design guidelines for affective communication.

To shed light on how this iterative process will unfold, figure 10 below outlines the key targeted moments for interaction with other WPs.

Table 18 Interactions between affective communication research in WP6 and the research activities in WP3-5

Interactions with WP3	Interactions with WP4	Interactions with WP5	WP6 deliverables
T3.1 – Collection of data on key characteristics of communities and participatory methods informing affective communication design guidelines (M3-M6)	T4.1 – Assessment of affective communication design guidelines (M12-M14)	T5.1 Connection o affective communication design guidelines to RFLLs approach (M13-M15)	D6.1 – Initial affective communication design guidelines (M3)
T3.2.2 – Validation of design guidelines with LECs (M9-M15)	T4.3 – Visual representations and LECs storylines inform narrative expression and affective communication design guidelines applied in regional design (M18-M23)	T5.2.1 & T5.2.2 - Affective communication design guidelines are applied to RFLL action planning and citizen group mapping (M15-M19)	D6.5 - Affective communication design guidelines inform approach taken in storytelling activities with moments for digital feedback collection (M6-M36)

Interactions with WP3	Interactions with WP4	Interactions with WP5	WP6 deliverables
T3.3 – Media analysis informing adaptation of design guidelines to regional modes of communication (M14)	T4.4 – Reflection on the use of affective communication design guidelines in WP4 and alignment of narratives / storytelling (M23-M25)	T5.3 – surveyed feedback on the use of affective communication design guidelines in RFLL from the communities (M19-M28)	D6.6 – Input collected from Community Champions on affective communication design guidelines used in outcomes of the campaign (M9-M36)
		T5.4 Reflection on the use of affective communication design guidelines in RFLL drawing on interviews (M28-M31)	D6.1 update 1- Affective communication design guidelines are re-drafted based on learning from previous applications and feedback (M12)
			D6.7 – Reflection and conclusions from design guidelines application included in Beyond Dust final conference materials and used as a tool for capacity-building (M12-M36)
			D6.1 update 2 - Affective communication design guidelines are re-drafted based on learning from previous applications and feedback (M24)
			D6.4 – Inclusion of learnings from affective communication activities in assessment of the factors that affect effectiveness of the guidelines used (M24-M34)
			D6.1 update 3 – Final version of the design guidelines is drafted based on the final analysis (M36)

5.1.3.   Expected results

The expected results for affective communication revolve around the construction of design guidelines and relate to two deliverables:

- **D6.1 Communication, Dissemination and Exploitation Plan (months 3, 12, 24, 36, lead: ISOCARP):** In each update of this deliverable, the current state of research into affective communication is outlined. This is where the backing research (literature review, arts-based research) is recorded. The deliverable will not outline the current state of design guidelines but will describe the methods used and to be used in the 12 months prior to and post update. These will then be consistently updated throughout the project. Within D6.1, the theory underpinning affective communication (as a guiding principle for all project communication) is also outlined. A literature review of existing strategies for affective communication is also contained in this deliverable, informing the first design guidelines.

- **Internal deliverable: design guidelines (months 6, 12, 24, lead: ISOCARP):** the first version of the affective communication design guidelines will be produced as a separate internal document building on D6.1. Design guidelines are to be constructed by month 6 and continuously updated throughout the project. This is an internal resource that will provide partners with guides for affective non-verbal communication, targeting key tasks and specifying engagement strategies per least-engaged communities in case study regions.

5.2.   Methods in DUST's exploration of affective communication

5.2.1.   Literature analysis

The literature review on affective communication is conducted drawing on perspectives on scientific communication, engagement and understanding of arts, and cognition and development studies. It considers ideas of affect and value creation in non-verbal communication and their relevance for the project. Literature review is used first to extract the key questions relating to affective communication, around which a structure for design guidelines can be built. It provides the first points of orientation to consider the integration of affective communication in the project. After its first deployment in the collection of literature relevant to affective communication, literature review will also be used to answer questions that arise in the application of design guidelines, drawing on experiences in literature to anticipate potential strategies for non-verbal communication that is sensitive to community forms of knowledge. All outputs of literature review on affective communication will be contained in D6.1 and will inform the development of design guidelines.

