Enabling Positive Tipping Points towards clean-energy transitions in Coal and Carbon Intensive Regions

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D7.2: Full Project Knowledge Integration Report with Results, Procedures and Recommendations

Work Package: 7
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Preface

TIPPING+ will provide an empirical in-depth social science understanding of fundamental changes in sociodemographic, geographical, psychological, cultural, political, and economic patterns which give rise to Social-Ecological Tipping Points (SETPs), both positive and negative in relation to socio-energy regional systems. Such empirical and theoretical insights will shed new light on the interdependencies between changes in regional socio-cultural structures and the technological, regulatory and investment-related requirements for embracing (or failing to embrace) low-carbon, clean-energy and competitive development pathways in selected coal and carbon intensive case study regions (CCIRs). The overall goal is to understand why and under which conditions a given social-ecological regional system heavily dependent on coal and carbon-intensive activities may flip into a low-carbon, clean energy development trajectory – or on the contrary may fall into an opposite trajectory with all its negative implications. Towards this goal, main focus of TIPPING+ is the participatory co-production of knowledge on the driving forces and deliberate tipping interventions leading to the emergence of positive tipping points toward clean energy transitions in European CCIRs.

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7	Universitaet Graz	UG	AT	
8	University of Piraeus Research Center	UPRC	GR	
9	Palacky University Olomouc, Faculty of Science	PUO	CZ	
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11	National School of Political Studies and Public Administration	SNSPA	RO	
12	Institute for Structural Research	IBS	PL	
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Executive Summary

The Deliverable 7.2 “Full Project Knowledge Integration Report with Results, Procedures and Recommendations” aims to present the operational process of knowledge integration and key project results and recommendations on Social-Ecological Tipping Points (SETPs) to accelerate low-carbon, clean energy transitions in CCIRs.

The objective of the TIPPING+ project was to generate a unique transdisciplinary social science analytical framework and build theory to contribute to the understanding of transitions in coal and carbons intensive regions: causes, effects, development trajectories, SETPs. The project has significantly moved beyond the current state-of-the-art. It has provided a comprehensive, original, empirically grounded, and policy-relevant understanding of the critical concept of SETPs and of tipping interventions to support the successful undertaking of clean energy transitions in European regions heavily dependent on fossil fuel extraction or intensive fossil-fuel industrial activities.

Knowledge integration based on interdisciplinarity and transdisciplinarity was one of the core principles of the project. The project team had devised key procedures for knowledge integration to be applied across the project, which helped achieve interdisciplinary and transdisciplinary research outputs. Knowledge integration was designed and carried through the entire project by a WP5-WP7 task force, which organized regular weekly and monthly open communication space meetings (WOCS/MOCS) and every six moth integration workshops. The task force was the central organizational unit for maintaining an overall management of knowledge integration in the project. Integration workshops served as the key platform for all consortium partners for working together: commonly defining research questions, looking for commonalities and searching for synergies. The weekly and monthly meetings ensured exchange of ideas among researchers within the consortium as well as well beyond the consortium in the scientific and policy communities, presenting the work in progress and learning about the research beyond the project. These operational procedures played a key role in the integration of interdisciplinary and transdisciplinary research work, especially, if the researchers’ teams come from strongly disciplinary background.

The TIPPING+ project has resulted in a significant number of research and policy outputs: the special issue “Enabling Sustainable Transitions in Coal and Carbon-Intensive Regions - Interdisciplinary Social Science Perspectives” in the highly ranked Global Environmental Change journal, the book “Positive Tipping Points Towards Sustainability” to be published by Springer, the “Booklet Regional Strategies, Responses and Solutions for Enhancing Positive STEPs for Energy Transitions in CCIRs” and the “Policy Briefs with Recommendation on SETPs to Accelerate Low-Carbon, Clean Energy Transitions in CCIRs”. The special issue and the book synthesize empirical findings across the cases studies, as well as focus on concept and theory building. The booklet and the policy briefs present the co-developed narratives, strategies, recommendations, and advice for the policy makers.

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1 Introduction

The objective of the Deliverable 7.2 "Full Project Knowledge Integration Report with Results, Procedures and Recommendations" is to present the operational process of knowledge integration and the key project results and recommendations on Social-Ecological Tipping Points (SETPs) to accelerate low-carbon, clean energy transitions in CCIRs.

Well defined procedures play an important role in the integration of interdisciplinary and transdisciplinary research work, especially when researcher teams come with strong disciplinary backgrounds and perspectives. Procedures in the TIPPING+ project were crucial as they provided a structured and organized approach for combining different streams of research, compare and synthetize findings, and perspectives. They also served as a platform for communication within the consortium and beyond the consortium, with the sister research projects funded under the same H2020 call as well with the wider scientific and policy making communities, ensuring that the synthesis of research findings is robust, and useful for policy and decision makers. Therefore, we paid great attention to provide a smooth, regular, and consistent process of knowledge integration through the lifetime of the project.

The report is organized in five~~four~~ main chapters.

Chapter 2 "Revisiting Project Objectives and Ambition and How We Respond to Them" presents the starting point of the project. It reminds the reader our point of departure – project objectives, key concepts, and definitions, as well as the contribution of the TIPPING+ project beyond the state-of-the-art.

Chapter 3 "The Organization of Work to Improve the Existing Understanding of the Cross-Scale, Cross-System that Affect Low-Carbon Clean Transitions in CCIRs" sets out the key procedures for the knowledge creation and integration developed during the project. We demonstrate how the specially created WP5-7 task force, the integration workshops and the regular weekly and monthly meetings helped achieve interdisciplinary and transdisciplinary research outputs.

Chapter 4 "Phases of Knowledge Creation and Integration" presents the steps of the knowledge creation and integration process – the elaboration of the case study guidelines and the analytical framework, characterizing case study regions, identifying narratives and key parameters for SETPs.

Chapter 5 "Integrating TIPPING+ Deductive findings: towards transformative emergence" contains the main findings of the integration of the deductive analyses produced by Work Packages 1, 2, 3, 4 and 5 regarding the literature reviews relevant to identifying the key theoretical and research challenges regarding the identification and enabling SETPs in CCIRs that appeared as TIPPING+ working paper. In particular it found out that research and policy usage of SETPs towards regional sustainability faces three key challenges: (a) integrating theoretical and empirical contributions from diverse social and ecological sciences, together with complexity theory (b) designing open transdisciplinary assessment processes able to represent multiple qualities of systemic change and enable regionally situated transformative capacities, and (c) moving away from one-directional metaphors,

static ideas of individual agency or single equilibrium in energy transitions; and instead, focus on understanding the conditions and capacities for the emergence of systemic transformations and regenerative processes across multiple levels of changing agency, unfolding both in social and biophysical systems and in many moments in time.

Chapter 6 “Project Results and Achievements” introduces the key substantive outputs of the project: the special issue “Enabling Sustainable Transitions in Coal and Carbon-Intensive Regions – an Interdisciplinary Social Science Perspectives” in the highly ranked Global Environmental Change journal, the book “Positive Tipping Points Towards Sustainability” to be published by Springer, the “Booklet Regional Strategies, Responses and Solutions for Enhancing Positive STEPs for Energy Transitions in CCIRs” and the “Policy Briefs with Recommendation on SETPs to Accelerate Low-Carbon, Clean Energy Transitions in CCIRs”.

It is important to note that the Deliverable 7.2 “Full Project Knowledge Integration Report with Results, Procedures and Recommendations” primary serves the purpose to present the operational process of knowledge integration. Throughout the report, we refer to other project deliverables, in which one can find the relevant information about the key project results and outputs. The “Contribution to the Tipping Plus Project’s Integration Framework from disciplinary perspectives” are presented in the Deliverables 1.3-4.3 which contributed to the Deliverable 7.1. The “Case Study Findings” are provided in the Deliverable 5.2, while the “New Social Science Theory on SETPs in CCIRs Including the Overall Project Knowledge Integration Framework” is presented in the Deliverable 7.1.

2 Revisiting Project Objectives and Ambition and How We Responded to Them

2.1 Revisiting Project Objectives

The objective of the TIPPING+ project was to generate a unique transdisciplinary social science analytical framework to respond to the following intertwined questions:

- Why at one or several points in time Coal and Carbon Intensive Regions (CCIR) flip into fundamentally different development trajectories and embrace low carbon, clean-energy transformations?
- What are the actual effects of such fundamental changes on the livelihoods and the sustainability of regional economies and social-ecological systems?
- How can the knowledge from the recent past about the multiple social-ecological processes leading to sudden and fundamental changes in these regions be used to identify the most effective tipping interventions enact low-carbon, clean-energy transitions in other regions?

The project's objective was devised according to the call "Building a low-carbon, climate resilient future: secure, clean and efficient energy" focusing on providing a better understanding of socioeconomic, gender, sociocultural, and socio-political factors, and their interrelations with technological, regulatory, and investment-related aspects, in support of the goals of the Energy Union and particularly its research and innovation pillar. In addition, the project was designed in a way to yield practical recommendations for using the potential of social innovation to make Europe's energy system more secure, sustainable, competitive, and affordable for Europe's citizens.

We articulated the overall objective of the project described above in four operational objectives:

- Objective 1: Identify, quantify, and evaluate different dimensions and indicators in human-geography, social, policy, environmental and economic domains that characterize the emergence of SETPs in the form of fundamental changes in CCIRs from a transitions-oriented interdisciplinary social science focusing on regional social-ecological systems.

- Objective 2: Explore cumulative processes, capacities and socio-structural forces leading in CCIRS that lead to positive or negative tipping points in energy transitions considering different regional challenges, opportunities, and configurations.

- Objective 3: Co-develop socially acceptable regional future visions up to 2030 to support more durable governance arrangements and strategic goals for CCIRs in line with broader goals of the EU 2030 package, EU Energy Union, and Global Stock Take with relevant actors.

- Objective 4: Identify critical tipping interventions and devise practical transformation strategies in specific CCIRs to potentially reach future visions and promote regional sustainability learning and awareness of positive tipping points in education, governance, and planning processes.

We started the knowledge generation within the project with the observation, based on an exhaustive multidisciplinary literature review, that national and international climate mitigation policies and strategies often do not consider the nuanced needs and real conditions and opportunities present at the regional level, resulting in misalignments between (inter) national climate policy goals and local priorities.

We also observed that these challenges are more acute in high-carbon intensive regions that are economically dependent on fossil fuels but must also meet national and EU climate change targets. Additionally, national climate policies (e.g., Nationally Determined Contributions) not only lack the ambition needed in meeting Paris Agreement goals (Rogelj et al 2016), but often lack credibility at the regional and local level as longer-term climate goals do not resonate with the immediate social-economic needs nor actual possibilities for transformation observed from below (Amundsen et al 2018).

Moreover, typical assumptions about individuals' preferences and how they respond to fast socio-structural changes occurring at local level can lead to limited understandings about their behavior and abilities to adapt or innovate (Sarrica et al 2018). In these various regional social-ecological systems, different community values, social identities and cultural practices unfold and may - or may not - be integrated as part of broader climate mitigation actions.

We also noted that there is a lack of systemic understanding of systems' dynamics and in particular in Europe, with regard to carbon intensive regions beyond coal intensive regions. While coal and fossil fuels are defined technological sectors, Coal and Carbon Intensive Regions (CCIR) are not so easy to define and rarely systematically analyzed as complex systems (Allen et al. 2017), that is as regions characterized by with multiple geographical, social, cultural, and political dimensions as integral starting points of analysis. Moreover, failing to systematically consider these multiple social dimensions and perspectives often leads to an ineffective implementation of mitigation actions and climate policies (Tàbara et al 2019, Geels et al 2017).

Considering these gaps, within the project we identified, characterized, and carried out empirical analyses to advance the state of the art on both negative and positive tipping points supporting the transformative capacity of regions as well as advancing Transition Theory. Our focus concerned the participatory co-production of knowledge concerning the driving forces and deliberate interventions leading to the emergence of tipping points towards clean-energy transitions in CCIR.

As the Deliverable 7.1 shows, the Integrated Framework, based on the insights from the regional case studies, has been elaborated. The framework was elaborated in an interdisciplinary manner through early engagement of regional key practitioners and stakeholders from the case studies and it helps to characterize and explain the decisive

events, processes, major systems' transformations, and the effects of clean energy transformations in European CCIRs.