Table 19 Inputs to and outputs from literature analysis on affective communication

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
-	-	T6.1 – Iteration	Literature insights to inform the elaboration of affective communication design guidelines
-	-	T6.1 – Art-based Research (ABR)	Literature insights on non-visual communication to inform the elaboration of affective communication design guidelines

5.2.2. Iteration

Iteration is considered as a method for research into affective communication in the project as it combines multiple qualitative research methods, in a process of defining and re-defining design guidelines for affective communication. Iteration is used consistently in the construction of design guidelines and refers to the alignment of guidelines to the needs and considerations of project partners in deployment. In effect, iteration is a process of feedback loops in which data is collected from tasks in other WPs and used to adjust the content of design guidelines, to be used in later tasks.

Iteration occurs through a combination of survey, semi-structured interview, and observation at key moments in the project. These will occur in tandem to tasks performed in other WPs and will be conducted by partners in WP6, to assess how researchers use the design guidelines and how these should be edited to be the most useful. The outcomes of these activities will inform the re-structuring and generation of new content in design guidelines. The processes of analysis and guideline re-design will be recorded in D6.1.

Table 20 Inputs to and outputs from iteration

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T6.1 – Literature analysis (M3)	Literature insights to inform the elaboration of affective communication design guidelines	Coordination of feedback loops with other research methods in WP2-6	Input for affective communication design guidelines

5.2.3.   Art-based research

Art-based Research (ABR) is of relevance for work on affective communication as it provides a basis to understand the impacts of non-verbal communication on the least-engaged communities in case-study regions. ABR refers to "the systematic use of the artistic process [...] as a primary way of understanding and examining experience by both researchers and the people they involve in their studies" (McNiff, 2023, p. 29) In ABR artistic expression is used as data for academic investigation within more traditional scientific approaches to study and analyse social phenomena. In DUST, ABR is used in the collection of data for the construction of affective communication design guidelines and to analyse the efficacy of these guidelines in reaching the least engaged communities. The use of ABR generates output in both D6.1 and the constructed design guidelines for affective communication.

ABR is first used to provide a structure for the construction of design guidelines on affective communication, drawing on studies that consider art as research and outline methods to understand ethnographic or behavioural topics through artistic mediums. In this sense, ABR contributes to the literature review outlined previously, by providing guidance on strategies for affective communication, relating to artistic expression and its relationship with the affective dimension of learning.

ABR is also used consistently throughout the project to analyse how produced non-verbal communication material is received and understood by community members. Three aspects of ABR are of note here: embodied impact, mediation, and value creation. Embodied impact considers how artistic expression translates to changes in audience social practice through explorations of exposure as a means for behavioural and opinion change. It allows for exploration of how non-verbal communication in DUST is absorbed by members of least-engaged communities and the potential changes in social practice this may lead to. Mediation explores how art can act as a bridge between disconnected phenomena. In the project it will be used to understand the role of non-verbal communication material in connecting forms of community understanding to broader ideas of sustainability transitions. Value creation looks at how art benefits the user, considering intrinsic and instrumental value and connecting to ideas of wellbeing, heritage, and pleasure. In DUST this concept will be used to evaluate if non-verbal communication material is of value to least engaged communities.

Table 21 Inputs to and outputs from Art-based research

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T6.1 – Literature analysis (M3)	Literature insights to inform the elaboration of affective communication design guidelines	T5.1, T5.2 T5.3 – Regional futures literacy labs	Affective communication design guidelines integrated planning of the RFLLs approach, action plans and citizen engagement, implementation of the workshops

Inputs from tasks / methods	Content and purpose of the inputs	Outputs to tasks / methods	Content and purpose of the outputs
T3.1 – Desk research (M6)	Informs affective communication design guidelines		
T3.2- Face-to-face research methods (M15)	Validating affective communication design guidelines		
T3.3 – Media analysis (M15)	Media narratives insights inform affective communication design guidelines to adapt them to the regional media contexts		
T4.3 – Regional design (M24)	Visual representations and least engaged communities' storylines inform narrative expression and communication design guidelines; Reflection on and assessment of the use of affective communication design guidelines		
T5.3 – Regional futures literacy labs (M18-M29)	Community assessment of affective communication design use in RFLLs		

6. Conclusion

## 6.1. Triangulation and synergies between methods

The DUST research methodology was designed to combine and generate synergies across multiple methodological perspectives, reflecting the principle of triangulation. The latter is inspired by navigation and land surveying methods, whereby a single point in space is determined by converging measurements taken from two other points in space. Triangulation as a research strategy builds on the idea that "phenomena under study can be understood best when approached with a variety or a combination of research methods" (Given, 2008, p. 892). The assumption is that "confrontation of a series of complementary methods of testing [...] contains a degree of validity unattainable by one tested within the more constricted framework of a single method" (Webb et al., 1966, p. 174). This is why triangulation improves both credibility and validity of research on social phenomena, while reducing biases related to specific methods.

Accordingly, the WPs and the core components of the DUST research – the multiple case study research and the experiments in RFLLs – involve triangulation of research methods and data sources to enrich the understanding of the phenomenon studied, ensure robustness of findings, and contribute to minimising the limitations of each of the research methods used through synergies and complementarities (see Fig. 13). Thus, the performance of participation in WP2 is studied by synergising the survey method, with Actor-Process-Events Scheme tool and the STEP index. By the same token, the deepening of the understanding of the factors that affect this performance of participation in WP3 also involves triangulation of methods and data sources, by combining desk research (including document analysis), with interviews and focus groups as well as computer-assisted media analysis. Following the same logic, validity, and robustness of the findings from the DUST experiments also involves building on a tightly interwoven set of methods and data sources. In WP4, the evidence base for the experiments is prepared on the basis of a combination of spatial analysis, regional design, and collection of citizen insights on just transition policies via online deliberation tool Pol.is. Then, in WP5 the RFLLs build on a combination of the futures literacy method elaborated by UNESCO, with science-policy-society dialogues, supported by Art-based research method guiding engagement of citizens in the process.

The use of triangulation is not unproblematic in practice, because it creates a risk of confusion between different methodological perspectives (Blaikie, 1991) and discrepancies across the evidence base. Despite these difficulties, methodological pluralism and triangulation do bring dividends in terms of robustness of the research, provided that the researchers remain diffident and realistic about the relative merits and limits of the methods used to triangulate insights (Heesen et al., 2019). Thus, for the DUST research methodology to succeed in generating rich, valid and robust insights into participation of the least engaged communities in just transition policies through combination of qualitative, quantitative, experimental and art-based research methods, it is essential to ensure the following: (1) a sound, cross-cutting conceptual spine for the research to be shared by the researchers involved; (2) shared understanding of the limitations and shortcomings of each of the methods used and of the combination thereof in the projects' methodology; and (3) a close coordination of the interactions and flow of insights, inputs and outputs across the diverse research methods applied and tasks throughout the research

process. The methodological framework, presented in this document, together with the theoretical framework outlined in Deliverable 1.1 provide a basis for the latter, offering the DUST team a theoretical, methodological, and organisational compass for the research.