In order to respond to the overall objective of the call and precisely to the objective of the TIPPING+ project to elaborate a robust and empirically grounded theory of Social-Ecological Tipping Points (SETP) which can be applied to support successful clean-energy transitions in CCIR, we needed first to produce a stepwise advance in the scientific understanding of the critical concept of SETP. For instance, the decision of 'leaving fossil fuels in the ground' could be understood as a positive tipping point from the perspective of climate policy and also to trigger alternative energy innovations, but the practical consequences of that decision at the regional and local levels in terms of employment, cultural identity and social-ecological re-structuration need a careful examination before being qualified as such (Dale et al 2018, Dale & Kristoffersen 2018).

The various streams of literature review carried by the Work Packages 1-4 showed that most research on tipping points had focused on biophysical tipping points and much research is still lacking from the social sciences, especially in Transition Theory using a transdisciplinary methodology (Milkoreit 2018; Koop et al 2016; Werners 2013; Westley 2011; Jordan 2010; Nuttall 2011). Natural scientists have tended to show the negative, large-scale, catastrophic potential changes in the Earth's biophysical conditions. Climate tipping points are understood by natural scientists to occur when a critical threshold of change in one or several components of the Earth biophysical system – due to the cumulative and interactive effects of previous changes -can lead to a major irreversible change in the state of that system (Cai et al 2016, Lenton et al 2008).

However, empirical social research is still lacking, and transdisciplinary collaboration also needed (Brondizio et al 2016) to understand which kinds of tipping interventions could generate fast systemic transformations towards positive futures in socio-economic systems (Farmer et al 2019; Otto et al. 2020). History shows many examples of positive tipping points in social systems, even at small scales. Positive transformations in complex socio-energy systems (Miller, Richter & O'Leary 2015) require the coordination and combination of interlinked systems of solutions, derived from situated capacities, which in turn, may emerge from transformative visions of different futures societies want to live (Tàbara et al 2018; Veland et al 2018).

During the extensive multidisciplinary literature reviews conducted during the first year of the project, one of the challenges we encountered was the diversity of terms used in the different disciplines by various authors. Therefore, we clarified the terminology used in the project, considering that we explored Social-Ecological Tipping Points in coal and carbon intensive regions.

We defined "tipping" as referring to the accumulation of structural forces (e.g., in societal, cultural, economic, environmental, policy, political and technological dimensions) within a system, leading to a "point", or rather a moment in time which triggers a cascade of changes resulting in deep, systemic transformations towards low-carbon, clean energy systems.

We defined "carbon-intensive regions" in an innovative manner that has not yet been applied in energy transition studies. We used the IPCC approach (Fischedick et al 2014), “carbon intensive” referring to two areas: (i) Upstream energy extractive industry regions (that is, coal & fossil fuels extraction areas); and (ii) Downstream carbon-dependent regions, which include analyses of specific energy-intensive sectors and services such as transport, buildings, industry and service sectors particularly important in the regions chosen.

We also refined the concept of “region” to be used in the project. We combined the conventional notion of administrative regions across different levels (e.g., EU level, country, sub-national, city etc.) with a more conceptually complex understanding as social-ecological regional systems to be able to draw insights from the various social science disciplines integrated in the project (e.g., social psychology, anthropology, human geography, policy science or new economics).

Going beyond the definition of regions based on administrative borders allowed us to unveil and analyze the underlying multi-level regions systems’ tipping dynamics among networks of actors and its effects (Galaz et al 2016; Mandel et al 2019). It also enabled the analyses of conflicting or cooperative interests (Lenton 2014; Totten 2012) and of economic incentives required for new forms of climate cooperation (Stine et al 2018, Parousos et al. 2019) clustered around coal and carbon intensive economic activities**.**

This helped us provide a more nuanced, fluid and at the same time systemic understanding of regional systems based on specific social, cultural, economic, and environmental factors and their interconnections. We identified and characterized the factors and interconnections through specific indicators identified in the field and via desk studies. We then will use them to develop strategies relevant for enabling critical positive tipping points in the regions in question and beyond.

The literature reviews as well as the clarification of the terminology used within the TIPPING^{+} project helped us elaborate an incipient analytical and integration framework in the early stages of the project. We therefore provided to the whole consortium the framework to perform the following work streams:

- Further characterize CCIR by including both regions characterized by upstream energy extractive industries (coal & fossil fuels) and the downstream energy-intensive sector & services and to identify the main drivers for the emergence of positive and negative social-ecological tipping points in these regions.

  As these deep regional systemic changes, driven by the need for energy transitions, unfolds, we hypothesized that a combination of qualitative and quantitative analysis of: (1) Demographic trends and structures and geographical distribution patterns in gender, migration, and youth (2) Community, gender, socio-psychological and ideological factors, including the rise of populism or anti-democratic attitudes (3) Public policy interventions and governance factors and their cross-cutting effects at different levels (4) Economic trends including their effects in job creation/destruction, distributional changes in welfare and variations in stocks and flows of natural

resources and energy and the associated technologies available at regional level could enrich our understanding of how positive SETPs occur.

- Identify key social-economic structures, trends, and changes, taking into consideration cultural, social and psychological aspects at individual and household levels in order to assess how livelihoods and communities affect and are affected by changing socio-ecological conditions in CCIRs.

  We focused on assessing how the creation or the loss of endogenous development capacities affect livelihoods and the possibility for actors, stakeholders, and communities to support deliberate positive transformations towards clean-energy systems development trajectories.

- Gather critical insights from a wide and representative diversity of Coal and Carbon Intensive regions.

  We addressed cases to understand recent past and potential alternative futures in low-carbon, clean-energy transitions, which cover not only East, Central, North, and South European countries, but also other critical areas like Arctic region and Greenland as well as non-European countries such as Canada, and Indonesia.

- Map out and assess, both qualitatively and quantitatively, the different kinds of coping and innovation strategies implemented by regional actors related to clean-energy transitions.

  In our analysis, we included the interplay between (1) main narratives and visions developed by regional agents regarding energy systems (2) the types of regional transformative capacities (including both coping and innovative ones) created or lost during the last decade, and (3) the kinds of specific strategies, solutions and responses adopted to address the systemic challenges confronted by CCIR.

- Provide theoretically grounded practical recommendations to support the most effective of positive tipping interventions to enable low-carbon, clean-energy transitions for Europe's CCIR and to prevent negative trajectories that hamper decarbonization in regional socio-economic systems.

  We based our recommendations on the combination of participatory co-production of transformative visions and grounded knowledge from the case studies about the emergence (or lack thereof) of SETP in these regions. Stakeholder engagement via workshops and other means in all case studies helped us operationalizing the specific research questions in policy relevant ways and generate tailored recommendations to support the implementation of the EU energy goals.

- Generate continuous mutual learning feedbacks and enhance regional transformative capacities through the whole duration of the project by ensuring an early engagement of case studies stakeholders.

To foster positive impacts, a series of ad hoc engagement, science-policy integration and interfacing activities were carried out during the whole duration of the project. Stakeholder engagement started at a very early stage of the project and helped us produce the analytical framework.

2.2 Revisiting Project Ambition and Contribution of TIPPING+ Beyond the State-of-the-Art

One of the scientific outcomes expected from the TIPPING+ project was to provide, for the first time in the Transition Theory scholarship, an integrated transdisciplinary assessment from the social sciences of the dynamics of positive and negative points in regional energy systems. To deliver such an assessment, we focused on processes occurred during the last decade in twenty key European regions largely dependent on industries with intensive use of coal and carbon or the extraction of fossil fuels themselves and placed special attention to unveil the socio-economic, gender-related, political, and cultural factors that condition their development trajectories at one or several points in time.

Our work was situated at the knowledge frontier of the interdisciplinary and transdisciplinary social research applied to Transition Management. From this unique standpoint, the work of the whole consortium moved beyond the current state-of-the-art by providing a comprehensive, original, empirically grounded, and policy-relevant understanding of the critical concept of SETPs and of tipping interventions to support the successful undertaking of clean-energy transitions in European regions heavily dependent on fossil fuel extraction or intensive fossil-fuel industrial activities.

Specifically, as a consortium, we achieved in TIPPING+ the following:

- We elaborated an integrated and theoretically grounded social science framework to interpret the cross-cutting forces, conditions, and dynamics, related to various population, geographical, cultural, public policy, economic and resource systems that lead to key bifurcations in regional energy systems trajectories, yielding either positive or negative results in terms of regional welfare, livelihood improvements and adoption of clean-energy strategies.

- We mapped out and categorized the different kinds of social-ecological tipping points in various regional energy systems and the specific moments in time where the original systems conditions were or are likely to be transformed towards the success or failure of low carbon, clean-energy regional development trajectories.

- We unveiled the different kinds of transition narratives, types of capacities – including diverse knowledge systems-, and alternative strategies on energy systems developed both by individual actors and regional networks operating at different scales of action and their interaction.

- We traced regional public opinion trends and emergent narrative on populism and anti-democratic attitudes that negative affect the implementation of low-carbon and clean energy transition in several case studies.

- We identified and provided an empirical, comparative, in-depth understanding of the heterogeneous agent dynamics, learning processes and enabling socio-economic, cultural, and political conditions leading to SETP in European CCIR cases.

- We assessed the relationships between socio-cultural and policy-related narratives and the evolution in personal and family biographies, the kinds of organizational networks within CCIR, as well as behavioral innovations leading or constraining the emergence of regional capabilities to embrace clean-energy and sustainable development trajectories.

- We provided a comparative and integrated analysis of the relationships between changes within different social, economic, governance and cultural systems in European CCIR and the consolidation or loss of governance arrangements to secure clean energy and socio-economic transitions in these regions.

- We assessed the role of gender in socio-cultural transformations and socio-political issues derived from actions promoting clean-energy transitions in these regions.

3 Organization of the Work to Improve the Existing Understanding of the Cross-Scale, Cross-System that Affect Low-carbon Clean Transitions in CCIRs

3.1 Constitution of a Task Force between WP5&WP7

In order to develop the Integration Framework and New Social Theory, we constituted a task force from the teams of WP5 and WP7. The WP7 team has been responsible for the integration of the disciplinary knowledge, whereas WP5 team coordinated the work of the case studies. The task force worked closely together with WPs 1-4 to create a transdisciplinary understanding across the four core disciplinary perspectives considered in the project.

The main objective of the task force was to coordinate the joint elaboration of the TIPPING+ integration framework and to connect and integrate in a scientific and policy relevant way various insights generated by all project work packages and case studies and to do so by developing a new social grounded theory on SETP.

The task force was also responsible for generating robust and empirically grounded recommendations and visions based on the theoretical and empirical insights from all project WPs to support positive social-ecological tipping points and tipping interventions toward low-carbon, clean energy transitions in European CCIR. WP7 and WP5, therefore, identified the necessary endogenous transformative capacities and the most potentially effective tipping interventions to achieve them. This task included proposals on practical transformation strategies in specific CCIRs to potentially reach future visions, promote regional sustainability learning and awareness of positive tipping points, and prevent negative and catastrophic ones in climate governance and regional planning processes.

3.2 Establishment of Knowledge Integration Procedures with all WPs: Integration Workshops

We started by exploring key cross-cutting dimensions and interactions to advance the current social science interdisciplinary knowledge about the occurrence of SETPs. These key cross-cutting dimensions included:

(1) new trends, changes and impacts of energy transitions on demographic structures and geographical distribution patterns, namely in gender, migration and youth (Black et al 2011, Brozska & Frölich 2016);

(2) community, gender, psychological factors related to energy transitions (Westley et al 2016), including those of social conventions and in public opinion trends and communication (Centola et al 2018, Doyle et al 2016; Russill & Nyssa 2009);

(3) policy interventions and governance factors (Breetz, Mildenberger & Stokes 2018; Stokes & Breetz 2018);

(4) economic transformations on employment, distributional welfare and in the stocks and flows of energy and natural resources (de Zeeuw & Li 2016; van der Ploeg 2016).

Building on the latest contributions in transdisciplinary social science applied to Transition Theory (Tàbara et al 2019), which shows that enabling deliberate positive tipping points in development trajectories depend on three main components, we elaborated guidance for the case studies concerning:

(a) Collective visions and narratives which frame and provide actionable meaning (Lynch 2018, Miller et al 2015);

(b) Types of transformative capacities created to achieve those visions;

(c) Types of strategies and solutions including new socio-technical innovations derived from such capacities.

The knowledge integration was designed as a dialogic procedure organized and run by WP7 with all WP leaders and a selection of regional stakeholders. In order to facilitate knowledge integration across the four core disciplines (WP1-WP4) and the case studies, a series of five WP7 integration workshops were organized.

The overarching goal of the integration workshops (hold every 6 months over the duration of the project) was to improve the existing understanding of the cross-scale, cross-system that affect low-carbon, clean transitions in CCIRs.

Insights gained from the European case studies, mainly focusing on what has occurred during the last decade, were complemented by additional cases using other time scales and international cooperation with non-European partners in Indonesia and Canada.

Considering that due to the Covid-19 pandemic, the kick-off meeting of the project had to be held online, most members of the partner teams in the consortium didn't know each other. We, as a task force constituted by the WP7 and WP5 teams, had to be innovative and experiment with online tools and methods and elaborated a highly dynamic workshop format based on volunteering case studies, facilitated role-playing scenarios, jointly built visualizations on Jamboard, Miro and Mural and rich picture synthesis and discussion on documenting transdisciplinary work across WPs and case studies (see Annex 7.6 for the details).

We also used the opportunity offered by the regular integration workshops to help the early career researchers in the consortium to organize as a network to which we provided mentoring and training in workshop and meeting facilitation, chairing and reporting.

The First (Online) Integration Workshop (Milestone 37 of the project)

It was held on 15 December 2020 and was aimed to:

- Get to know each other within the Consortium.
- Help everyone in the consortium understand the core perspective of each WP.
- Help everyone to understand the WPs1-4 initial insights based on the literature reviews recently carried out.
- Test the WPs1-4 disciplinary and cross-disciplinary perspectives on four volunteer case studies (Austria, Canada, Greece and Spain).
- Start integrating the four perspectives into an analytical framework based on the draft jointly elaborated by WPs3, 5 and 7.

The First Integration Workshop helped case study teams to start thinking about the elements they need to collect and elicit in order to identify: (1) the narrative and context of the region and its transformative capacity, (2) the deliberate or unexpected tipping event that triggered the status quo to change, (3) the interventions (solutions/ innovations) that led or may lead to the tipping point and (4) the immediate and long-term outcomes of the tipping point.

Based on the insights gained in the workshop, WP5 and WP7 jointly elaborated guidelines for the case studies on how to use the analytical framework and help them identify:

- the narrative and context of the region and its transformative capacity.
- the tipping event (deliberate or unexpected) that triggered the status quo to change.
- the interventions (solutions/ innovations) that led or may lead to the tipping point.
- the immediate and long-term outcomes of the tipping point.

The report of the first integration workshop is available in Annex 7.1.

The Second (Online) Integration Workshop (Milestone 38 of the project)

Based on the insights and feedback from the participants in the First Integration Workshop, we organized the Second Integration Workshop as a series of workshops, starting in April 2021 and ending in June 2021, divided into four phases:

- Identifying the mainstream narratives (27 April 2021)
- Characterizing case study regions (18 May 2021)
- Identifying off-stream narratives (15 June 2021)
- Identifying synergies between Case Studies and Work Packages (22 June 2021)

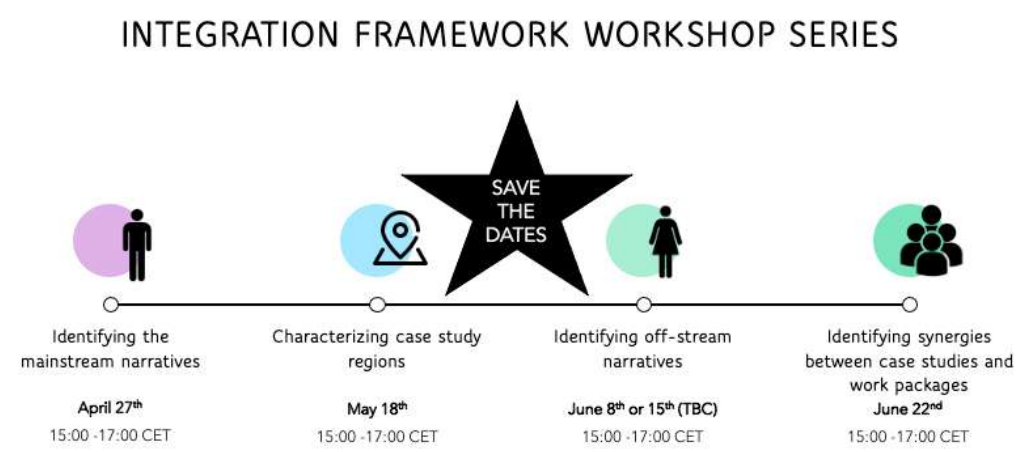

Figure 1: ***TIPPING+ The Second Integration Workshop Phases***

The second integration workshop was aimed at:

- identifying and presenting case study narratives.
- characterizing case study regions.
- trying to identify commonalities across the case studies.

The aim of the **Phase 1** of the Second Integration Workshop – held on 27 April 2021 – was to identify the mainstream narratives in all case studies of the project, the key actors, institutions, and sectors supporting the mainstream narrative as well as the most relevant components present in the case study among technology, stakeholders, institutions, ideologies and policies that make the case unique.

Based on the analysis performed by WP5, the case studies were allocated to clusters along recurring themes characterizing the case study regions: coal-centric regions transitioning, coal-centric and populist ideologies, emerging/innovating industries/sector, local/indigenous knowledge, and resource rich.

The report of the Phase 1 of the Second Integration Workshop is available in Annex 7.2.1.

The aim of the **Phase 2** of the Second Integration Workshop – held on 18 May 2021 – was to characterize the regions in case studies.

Based on the literature review from the WP5, we defined the region through how it's called to formally, then through its function (sector), and finally through how the region is perceived. Case study teams were invited in the workshop to (1) consider how their region can be defined, (2) in what ways might these three region-definition dimensions be expressed and (3) which of these three dimensions will be most effective for narrating the transition pathways in each case study.

Moreover, perceptual aspects such as where are the boundaries between "us" and "them, how these boundaries affect interpersonal and intergroup relationships, who is attached

(individual/group), what they are attached to (social place/physical place), and how they are expressing their attachment (through what behaviors, emotions, reasoning), is there a place that represents the soul of the community and is there a local environment (e.g. a river) that constitutes part of regional identity, were considered.

The report of the Phase 2 of the Second Integration Workshop is available in Annex 7.2.1.

The aim of the **Phase 3** of the Second Integration Workshop – held on 15 June 2021 – was to identify the alternative narratives in case studies.

Based on the work on the mainstream narratives performed in Phase 1, we searched for narratives that deviate from the mainstream by applying the same core components from the case study guidance: technologies, stakeholders, ideologies, institutions and policies. The alternative narratives answer the question: "Where do stakeholders want the region to go from here?" and can provide indications of changes or transitions that can potentially lead to a transformation.

Within the alternative narratives, we identified (1) on-stream pathway narratives which can promote new low carbon technologies under the 'same' system, existing only in a special space within the mainstream pathway but not challenging the current norms or the rules of the game and (2) off-stream pathway narratives which depart from the mainstream perspective and challenge the mainstream narratives and the very power dynamics of the mainstream narrators.

The report of the Phase 3 of the Second Integration Workshop is available in Annex 7.2.3.

The aim of the **Phase 4** of the Second Integration Workshop – held on 22 June 2021 – was to identify transformative narratives and synergies between case studies and work packages. Case study teams together with WP1-7 teams identified transformative-stream narratives and pathways involving radical technological, social and/or policy change in the way individuals interact with their biophysical systems and with the representation of diverse stakeholders and their perspectives that challenges the CCIRs mainstream pathways and its power dynamics. In addition, participants reflected on how the transformation processes can change the power dynamics of the previous mainstream pathway and include groups previously marginalized and consider broadening the discussion of equality and gender beyond women by including gender with other intersecting social identities.

The report of the Phase 4 of the Second Integration Workshop is available in Annex 7.2.4.

The Third (Hybrid) Integration Workshop (Milestone 39 of the project)

The workshop was held on 22 March 2022 in Potsdam, Germany in a hybrid format. While we initially aimed to conduct the Third Integration Workshop in December 2021, we decided to postpone it to the first quarter of 2022 in a hybrid format combining on-line and on-site presence.

The aim of the workshop was to discuss and present the visualizations of the case studies' mainstream, on-stream and off-stream narratives and identify common patterns across them.

Before the Workshop, the Case Study teams were asked to provide the first draft of their case study contribution to D5.2. Among others, they were asked to describe both mainstream and alternative narratives by including the six following components:

A. Technology:
- Level. What types of technological sectors have been dominant in the region?
- Space. Where have the technological sectors been located?
- Time. How long have these sectors been dominant?

B. Stakeholders:
- Level. What types of stakeholders have been dominant in the region?
- Space. Where have the stakeholders been located?
- Time. How long have stakeholders been dominant?

C. Institutions:
- Level. What types of institutions have been dominant in the region?
- Space. Where have the institutions been located?
- Time. How long have these institutions been dominant?

D. Ideologies:
- Level. What ideologies have been dominant in the region?
- Space. Which area/where do ideologies steam from?
- Time. How long have these ideologies been dominant?

E. Policies:
- Level. What types of policies (policy mix) have been dominant in the region?
- Space. Which areas/regions do the policies cover?
- Time. How long have these policies been dominant?

F. Other contextual factors (e.g., external events, the environment, politics): provide a description considering the following:
- Level. What types of contextual factors have been dominant in the region?
- Space. Where have the contextual factors have been located?
- Time. How long have these contextual factors been dominant?

To stimulate in-depth discussions, the case study teams were grouped into three clusters based on similarity of the patterns in their narratives' visualizations:
- Cluster 1 **"No Significant Decline of Mainstream Narrative"** (Indonesia, Italy: Carloforte, Denmark: Greenland, Spain: Balearic Islands, Canada).
- Cluster 2 **"Growing On-Stream Narrative"** (Poland: Silesia, Germany: Ruhr, Italy: Sulcis, Austria, Romania: Jiu Valley).
- Cluster 3 **"RET Growth and Diversification of Economy"** (Norway: Svalbard, Spain: Teruel, Norway: Lofoten, Greece: Megalopolis).

The report of the third integration workshop is available in Annex 7.3.

The Fourth (In-person) Integration Workshop (Milestone 40 of the project)

The workshop was held on 22 June 2022 in Athens, Greece in an in-person format.

The aim of the workshop was to discuss and elaborate an overarching theoretical framework of social change and future regional strategies supported by empirical evidence from case studies.

Before the Workshop, the case study teams were asked to provide the second (and final) draft of their case study contribution to D5.2. They were asked to update their case studies based on key questions and key indicators agreed upon at an in-person meeting in Potsdam on April 27 & 28 2022. The main goal of the update was to consider an interdisciplinary perspective to the case studies - the questions and indicators were to be mainly considered in the narratives (values and identity, policy and politics and economic potential) and in the context discussion (geography and migration).

The following questions and indicators were selected for each WP.

Geography & Migration (WP 1):

A. Are there any population/migration movements in the region? If so, what are the demographics of migration by age, education, gender, rural/urban etc. (based on easily available secondary data)?
B. What is the key motivation for migration (based on the data already collected)?

Values and Identity (WP2):

A. What are the key identity and values dominant in the region (based on the data already collected)?
B. Has there been value and/or identity change over the course of the transition in the region?
C. Does identity (change) and values (change) reflect on electoral behavior and electoral platforms?

Policy & Politics (WP 3):

A. What have been the key policy interventions over the course of the case study leading to energy transition? (Note: intervention can be policies, strategies, programmes, and projects.)
B. Has there been specific support/lack of support of policies by political parties?

Economic Potential (WP 4):

A. Is there an alternative to the mainstream that is seen as economically viable?

The report of the fourth integration workshop is available in Annex 7.4.