Figure 12 Triangulation across methods in DUST research
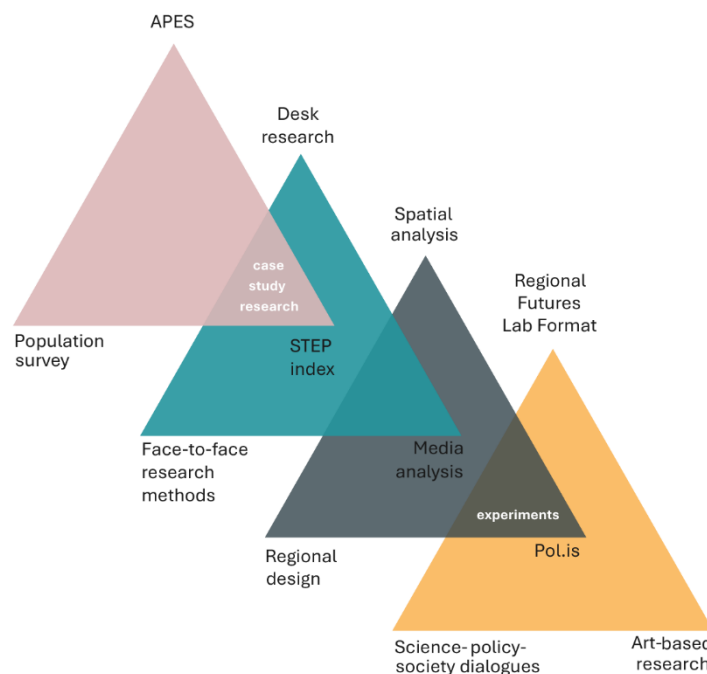
6.2. Reflection on methodological innovation

The DUST methodological framework innovates and moves beyond the typical research designs in social science in several ways. The case study research in the first phase of the project may be based on a typical mixed method research design, where diverse methodological approaches are combined to deliver more robust results, however, the combination of the specific methods is novel, especially in the context of research on just transitions and participation. The case study research, thus, combines quantitative methods, namely the development and application of the STEP index, of the population survey and computer-assisted analysis of media narratives on transitions policies. This amalgamation of methods is expected to deliver synergies and allow for developing a fine-grained understanding of the challenges in participation in place-based just sustainability transitions policies in a multi-level context.

The most innovative aspect of the DUST methodology, however, is the novel combination of design-based approach with experimental and participatory methods involving citizens in the research process, both through physical, hands-on workshops and digital deliberation at scale. Thus, DUST methodology includes experimental and an original mix of spatial analysis and regional design, including artistic and visual expression of citizen anticipation of sustainable regional futures, with online deliberative participatory tools to develop consensus on regional futures and co-creation with citizens and stakeholders as part of Futures Literacy Lab format. By this, DUST innovates in terms of testing a new approach to citizen science, which delivers policy-relevant research, generating rich insights for democratisation of just transitions policies, while, at the same time, putting a strong emphasis on generating inputs from citizens and especially

from the groups that are typically marginalised in policy debates and participatory activities along the policy cycle.

This is complemented and facilitated by an equally innovative approach to communication with the participants of the research. This approach is also centred on boosting participation and giving agency to the least engaged communities and is seldom used social science research. It builds on art-based research methods and the concept of affective communication, which emphasise non-verbal, visual communication means tailored to the socio-cultural specificity of the places and communities studied and involved in the research process.

The caveat is that, as any innovative activity, this methodological innovation comes with some risks and requires a degree of flexibility to accommodate challenges emerging during the research. Thus, the application of the methodological framework presented in this document will entail adjustments and refinements of the methods and their interplay resulting from 'learning-by-doing' in the research process. Be the same token, some of the elements of the research methodology are still in development at the time of writing of this document, especially those that are used at later, experimental stages of the project, including the participatory experiments in RFLLs (WP4 and WP6) and the research on affective communication (WP6). The latter, for instance, has been added to the research project only after the proposal was accepted as an additional are for investigation to inform affective learning and communication towards the least engaged communities. This methodological framework should, therefore, be considered as a 'living document' which will be updated several times as the project unfolds, the details of the application of some of the methods, their conceptual underpinnings and limitations are more clearly defined, and as lessons are drawn from the initial application of the methods in the 'real world'.

By this, the future adjustments to this methodological framework will inform and guide the implementation of the DUST research project as it unfolds. Equally, importantly, though, the final version of the document, reflecting the lessons learnt from the application of the DUST methodology in the case study regions, will also inform future the design of future research beyond this project.

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