The Fifth (Hybrid) Integration Workshop (Milestone 41 of the project)

The workshop was held on 1-2 December 2022 in Paris, France in a hybrid format and aimed to:

- finalize the integration framework of the TIPPING+ project based on the initial version and the work done in WPs 1-5 and the empirical findings of the case studies.
- advance the new social theory on SETPs in CCIRs.
- advance on cross-work-package and cross-case-study understanding and insight.

Before the workshop, the Work Package Leads were asked to submit their contributions for development of the Integration Framework and the New Social Theory. They were asked to reflect on the following nine points:

A. Based on your multi-/inter-disciplinary knowledge and empirical findings, what transition stages would you use to describe the transition process and time scale in coal and carbon intensive regions? Please indicate the related theory or framework.

B. How would you describe the type(s) and sequence of change(s) (e.g., sectoral change, power shift, etc.) in the transition of coal and carbon intensive regions that your discipline helps analyze? What measures (if any) is used for each type of change?

C. What is the stance on justice in the study of transitions in coal and carbon intensive regions (either of the stakeholders or of the researchers: do they/you view justice as a trigger, a process, or an outcome in the case?)?

D. Based on your multi/interdisciplinary knowledge and empirical findings, how do you understand the shaping of regions going under transition (do regions change their boundaries and are territorialized)?

E. Based on your multi-/inter-disciplinary knowledge and empirical findings, how, if so, does the transition process relate to the concept of multiple stable states (Milkoreit 2018)?

F. Based on your multi-/inter-disciplinary knowledge and empirical findings, how, if so, does the transition process relate to the concept of (Ir)reversibility (Milkoreit 2018)?

G. Based on your multi-/inter-disciplinary knowledge and empirical findings, how (and at what stages) do positive and negative feedback loops influence the transition process (Milkoreit 2018)?

H. Based on your multi/interdisciplinary knowledge and empirical findings, what are the key triggers of change and/or tipping points in transitions?

I. What additional concepts/theoretical elements were useful but not found in this list of concepts?

The report of the fifth integration workshop is available in Annex 7.5.

3.3 Organisation of the WOCS

In the beginning of the project, the WP5-WP7 task force suggested to and helped the management team to set up a weekly open communication space (WOCS) – one-hour online meeting on weekly basis. Participation at WOCS was voluntary.

The goal of WOCS was to:

- stimulate and spread knowledge created during the project.
- serve as a platform for preparing integration workshops and other project events.
- bring information and knowledge from outside the project (inviting guest lectures etc.).

In 2020 and 2021 a total of 44 WOCS were organized. During the third year the weekly open communication space was transformed into monthly communication space (MOCS). A total of six MOCS were organized in 2022.

Towards the end of the project when the case studies were approaching to the end of their research, a need for WOCS/MOCS diminished and was replaced by informal ad hoc meetings among project participants (paper/book chapter co-authors etc.).

The list of the WOCS and MOCS is available in Annex 7.7.

3.4 Stimulating Transdisciplinary

A main expected outcome of the TIPPING+ project was to provide for the first time in Transition Theory scholarship an integrated transdisciplinary assessment from the social sciences of the dynamics of positive and negative points in regional energy systems.

Any attempt to understand (and possibly intervene successfully in) the systemic dynamics that affect clean-energy transitions in European CCIRs demands an improved theoretical and empirical understanding of the key socio-economic, political, and behavioral drivers that lead to the emergence of SETPs in these regions.

Such outcome also requires moving from interdisciplinary to transdisciplinary approaches by considering not only insights derived from academic disciplines but also other from practitioners and stakeholders beyond academia. Transdisciplinary research is a mode of collaborative, interdisciplinary knowledge production aimed at addressing real-world wicked problems (Klein, 2004).

An overarching understanding of transdisciplinarity is 'a reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge' (Lang et al 2012).

Within the project, the WP5-WP7 task force, together with a few other transdisciplinary researchers inside and outside the consortium worked together on understanding transdisciplinarity and its relationship with stakeholders and the characterization of questions for transdisciplinary research outcomes and just knowledge co-production in large-scale research projects (Lieu et al 2023).

To understand transdisciplinarity and also its limits in large-scale research projects, we structured our reflection and analysis along questions central to transdisciplinary practice to TIPPING+: *'why'* (the intended use of knowledge outputs), *'what'* (knowledge is included & co-produced), *'who we are'* (researchers' broadly shared principles & positionality), *'who-with'* (stakeholders' perspective and priorities), *'who-funds'* (sponsors & audience of the research) and *'how'* (approaches & practices for co-production) to the TIPPING+ project.

These six questions and dimensions of transdisciplinarity are further detailed in the Table 1 below:

Why	**What**	**Who-we are**	**Who-with**	**Who-funds**	**How**
The intended use of knowledge outputs	**Knowledge is included & co-produced**	**Researchers' broadly shared principles & positionality**	**Stakeholders' perspective and priorities**	**Sponsors & audience of the research**	**Approaches & practices for co-production**
● Motivated by societal problems ● Generative knowledge that is locally relevant and contextual ● Implementation oriented as opposed to applied	● Diverse knowledge from society and lived experiences ● Recognition of different worldviews, values, and ideologies ● Interdisciplinary knowledge in science and industry	● Awareness and acceptance of reflexivity ● Willingness to face uncertainty ● Having a "whole system" view ● Curiosity-driven pragmatism ● Positionality of the individual: making explicit one own starting point	● Specify the position of foreground stakeholders and background stakeholders (Abbot, 2004) ● Inclusive participation with diverse stakeholders on equal terms ● Making transparent power dynamics and inequalities ● Acknowledging stakeholder priorities openly and non-defensively	● Making explicit the groups and institutions the research is accountable to ● The conditions on the use of research funds and outputs ● Making explicit to the users and audience of the research findings and in what capacity	● Knowledge Integration and methodological pluralism ● Combination of methods and approaches a ● Joint problem (re-)framing ● Explicitly creating spaces for groups historically marginalized ● Transformative learning

Figure 2: ***TIPPING+ The Six Questions and Dimensions of Transdisciplinarity in Tipping+***

Why and What

We were expected to produce more knowledge on why coal and carbon intensive regions sometimes slip into fundamentally different development paths - why some embrace low carbon and clean energy pathways whereas some not so much and what are the most effective tipping interventions enacting low-carbon energy transitions. In cooperation with stakeholders in case study countries, we aimed to improve the understanding on what is the expected impact of fundamental changes on regional socio-economic systems.

Through the final stage of the stakeholder engagement, we presented our findings to the stakeholders. The synthesized findings of all the case studies are expected to shed light on a wide range of various interventions leading to a (just) energy transition. National and EU policy makers will have new knowledge on how to better design policies and/or what steps to take to achieve a smooth energy transition, which is just to impacted social groups and socio-economically viable for the region.

Who-We Are

The team of TIPPING+ consists of economists, sociologists, political scientists, human geographers, mathematicians, social psychologists, anthropologists, and others, who aim to understand a wide range of factors and patterns that lead to energy transitions in their respective regions. A major tenet of the project was that a single Social Science discipline is insufficient to grasp the large complexities that explain the dynamics and emergence of SETPs. Different disciplines and perspectives, including those of practitioners and those related to the inclusion of women and youth need to be considered in an integrated manner.

The transdisciplinary principle of the project was emphasized from the beginning of the project. At the proposal stage, we clearly indicated that inter- and transdisciplinarity is one of the key guiding principles in our research. The WP5-WP7 task force has emphasized it throughout the entire process of project implementation being aware that a central challenge was to ensure that different project perspectives are well considered and contribute to a robust framing of the research questions and to the process and strategies to address them.

This is a clear challenge for a large-scale project such as TIPPING+. We have addressed this challenge by devoting three work packages to coordinate interdisciplinary knowledge production and guiding case studies with their stakeholder engagement (WP5, WP6 and WP7, see the

Figure 3: ~~Figure 3~~ representing the links across work packages).

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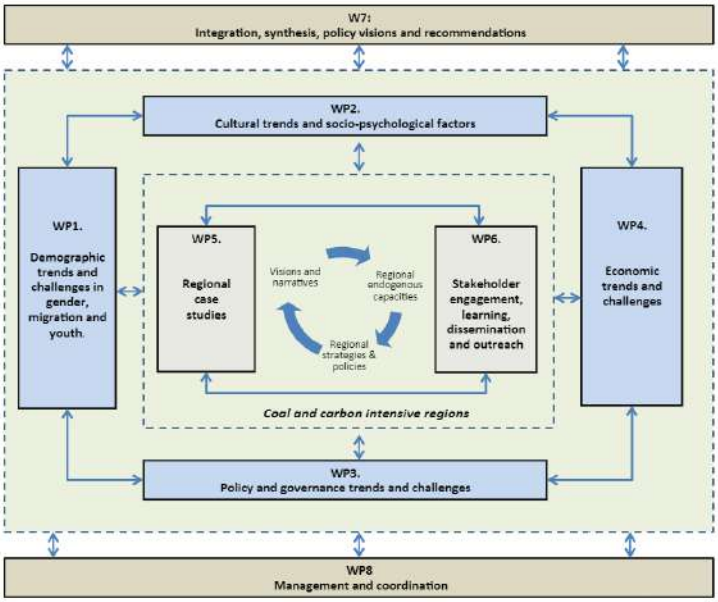

Figure 3: ***TIPPING+ Research: Interdisciplinary Research with Societal Stakeholders***

Since the beginning of the project, the consortium team was encouraged to contact stakeholders – not only for the purposes of data collection – but also for establishing the dialogue and understanding how they can benefit from the project.

Overall, the case study teams organized webinars, seminars, workshops, and conferences together with stakeholders, as well as they conducted interviews and focus groups to understand the needs, concerns, and future visions of all the actors potentially affected by the energy transition.

Who-Funds

The funder's intention was to explore the principal socio-economic challenges CCIRs are facing and what effects these have had on the livelihoods and sustainability of local and regional economies and to identify communities' coping strategies. This would then help to formulate practical recommendations on how to use the potential of social innovation to achieve the goals of the EU and to address challenges of the clean-energy transition for Europe.

This call was the first European Commission call we identified aiming to understand sustainability transitions with an explicit social-economic sciences and humanities angle. Answering the call text, we put together a core interdisciplinary international team which we expanded as we progressed in the proposal writing. To answer the call's objectives, we explicitly articulated a transdisciplinary dimension, reflected in the way we designed the over 20 case studies and the integration dimension of the project.

To reduce the methodology ambiguity often cited by reviewers for transdisciplinary methods, we provided a range of potential methods to apply for stakeholder engagement in the proposal. The inclusion of more detailed methods seemed to fare well with the reviewers.

However, in practice the methods applied for stakeholder engagement is dependent on the partner's existing expertise. Further training and lessons learning is needed in the consortium to roll out transdisciplinary research methods more widely.

Who-With

Stakeholder engagement has been one of the key methodological hallmarks of the project. The key stakeholder groups were municipalities and regional administrations, NGOs, industry representatives, miners, trade unions, local citizen groups, academia and institutions of higher education, cultural entities, politicians of national and regional level. At the start of the project, case study leads were asked to identify and involve the local, regional, and national stakeholders based on their contextual knowledge and geographical and cultural proximity to those stakeholders.

Among others, the case study teams were asked to identify what narratives each stakeholder group holds, what their vision of the future development of the region is and how they perceive the (potential) energy transition. This way, we have obtained a detailed map of stakeholders' stances and visions. We also encouraged all case study teams to search for non-mainstream narratives or those of the incumbents. This effort was intended to put in the foreground groups that have been marginalized (e.g., women, seniors, youth, and Indigenous groups). We are finding, without prompting, that many case studies highlight the issue of justice in their narratives and bring up stakeholders who face marginalization.

However, given the different backgrounds of the researchers, stakeholder engagement was taking place at different pace and depth – case study teams with more profound quantitative background were more cautious to interact than the teams composed of researchers with previous experience in stakeholder engagement and qualitative research methods. It remained a challenge on how to obtain a more balanced representation of stakeholders across all cases.

This learning process was significantly delayed due to disruption caused by the Covid-19 pandemic. But we believe that continuous dialogue and learning through our dedicated integration workshops helped to bridge this gap. Additionally, another dimension of transdisciplinarity achieved as a research outcome, is the support to emerging stakeholder-initiated and grass-root policy initiatives and movements supporting transition to clean energy.

How

Stakeholder engagement had two main dimensions. Firstly, after the initial meetings and workshops with stakeholders, we reshaped and reframed the initial research design to cover a wider perspective. After having conducted pilot interviews, we also modified the interview questions to better align with the modified research design. Secondly, the stakeholder

engagement has also served to clarify their concerns in an energy transition and to promote the idea of active participation in designing their future vision of the region.

Cooperating with researchers from other disciplines has been challenging in the team as we lacked a common language, and many researchers reverted to their own disciplinary language when discussing the research. Thinking and working with a transdisciplinary mindset has been challenging for some disciplinary researchers and took time to adopt. Some case study teams have focused much more on their discipline and found challenging to adopt a broader framework. Interdisciplinary and transdisciplinary approaches were not equally understood by all consortium partners.

4 Key Phases of Knowledge Creation and Integration

4.1 State-of-the-Art and Developing of Case Study Guidelines and the First Draft of Analytical Framework

The starting point of the project was, on the one hand, to define the Analytical Framework and Case Study Guidelines and, on the other hand, to conduct State-of-the-Art Disciplinary Literature Reviews in the WPs1-4. In the beginning of the project, the WP5-WP7 task force met with WPs1-4 and identified the key elements of the Analytical Framework, based on which WP5 further elaborated the Case Study Guidelines.

State of the Art Literature Reviews

The Literature Reviews were elaborated by each disciplinary work package separately: human geography and demographics, environmental and social psychology and anthropology, public policy and governance and economics.

After having elaborated the first draft and presented it to the consortium in regular WOCS, the WPs1-4 developed the final version of the literature reviews, which led to the Deliverables 1.1– 4.1.

Analytical Framework

In June 2020, we started, in collaboration with WP3 and WP5, the elaboration of a draft of an analytical framework to identify and select the key components explaining the emergence of SETPs in demographic, governance, economic, resource and psychological and cultural systems relevant for understanding clean-energy transitions in CCIRs. After the consolidation of a first draft, we run exchanges with WPs 1, 2 and 4 to make sure we captured all disciplinary and transdisciplinary aspects.

A central dimension of the analysis framework was the definition of key quantitative and qualitative indicators by WPs1-4 comprising human geographical, cultural, psychological, political, and economic perspectives. These indicators were set to help each case study capture its context and specificities and to provide a first base for comparability between case studies.

The draft of the framework is available in Annex 7.8.

The draft of the analysis framework constituted the basis for the development of the "Guidance for TIPPING+ Coal & Carbon Intensive Region Case Studies: narrative development, stakeholder engagement and indicators", led by WP5, available in Annex 7.9.

Case Study Guidelines

The case study guidelines (for details, see the Deliverable 5.2) was first developed by WP5 team, iterated on within the WP5-WP7 task force then shared with WP1-4 teams to ensure that the disciplinary perspectives were appropriately considered in the guidelines.

A workshop on "characterizing regions" was carried out with WP1-4 leads on May 2, 2021, to discuss the role of human geography and demographics, anthropology and environmental and social psychology, public policy and governance and economics in the tipping points of each region. Case studies submitted their first case study drafts on 18 February 18, 2022. These drafts were reviewed by WP5 & WP7 teams and comments were provided to the case study teams by 18 March 18, 2022.

All WP leads then met in-person meeting in Potsdam on April 27 & 28th 2022, where they jointly drafted key questions and key indicators to consider an interdisciplinary perspective in the case studies. These questions and indicators were to be considered further in the case studies narratives. Case study leads were then requested to submit a revised version by 17 June 17, 2022, in time for the in-person meeting in Athens on 22-24 June 2022. There, case study leads presented their case study progress in posters using a streamline visualization developed by the WP5-WP7 task force (see Section 4.3). The final versions of case studies were requested to be submitted by 15 September, 2022.

4.2 Characterizing Case Study Regions

The WP5-WP7 task force developed the definitions and criteria along which the case study teams were asked to characterize their region. This was part of the process of elaborating the case study guidelines and was performed in cooperation with WPs1-4, particularly, WP1 (see Deliverable 5.2).

As mentioned already above, the workshop on "characterizing regions" was carried out with WP1-4 leads on 28 April 2022.

As indicated in the Deliverable 5.2, there was a special emphasis on region in each case study. We built the definition of region on discussions with and contributions from the WP1 team in charge of the discipline on human geography and demographics. We define a region through how it's formal description, then through its function (sector), and finally through how the region is perceived.

- Formal region: "has definite borders and shares cultural homogeneity (sameness); it is uniform in nature. For example, an area that follows the same laws or speak the same language or follows the same physical features would be a formal region".
- Functional region: is based on horizontal spatial social and ecological flows across a geographic area, i.e., functional links or interactions constituted around common interests, needs, goals or strategies, which are represented by flows of persons (commuting to work, for shopping, healthcare, etc.), or of capital, information, goods,

resources or other related to stocks and flows of pollution (e.g., GHG) which also ultimate affect the dynamics of the region.

- Perceptual region: based on shared perceptions and attitudes of people who live in a given area, linked to a shared cultural identity (e.g., character shaping) defined by people's feelings, sense of belonging and attitudes about that area. The following questions (provided by WP2) help describe the characteristics of a perceptual region.

4.3 Identifying Key Narratives

The key component of the Case Study Guidelines was identification of the key narratives: mainstream, on-stream and off-stream narratives. The WP5-WP7 task force proposed the first draft of the theory and rationale of framing and narrative building, which was further commented and elaborated by all the case study teams.

As it is emphasized and further elaborated in the Deliverable 5.2, the goal of identifying "the narratives" was to capture the changes in the transition. By narratives in our project, we mean 'the storyline describing how the CCIR pathway (i.e., pathway broadly is a course of direction) was historically developed until the present and how some promising CCIRs pathways can be potentially developed in the future'.

The mainstream narrative(s) identifies the pathway that represents the mainstream or dominant (mainstream and dominant are used interchangeably) energy/high carbon) sector (e.g., coal power sector). We also focus on the narrators who are the dominant stakeholders in power and who perpetuate the mainstream narratives. We also identify the enable policy environment that has promoted the high carbon energy technologies central to the energy mainstream system. This energy system includes the mainstream energy technology value chain, the workforce, other stakeholders, institutions, as well as policies that support the system.

The starting point for developing narratives begins at the regional level in every case study. Therefore, we asked the case study teams to define the boundaries for the regional level and only then proceed with identifying the mainstream narrative.

When the case study teams had identified their mainstream narratives and defined the boundaries of the regions, we organized two sessions of the Second Integration Workshop (see Section 3.2 of this report):

- Identifying the mainstream narratives.
- Characterizing case study regions.

During these workshops, the case study teams could present their narratives and discuss their findings with each other.

When the mainstream narratives had been defined, the case study teams were asked to look for alternative narratives (on-stream and off-stream narratives, and transformative narratives).

These alternative narratives can provide us indications of changes or transitions that can potentially lead to a transformation.

The on-stream pathway can promote new low carbon technologies but under the 'same' system. They exist only in a special space within the mainstream pathway but do not challenge the current norms or the rules of the game.

The off-stream pathway refers to alternative perspectives that depart from the mainstream perspective and challenges the mainstream pathway.

Based on the alternative narratives, we identify those that have potential for transformative changes.

Once the case study teams had completed their work on the alternative narratives, we organized last two sessions of the Second Integration Workshop (see Section 3.2 of this report):

- Identifying off-stream narratives.
- Identifying synergies between Case Studies and Work Packages.

During the first session, the case study teams could present and discuss their alternative narratives, whereas during the second session case study teams could look for commonalities and potential synergies across the case studies.

As the last step in the process of narrative building, the WP5-WP7 task force elaborated the sample visualization (see the Figure 4), which was discussed with the case study teams. Each case study team was asked to present its case study on this visualization.

The visualization summarizes the different narratives that were discussed before: *mainstream CCIR narrative* and *alternative narratives* that depart from the mainstream, consisting of on-stream narratives (those that complement but do not challenge the regime) and off-stream narratives (those that exist outside the regime and can potentially challenge the regime), which potentially could lead to a transformation pathway.

Finally, during the Third Integration Workshop in Potsdam (22 March 2022, see in Annex 7.3), the case study teams were invited to present and discuss their visualizations.

For more information about the theory of framing and narratives, refer to Deliverable 5.2 and Deliverable 7.1.

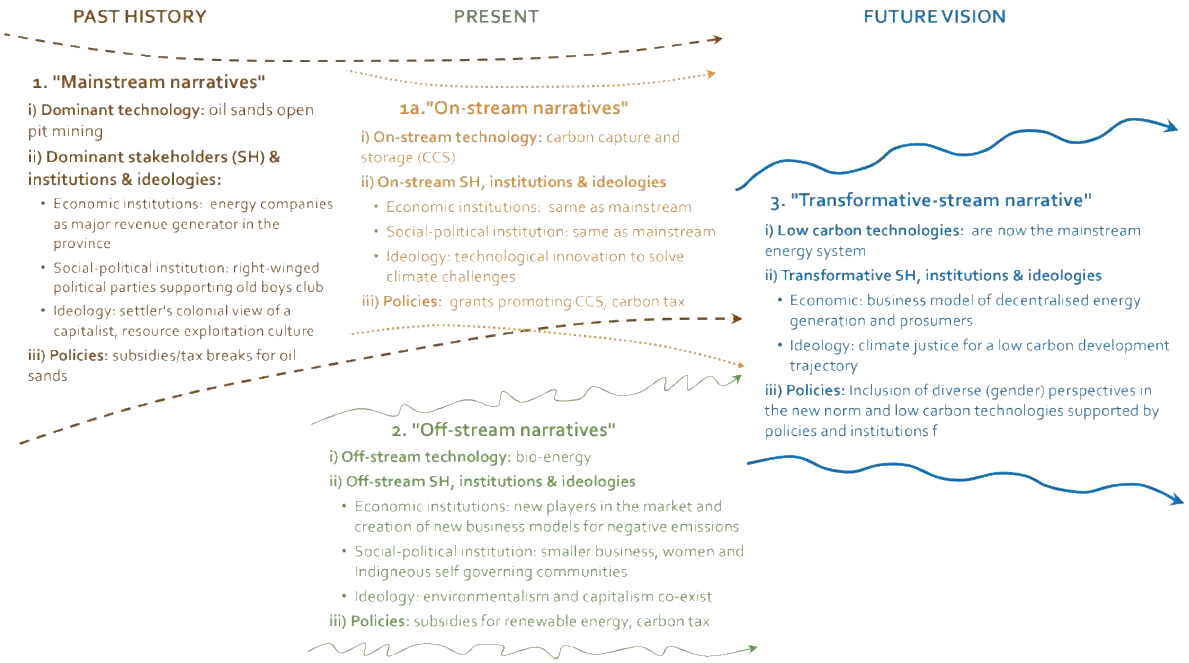

*Figure 4: **TIPPING+ Sample Visualization** (Source: see the Deliverable 5.2)*

4.4 Identifying Key Parameters for STEPs

Besides characterizing the regions and identifying the narratives, the case study teams were also asked to present their case study along other parameters: indicators for SETPs/Transitions, Tipping Points and Enablers and Barriers.

Indicators for SETPs/Transitions

The indicators were defined in the initial phase of the project. WPs 1-4 were asked to provide the key indicators for transition and/or Tipping point in their respective discipline. They were elaborated as part of the Case Study Guidelines and discussed several times during the WOCS.

Tipping Points

Reaching an agreement on the tipping points was challenging in the consortium. Several WOCS were dedicated to external guest lectures presenting their theoretical approach on tipping points, as well as many internal discussions were held among the project participants. During their research several case study teams concluded that their case study has not reached a tipping point yet or it is difficult to conceptualize along this theoretical framework.

Numerous case studies, either alone or in comparative studies as well as WP teams are in the process of publishing their findings and insights, see next section.

Enablers and Barriers

In order to identify enablers and barriers of the transition, all WPs and the case study teams met in the Fifth Integration Workshop in Paris on 1-2 December, 2022 and discussed the key enablers and barriers to transitions in CCIRs. Later, based on this discussion, WP5 and WP7 initiated an article in the Special Issues, which focused on key studying enablers and barriers in a set of cases studies.

The discussion on the barriers and enablers of transition in CCIRs was an important part for building the Integration Framework and the New Social Theory. For more details on enablers and barriers, refer to Section 5.3 in the Deliverable 7.1.

5 Integrating TIPPING+ Deductive Findings: Towards Transformative Emergence

This section contains the main findings of the integration of the deductive analyses produced by Work Packages 1, 2, 3, 4 and 5 regarding the literature reviews relevant to identifying the key theoretical and research challenges regarding the identification and enabling SETPs in CCIRs. This section appeared also as a TIPPING+ Working Document as follows:

Tàbara J.D., Mangalagiu D, Frantal B, Mey F, Maier R, Lilliestam J, Sarrica M, Mandel A, Lieu J, Cottone P., Veland S, Martínez-Reyes A. 2021.Towards transformative emergence. Research challenges for enabling social-ecological tipping points toward regional sustainability transformations. TIPPING+ Working Paper. https://tipping-plus.eu/sites/default/files/Working%20Documents/T%2BWorking%20Document%20Series%202021.01-Transformative%20emergence.pdf

5.1 Abstract

A crucial task to accelerate global decarbonisation is to understand how to enable fast, equitable, low-carbon transformations in those regions of the world most intensive in the production and use of fossil fuels. To support this endeavour, we underline the relevance of the boundary concept of social-ecological tipping points (SETPs) and highlight three key challenges for its robust conceptualisation and policy use in assessing regional sustainability transformations. Positive SETPs can be understood as the moments or critical thresholds in which, as a result of cumulative and beneficial effects of previous deliberate and targeted interventions, additional actions or events push a coupled social-ecological system towards an a more just and sustainable trajectory or configuration. Our review shows that research and policy usage of SETPs towards regional sustainability faces three key challenges: (a) integrating theoretical and empirical contributions from diverse social and ecological sciences, together with complexity theory (b) designing open transdisciplinary assessment processes able to represent multiple qualities of systemic change and enable regionally situated transformative capacities, and (c) moving away from one-directional metaphors, static ideas of individual agency or single equilibrium in energy transitions; and instead, focus on understanding the conditions and capacities for the emergence of systemic transformations and regenerative processes across multiple levels of changing agency, unfolding both in social and biophysical systems and in many moments in time. We refer to these complex and place-situated processes as learning to enable regional transformative emergence.

5.2 Introduction

Accelerating global decarbonisation requires fast learning on how to enact rapid, equitable, transformative change towards sustainability in those regions of the world most intensive in the fossil fuel production and use. However, an operational integrated social theory on how to accelerate systemic change through strategic actions toward this end is missing. For this reason, we underline the relevance of the boundary concept of tipping points as a way to improve our understanding on how to approach the complexity of rapid sustainability transformations at the regional level. However, tipping points and their related terms, such as leverage points, turning points, or regime shifts adopt many diverse meanings and uses in the literature [Winkelmann et al. 2022; Biggs et al. 2018, Otto et al. 2020, Farmer et al. 2019, Van Ginkel et al. 2020; Shrivastava et al. 2020; Leventon et al. 2021; Fisher and Riechers 2019; Tàbara et al. 2018; Werners, 2013] which shows in practice the high polysemy and ambiguity of the term. Based on a synthesis from various social sciences contributions1, we introduce the notion of 'social-ecological tipping points' (SETPs) and underline three key challenges that face its robust conceptualisation, empirical operationalisation and policy use to assess and accelerate low-carbon regional sustainability transformations. On the one hand, acknowledging and integrating contributions from diverse social science; and on the other, designing open and transdisciplinary processes able to represent multiple qualities of systemic change. Furthermore, we argue that 'positive' tipping points, simply defined in this context as those aligned with sustainability goals, cannot be fully predicted when or whether they will happen, although the transformative capacities and conditions for their emergence may be enabled. So when they happen, transformations may emerge across multiple levels of agency - from individual, organisational and systems levels- and hence generate multiple learning processes and virtuous circles of regenerative feedbacks between social and biophysical systems.

5.3 Social-Ecological Tipping Points towards sustainability

Traditionally, the notion of tipping points was used in environmental sciences in a negative sense, e.g., to refer to catastrophic futures or show the effects of overshooting planetary boundaries [Folke et al 2021]. However, the concept is being reframed to address the potential of positive ones and in particular to identify social actions which at one point have attained or could attain deliberate visions such as those related to sustainability or climate resilience [Sharpe and Lenton 2021, Lenton 2020 Tàbara et al., 2018]. Here we define SETPs as those hybrid thresholds derived from intertwined social and biophysical forces in which a relatively small action pushes a given social-ecological system towards an alternative development trajectory or basin of attraction. In the case of *positive* SETPs in terms of sustainability, such moments would occur when, and due to deliberate actions, tangible gains in terms of Sustainable Development Goals (SDGs),

[1]as examined in the TIPPING+ project www.tipping-plus.eu

improvements in justice -e.g., distributive, recognition and procedural- and the building of the necessary transformative capacities and generate better adapted social-ecological interactions and institutions would emerge.

SETPs may then constitute an abrupt departure of an original system dynamics or create a completely different kind of system configuration. Because of their inseparable nature of coupled social and biophysical interactions, SETPs lead to multiple transformations, feedbacks and qualitative changes both in economic, policy and social practices as well as in life-support systems [Tàbara et al 2021]. Moreover, such transformative processes comprise of three main kinds of elements: (1) *an original context or system of reference*, the dynamics of which are driven both by social and biophysical components (2) a *tipping event or disruptive process* which may be brought about by a deliberate intervention or exogenous force, and (3) a set of *impact*s, ultimately changing *fundamentally* the original context conditions. Such consequences may be limited to one single system of reference or extend into a cascade of qualitative reactions in other systems. In this regard, conceptually, it is useful to distinguish between *sectorial tipping points*, occurring in specific sectors or domains - just as it could be the case of turning private mobility from fossil fuels to electric sources but without much broader institutional reforms. And those *systemic tipping points* which affect a whole array of interconnected systems, and do so across a whole sort of personal, organisational and political arrangements. The former is often referred to as transitions whereby system end-points, policy targets, and the new system equilibrium are assumed to exist, can be decided or are known beforehand (e.g., 'achieving a carbon-neutral Europe by 2050'). Whilst in contrast, in systemic tipping points these final outcomes, policy goals, or new system states cannot fully be known beforehand or specified -hence no equilibrium or final system configuration is assumed [see Stirling 2015]. However, note that in regional research and policy both approaches may be complementary. Eventually, enabling the emergence of a systemic tipping point may only be possible by creating the enabling conditions for multiple sectorial tipping points to appear and be combined across many kinds of systems, also referred as deep transitions [Schot and Kangera 2018]. For instance, in some regions the former dependence on carbon-intense activities in the energy sector at one point in time was abandoned or 'released' in a way that the system moved towards a new basin of attraction and reorganized itself around new governance, economic, energy, and socio-cultural foundations [Coenen et al 2018; Cowell,2020; Crowther et al 2021; Gailing et al, 2020].

In a nutshell, and although it is hard to know when or whether a tipping point will happen, it is also true that when they happen, as in the case of aiming for climate neutrality, they rarely occur by chance. This means that in the case of social-ecological systems, the conditions for their emergence can be - at least partially - described and then possibly influenced by conscious and intentional actions2. In this vein, we define tipping interventions as those deliberate actions aimed at building the necessary transformative conditions and capacities for positive transformations to happen at multiple levels of agency in a dynamic way -that is, not only the system changes but the individuals within

[2] For a relevant philosophical discussion on the notion of transformative emergence, albeit not directly addressing sustainability issues, see [Van Dijk 2021]

that system also do, thus yielding desired structural effects in a given system of reference.

5.4 SETPs in Regional Sustainability Transformations Research. Three Challenges Ahead

5.4.1 Challenge I. Acknowledging and Integrating Diverse Contributions from Social Sciences

Tipping points can be observed in individual life trajectories as well as in community behaviours, but also in economic and distributional structures; in political, governance and institutional arrangements; in geographical and population dynamics [as those which could be derived from climatic risks, Owen and Wesselbaum 2020, McLeman 2017]; and in worldviews and beliefs systems, including conventions and public opinion trends [Galam and Cheon 2020]. Hence acknowledging the diverse interpretations of the notion and usages of tipping points by various social science disciplines is a first step for a robust conceptualisation and use in sustainability transformations research and action.

In psychology, models and theories of cognitive, socio-ecological and systemic kinds are key to understanding processes of qualitative change involved in socio-ecological tipping points at individual or community levels. Recent studies in human information processing investigate tipping points as 'the point at which people begin to perceive noise as signal' [O'Brien and Klein 2017], and show asymmetries between individual expectations and the actual moment at which this point is reached [O'Brien, 2020]. Going beyond the individual level of analysis, further insights on radical system transformation can be found in socio-ecological psychology, dynamical system approach, and models of change based on critical junctures theory [Liu & Pratto, 2018; Reed and Vallacher, 2020; Uskul and Oishi, 2020]. Rooted in general system theory and in cultural and societal psychology, these models stress that interrelationships among elements, sub-systems and systems determine the forms of adaptation to internal and/or external factors. However, and despite the centrality of models of change, psychological studies barely refer to tipping points in energy transition [Otto et al., 2020]. Thus, research could fruitfully mobilize insights from other social science fields to better to understand psychological tipping points and support the emergence of sustainable development pathways. Individual, social and cultural psychological models of change should be integrated with studies on decarbonization, which use tipping point as an interpretative tool [Schmitz, 2017], for decision making [Cuppen et al 2015], as a threshold [Strauch, 2020; Weng et al 2018], or associated with speed and scale in non-linear transformations [Messner, 2015].

In economics, the emphasis lies on the identification, modelling and quantification of possible economic interventions such as investments in disruptive technologies [Berger et. al 2020, Lawrence 2020, Jaakkola and van der Ploeg 2019] and their effects in terms of structural changes in the composition of employment or GDP, competitiveness or in financial assets [Oei et al., 2020, Berger et. al., 2020, Bovari et al., 2020, Semeniuk et. al., 2020, Tàbara et al. 2018]. A main contrast exists between those analyses being made with single equilibrium models [Nordhaus 2019; Lemoine and Traeger 2016] seeking an

optimal policy response and those models that account for the existence of multiple equilibria [Lamperti et al 2018]. The latter represent the move towards integrating system dynamics and agent-based approaches in future research on the economic determinants of tipping points [Hafner et. al. 2020]. For instance, an economic tipping point may be quantified or even partly anticipated when the costs of a technology decrease to a level which is able to replace an old one and create the conditions for the energy system to jump into a new enduring state or development dynamics [see also Patt and Lilliestam 2018]. However, many other social, cultural or political factors may contribute to adopting such new trajectory besides costs, as it is the case with electric mobility [Strauch 2020]. In this regard, several econometric methods are capable to detect structural change a macro and regional levels [Berger et al. 2020; Välilä, 2020].

In policy science and governance research, an obvious focus lies on fundamental changes in power dynamics and redistribution, the role of social mobilisation or particular events inducing radical modifications in institutional arrangements bringing about new constitutional regimes or breaking down former ones [Schmitz 2017, Linnér and Wibeck 2020]. This is the case, for instance, with those new regimes which emerged out of the fall of the Berlin wall, or more recently the change of the Chilean constitution following the uprising triggered by a relatively small increase in public transport fees [Heiss 2021; Arias-Loyola 2021]. This line of enquiry also addresses how governance and innovation networks develop within and across time and space to the point that unfold new institutions or forms of durable collaboration or transformative agency [Galaz et al 2016, Westley et al 2017]. Tipping processes modify the degrees of freedom and the opportunity space for system transformation [Herrfahrdt-Pähle E, et al. 2020; Folke et al 2021]. That is, either reducing or expanding it, as when in the latter case when some institutional constraints are removed, or new access to resources, networks or knowledge systems are created and facilitate new forms of innovation and agents' interaction [Amundsen et al. 2018; Füg and Ibert 2020, Jaakkola and van der Ploeg 2019, Lutz et al 2017, Oei et al 2020, Wiseman 2018, Schaffrin and Fohr 2017]. In this guise the notion of transformative governance is of special relevance to map out and identify the different kinds of capacities which may lead to tipping points towards sustainability [Hölscher and Frantzeskaki 2020].

In inter and transdisciplinary approaches, the insights from social-ecological systems (SES) and resilience research [Folke et al. 2021; Hahn et al, 2017; Lauerburg et al 2020] social and natural systems are combined to understand how they mutually influence or change together. These approaches are usually conceptualized with notions such as the adaptive cycle [Walker et al. 2020] whereby successively repeated periods of stability/conservation, release, reorganization, and exploitation make up the 'panarchy' process. There may be tipping points in between each phase, but critical thresholds certainly occur in the release phase, whenever the system loses key societal or environmental components or processes that would otherwise allow reorganization to its original form. Moreover, in sustainability transformations research using the notion tipping points and their related concepts such as leverage points in many ways as it is the case using lens and metaphors derived from social quantum theory. Following these perspectives, it is argued that a new consciousness about alternative plausible worlds, qualitative kinds of relations and realities across personal, political and practical configurations and of the role of individual agency in turning them actionable and

meaningful becomes fundamental [O'Brien 2016, 2018, 2021]. In addition, sustainability transformations require problematising current value systems and worldviews [Berzonsky & Moser 2017] so profound changes in worldviews can also be interpreted through the perspective of deep leverage points [Davelaar 2021]. In this respect, systemic tipping points in culture, education and policy processes are largely dependent on the role played by human information and knowledge systems [HIKS; Tàbara and Chabay 2013; van der Leeuw and Folke 2021] and normative values [Horcea-Milcu et al. 2019] and as argued by [Nyborg et al. 2016] tipping points can also be understood as the moments in which vicious circles in collective behaviour turn into positive ones, e.g, by a change of social norms and perceptions, which in turn can be induced by deliberate policies or the role of minority groups reaching a critical mass [Centola et al 20218]. Justice in particular is also considered a key driver for sustainability transformations and a crucial component to understand radical shifts in power dynamics regarding gender, ethnicity youth inclusion or the social recognition of disadvantaged groups [Allen et al 2018, Blythe et al 2018, Ziervogel et al 2017] and it is also of especial significance in energy transitions research [Cronin et al 2021; Doyon 2019; Patterson et al 2018; Bouzarovski S, Simcock N. 2017].

5.4.2 Challenge II. Designing Open Transdisciplinary Assessment Processes Able to Represent Multiple Qualities of Systemic Change and Enable Regionally Situated Transformative Capacities

When considering deep structural change, different disciplines often portray and refer to very different kinds of systems and of how their dynamic components operate. Even within those disciplines using a 'systemic approach' to sustainability transformations [Scoones et al 2020, Fazey et al 2017] one can find important contrasts, as it is the case with transition theory [Köhler et al. 2019], resilience and social-ecological systems research [Folke et al 2021, Moore et al 2014], coupled natural-human systems (CNHS; Liu et al. 2021] or organisational science [Hestad et al. 2021; Westley et al 2011] whereby the use of terms as 'ecosystems' can have little to do with what natural scientists refer to. This means that they also tend to emphasize different temporal and spatial scales or conceive the role of social agency in them in different modes.

In addition, the position of the researcher with respect to the systems of reference is not independent of their analyses. Systems are always defined in relational ways and are inevitably influenced by previous socially-constructed categories. Moreover, systems operate under different logics, agents and complex dynamics [Hestad et al. 2020]. Using an open, pluralistic, transdisciplinary approach it is necessary to help to overcome such limitations. However, the difficulties for providing a transdisciplinary methodology for the research of tipping points in sustainability science derives, among other reasons, from the existence of different ontologies as well as for conflicts in epistemologies and normative criteria used to describe and assess the systems of interest in which different disciplines operate [Tàbara et al. 2021; Milkoreit et al. 2018].

A key task then is how to design open, plural and transdisciplinary assessment processes for the assessment of SETPs, given that complex systems can only be described partially by one single perspective. This in turn would entail: (a) identifying and assessing different

qualities of deep structural change occurring in the different kinds of systems in which transformations are needed, even though they may not necessarily or immediately appear to be connected, and (b) to represent complex dynamics derived from alternative interventions according to multiple time, spatial and social scales or dimensions. In particular, and regarding time scales, the causality of events and the apparently trivial fact that 'timing matters' are crucial elements for investigation of tipping processes in regional transformations processes: 'what happens when' - the sequence of events - is important, since actions from the distant past can initiate particular chains of reaction that have effects in the present - some largely unexpected. As Pierson [2000] suggested, 'small' events early on may have a big impact, while 'large' events at later stages may be less consequential. And in this sense, tipping points and be understood as the breaking of previous path-dependencies and lock-in situations that mark the entry to new locked-in states. However, using the chronologies, methods and time, spatial or social conceptual boundaries from one single discipline limits our ability to fully understand the complexity of addressing the full complexity of SETPs processes. To understand these complex processes, a systematic exploration of the underlying conditions and how they are conceived by different perspectives- e.g., in terms of transformability, resilience and specially, regarding systems' sensibility to possible tipping interventions -subject to multiple time lags including social hysteresis- is necessary.

5.4.3 Challenge III. Enabling Transformative Emergence in Coal and Carbon-Intensive Regions

Sustainability transformations, whilst occurring at multiple levels of agency, they eventually materialise in places (Salomaa and Juhola 2020). In fact, it can be argued that sustainability science is always situated science. Research on the transformations of energy systems needs to pay especial attention to particular places, human geographies, spatial configurations and dynamics of networks within which deep transitions are embedded [Köhler et al 2019; Bridge and Gailing 2020; Coenen et al 2021; Mattes et al 2015; Naumann and Rudolph 2020]. Changing the configuration of energy production systems towards a distributed generation of renewables and multi-scale geographical shifts in energy demand underlines the importance of situating possible tipping points in socio-energy systems in specific places [Bridge, 2018]. However, when trying to apply the concept of SETPs to sustainability transformations in places, the actual meaning of regions and communities also needs to be reconceptualised and novel modes of analysis of trans-local and trans-regional action are required. In terms of tipping points, cross-scale interactions may be better assessed and mapped out by examining the extent to which positive synergies between different kinds of actors and networks around transformative solutions are being formed, rather than using other more rigid and less action-oriented operationalisation criteria. Thus, collective action in regional contexts is very much dependent on many intertwined and complex factors which cannot easily or simply be reduced to 'bottom-up/top-down dynamics' nor to the simple aggregation of fixed individual patterns of behaviour within larger systems configurations [Byrne and Callaghan, 2014]. Sustainability transformation processes do not occur only as a result of vertical and one-directional phenomena but in a much more complex, overlapping and dynamic processes of collaboration and competition between changing agents who

operate under different perspectives, personal roles, organisational logics or capacity of influence.

A novel approach in this regard would require a further elaboration on the notion of regions so as to integrate new components necessary to understand and enable sustainability transformations. That is, to consider not only the *formal regions* based on the 'sameness' in geographic, administrative, cultural or economic attributes; or the *functional regions* defined in terms of their operational links, flows and interactions; or *the perceptual or cultural region* related to areas socially constructed by cultural beliefs, feelings or attachment, or other collective imaginaries. This new approach may entail extending the functional category of region based on identifying what would be needed to be transformed for achieving a positive tipping point in sustainability terms. This would be close to what EU refers to the Accelerator Regions[3], although a *transformative region*, would also encompass dynamic transformations at multiple of levels agency, as well as in the other formal and cultural defining categories.

However, considering such novel approach to regional change would also need moving away from simple and one-directional metaphors of causality in socio-cultural and technological change [see Hughes et al. 2022] towards understanding and enabling the conditions for *transformative emergence*. Using the notion of transformative emergence in tipping points would mean to abandon fixed and static ideas of individual agency (e.g., the rational actor paradigm) in their interactions with other organisational or large systems' levels. That is, moving from synchronic perspectives of systems configuration and changes occurring only at one point in time or one single level - e.g., at individual and organisational level with direct dependency among them - to understanding that multiple transformations of properties may emerge and influence in a recursive way multiple configurations at multiple periods of time -and where no single or direct dependency relationships between agents and systems may occur among them [Van Dijk 2021, Humphreys 2020, Schot and Kangera 2018 Guay and Sartenaer 2016]. Further research using such dynamic understanding of agency-systems interactions in which both agents and systems do and need to change at the same time, may have profound implications for sustainability science and policy. And in particular for those approaches, such as in modelling, aimed at identifying positive tipping points derived from coupling multiple systems of solutions at different scales or domains of action[4].

In short, instead of one-directional and single end-point approaches, we advocate for a better understanding of those kinds of tipping interventions which may help to create the conditions for the emergence of larger and more lasting systemic effects in diverse but coupled social-ecological systems of reference; and do so at different levels of agency with special attention to be placed to individuals, communities and regions with higher potential for fast, positive systemic impact. Transforming systems require of empowered transformative agency operating in enabling environments which induce to such transformations in a recursive, 'multi-chronic' mode. This novel approach to accelerating transformative action in regions and communities would also call for the integration of

[3] As used both for regions and communities according to the EU Mission on Climate Change and Transformations [Hedegaard et al. 2020].
[4] http://www.highendsolutions.eu/page/transformative_solutions

both human and biophysical forces of change, insofar that improvements in biophysical conditions translate into improvements in human quality of life conditions and in turn generate multiple positive retroactive feedbacks in many kinds of systems (for the case of food systems see [Pereira et al. 2020]). But in any case, the possibility of such self-reinforcing positive learning loops leading to a systemic positive tipping point would be conditioned by the agents, networks and capacities required to implement transformative visions, and strategies in each particular regional contexts of action [Tàbara et al. 2018].

5.5 Conclusion

The need for understanding how to accelerate systemic and qualitative change towards sustainably derived from relative strategic and sensitive interventions is opening a large corpus of research on social-ecological tipping points. One additional reason for the attractiveness of this concept in sustainability science may lie in the belief - or hope- that few small actions or marginal additional forces could eventually lead to large, desirable and profound system' changes, as when seemingly trivial or imperceivable events trigger irreversible and accelerating chains of reactions [Nuttall 2012]. However, in the case of deliberate sustainability transformations, such belief has not yet been proven to be true. Or at least, such belief will only be confirmed when we better understand the previous and complex conditions that made such large systems' change possible in the first place. Whilst it may be the case that a disruptive event, intentional policy action, individual behaviour or technology may precipitate rapid change in a given system, whether it will eventually contribute to sustainability will depend very much on the extent to which many other conditions, contextual factors, previous forces of change come into play.

Tipping points, conceptualised as discontinuities in a development trajectory, as thresholds of qualitative structural change or as a move toward new basins of attraction, occur in many different kinds of systems, relationships and levels of agency; so, they can hardly be circumscribed to one single system of reference. Moreover, tipping points do not occur by chance. The building conditions by which SEPTs eventually unfold can be systematically described and analysed, albeit always partially and limited to the perspectives and tools that researchers use in their descriptions. But for this knowledge to become a solid basis for action, our review has underlined three key challenges for research. First, acknowledging and connecting the contributions from diverse social sciences with complexity theory [Byrne & Callaghan 2014], also using a situated, place-based approach. Second, designing open transdisciplinary assessment processes able to assess multiple understandings of qualitative change in social-ecological systems, with special attention paid to supporting transformative capacities; and third, rethinking the nature and interactions between agents systems from a transformative emergence perspective in which multiple transformations and learning feedbacks can emerge -in a 'multi-synchronic' way over multiple periods of time- at different levels of agency hence generating the potential for accelerating social-ecological change.

A better understanding of the social, economic and environmental challenges that individuals and groups encounter before, during, and after a given regional systemic transformation might also help clarify to whom the tipping points may impact positively

or negatively, e.g., in terms of justice and sustainability. Some of these challenges or injustices might originate from power asymmetries already in the system, such as social discrimination preventing participation in decision making spaces and gender inequities [Clancy et al.2020; Johnson et al. 2020]. Therefore, once both a target or directly affected group(s) and non-target ones have been identified, the sustainability potential of tipping interventions may be better tailored accordingly.

In this contribution we have argued that one of the most urgent tasks to move human societies towards sustainability has to do with learning how to accelerate sustainability change in those areas most intensive in the extraction and use of fossil fuels. Sustainability transformations research needs then to pay special attention to understanding the conditions by which coal and carbon intensive regions have managed to move to alternative, better-off structural situations and/or how radically clean-energy and socially just trajectories could be taken in other regions. However, and although the exact moment in which SETPs may occur cannot be known beforehand, we have argued that it is possible for sustainability science to contribute meaningfully to the assessment and policy learning processes to build the transformative capacities for their emergence.

5.6 References

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6 Projects Results and Achievements: Synthesis of Different Strategies, Responses and Solutions

The project has resulted in two noteworthy academic outputs based on knowledge integration achievements:

- The book "Positive Tipping Points Towards Sustainability" (publisher: Springer) and
- The special issue "Enabling Sustainable Transitions in Coal and Carbon-Intensive Regions: Interdisciplinary Social Science Perspectives" in the Global Environmental Change highly ranked journal.

Both are in the process of elaboration at the time of submission of this deliverable.

The Special Issue is entirely dedicated to papers related to the development of concept and methods for socially relevant and just transitions as well as the rich empirical work within the TIPPING+ project. As such, the Special Issue includes papers synthesizing empirical findings across a set of cases studies, as well as those focusing on concept and theory building and notably a paper on the new social theory developed in TIPPING+.

Similarly, the book includes several empirical chapters of knowledge integration, including the book chapter about narrative development in most case studies of the project.

The policy-oriented project results were integrated and synthesized in several project deliverables, most notably:

- Deliverable 5.3 "Booklet on Regional Strategies, Responses and Solutions for Enhancing Positive SETPs for Energy Transitions in CCIRs".
- Deliverable 7.3 "Policy Brief with Recommendations on SETPs to Accelerate Low-Carbon, Clean Energy Transitions in CCIRs".
- Deliverable 6.3 "Stakeholder Consultation and Outreach National and European Policy Actors" (policy briefs):
  - Policy brief "Tipping Investments Towards Clean Technologies Pathways".
  - Policy brief "Good Governance for Just Low-Carbon Energy Transitions".
  - Policy brief "Public Engagement and Community Empowerment".
  - Policy brief "Regional Development Through Economic Diversification".
  - Policy brief "A Fair Energy Transition Through Social Justice and Inclusiveness".

6.1 Special Issue "Enabling Sustainable Transitions in Coal and Carbon-Intensive Regions: Interdisciplinary Social Science Perspectives"

For this Special Issue, we constituted a team of five guest editors representing a diverse interdisciplinary group of researchers from the TIPPING+ consortium, working on sustainability transitions with different perspectives, at various levels and career stages. We combine expertise in numerous disciplines in natural sciences, social sciences, and humanities. The Guest Editors team is composed by Diana Mangalagiu, Jenny Lieu, Fulvio Biddau, Amanda Martínez-Reyes and Baiba Witajewska-Baltvilka.

The intent of the Special Issue is to provide the latest empirical findings, concepts, and methods in social science to assess transitions in coal and carbon-intensive regions (CCIRs) for sustainable transformations CCIRs refer to subnational territories with high economic dependency on either fossil-fuel extraction such as coal mining or carbon-intensive industries such as steel (European Commission, 2018).

We approached CCIR transitions from diverse disciplinary perspectives, and focused on understanding the narratives, conditions, and effects of tipping processes on multiple levels. In this guise, this Special Issue built on a unique social science component, from human geography, anthropology, social psychology, sociology, energy economics, and political sciences. The articles in the Special Issue include existing and new methodological approaches for transformative changes or social ecological tipping points across various time and spatial scales (Tàbara, Lieu et al 2021).

The Special Issue is advancing the state of the art in global environmental change through three objectives:

i. Advancing concepts, methods, and frameworks to understand sustainable transitions in coal and carbon-intensive regions.

The first objective focuses on advancing beyond the state-of-the-art interdisciplinary social science knowledge about the social processes that unravel pathways towards socially relevant and/or just, sustainable transformations in CCIRs. To achieve this objective, we built on socio-technical transitions, and socio-ecological systems concepts and refine them by linking them with the latest empirical knowledge on transitions in CCIRs. Thus, we deepened the understanding of interconnected social, technological systems with environmental goals that is crucial to prevent undesirable and unintended outcomes of interventions to move toward environmental, social, and economic sustainability.

ii. Understanding political and socio-economic influences on pathways for coal and carbon-intensive regions.

The application of the first objective brought us to the second one: understanding the underlying trends, socio-economic conditions as well as policy and political interventions that may enable or disable sectoral or systemic sustainable transformations in CCIRs. We dove into

the regions in which decarbonization actions are implemented but are especially difficult to scale up. The TIPPING+ case studies provide integrated insights with relevance to multiple spatial, temporal, and socio-political scales in diverse regions worldwide.

iii. Identifying cultural frames and discourses for pathways in coal and carbon-intensive regions.

The third objective was to identify cultural frames and discourses from different perspectives and levels that help understand how CCIRs can efficiently push forward their desired change. Transforming socio-energy systems in the CCIRs into clean and just ones has direct and far-reaching consequences across several socio-political levels, including the local, community, regional, and international ones. Hence, the SI presents empirical knowledge on how the strategic combinations of discourses, actions, solutions, and innovations at different points in time and spatial levels, can unleash knock-on effects to help the system flip into low-carbon energy trajectories. The articles in the SI reveal how discourses, technologies, or practices have been delegitimized, gradually eroding the commitment of or redefining the role of incumbent actors and unlocked and legitimized new pathways.

The Special Issue's contribution to novelty is fourfold:

- the approach of SETPs as a starting point to studying and conceptualizing sustainable transitions, and particularly how to break the carbon lock-in of CCIRs and transform them into sustainable regions.
- it addresses both up-stream and down-stream processes, hence focusing not only on fossil fuel extractive sectors and regions, but also on demand-side ones.
- it addresses carbon-dependent sectors as socio-ecological systems at a regional level.
- it is based on a strong contribution from diverse social science disciplines, in a fully interdisciplinary, impact-oriented approach including a strong component of stakeholder engagement.

6.2 Book "Positive Tipping Points Towards Sustainability"

The book is edited by Joan David Tabara, Alexandros Flamos and Diana Mangalagiu.

This book advances the scientific understanding of social-ecological and positive tipping points bringing fresh theoretical and empirical insights while using an integrative and comparative approach. Of special importance are the insights gained from regions and communities of coal and carbon intensive regions, following the work carried out within the EU funded project TIPPING+.

Acknowledging the difficulties but also the urgent need and opportunities in studying positive tipping points, this work will feature concrete case studies and novel methods that contribute to accelerate sustainable decarbonization.

Examples are provided on how positive feedbacks and learning synergies across scales and multiple domains can occur and/or be induced by strategic actions in disruptive technologies and socio-energy systems, carbon (dis)investment and finance, individual changes in consumption behaviors, and/or more broadly, by new forms of social movements engagement and civic litigation.

A common feature of positive tipping processes is that their interactions and effects can lead to reinforcing feedbacks and virtuous cycles of subsequent transformative change across individual, organizational, institutional, and larger systems scales in a way that *at one point in time* they can become autonomous forces of positive change (e.g., aligned to SDGs).

Understanding the possibilities but also the constraints, barriers, and limitations of positive tipping points toward regional sustainability requires, among other things, examining the following questions:

- How diverse and distributed regenerative strategies are being deployed in many kinds of systems, organizations, and places?
- How fast, structural change can be enacted in creative, engaging and situated mode? How can these targeted multiplicative strategies contribute to reducing poverty and enhancing equity, justice and inclusiveness?
- What innovative tools and methodologies - and particularly, new forms of modelling- can capture and explore multiple feedbacks, non-linearities and learning processes across social, temporal, and spatial scales?
- What role local transformative agents, visions, conditions, capacities, and values play in positive SETPs?
- How cultural identity dynamics may constrain or propel new forms of sustainability transformations?
- What role of social movements and litigation?

All in all, we urgently need to sharpen our knowledge about how and which feasible strategic options can replace unsustainable forms of economic wealth creation processes by green, net-positive, restorative ones while also generating tangible benefits to individual and collective livelihoods in the short term.

This book has two main objectives:

- To introduce the reader to the state of the art in research on social-ecological tipping points including the most relevant inter/transdisciplinary and integrated methodologies able to address them in both scientific and policy-relevant manner; and

- To advance the existing knowledge of analyzing tipping points with a focus on fast, systemic, and just decarbonization processes at regional level.

Hence, this book should be of interest to a broad audience, that is both social and interdisciplinary scientists and advanced students working on sustainability, climate and energy issues and policy makers and practitioners working in assessing the potential impacts

and effectiveness of strategic interventions aimed at accelerating just, sustainable decarbonization processes.

Subject Coverage

- Accelerating sustainability transformations
- Equity and justice in climate and energy transitions
- New approaches, tools and methods for assessing social-ecological tipping points
- Interdisciplinary social-environmental science research
- Cultural dynamics in sustainability transformations
- Regional, EU and global climate policy interventions

6.3 Deliverables 5.3 "Booklet on Regional Strategies, Responses and Solutions for Enhancing Positive SETPs for Energy Transitions in CCIRs

Deliverable 5.3 "Booklet on Regional Strategies, Responses and Solutions for Enhancing Positive SETPs for Energy Transitions in CCIRs" aims at:

- Translating project knowledge and key findings into plain, strategic and accessible language.
- Providing policy advice for stakeholders in CCIRs on various aspects of transition.
- Co-developing narratives with stakeholders for potential regional strategies to foster transformative capacities using also input from WPs1-4 and supported by stakeholder interaction procedures in WP6.
- Mapping out the main narratives, which underpin their regional energy development, and which highlight the strategies needed in a decarbonization trajectory in CCIRs and may vary depending on the core stakeholders and institutions that could contribute to positive tipping points within each CCIRs case study.

Specifically, the regional strategy booklets consider how the regions contribute to the policy areas of the Energy Union Energy and Innovation goals including promoting "climate action on decarbonization" and "Security, solidarity and trust" by working across countries to diversify energy sources. Case studies focusing on this specifically include Greece promoting energy autonomy on its islands and scaling up renewable energy within the EU to dependency on oil imports from abroad.

6.4 Deliverable 6.3 "Stakeholder Consultation and Outreach National and European Policy Advisers" - Policy Briefs

The policy briefs present the final output of the project and they are developed based on the knowledge gathered across case studies. They are elaborated jointly by the entire project team. During the last integration workshop in Paris (December, 2022) the project participants met and discussed the key points of the policy briefs (See Annex 7.5).

The policy briefs, being elaborated in close cooperation with WP5, as well as WPs 1-4 aims to present:

- The evolution of regional narratives, fostering or impeding the emergence of positive tipping points, including those, which have to do with the rise of populism and anti-democratic attitudes.
- The characterization of regional actors' capacities – or the lack of them – to undertake low-carbon transitions in such regions.
- The synthesis of the kinds of different strategies, responses, and solutions.
- The synthesis and lessons drawing from new business models and economic opportunities across case studies.

Each policy brief is based on information from project deliverables, case studies and published or ongoing scientific publications. The overall goal being to support a more robust policy and decision-making processes with input from stakeholders in CCIRs and shed light of possible interventions that could be implemented mostly at European, national, or regional/local level. The Policy-brief structure and content are based on the agreed template and guidelines.

- Policy Brief **"Tipping Investments Towards Clean Technologies Pathways"**

This policy brief draws on the results of TIPPING+ research and case studies to share the insights on **how to accelerate systemic investments towards clean technologies in Coal and Carbon Intensive Regions (CCIRs)**. In order to do that, it adopts a full-systems transformations perspective that highlights the importance for policy makers and economic entrepreneurs to identify the key opportunity spaces, actors, needs, capacities and a portfolio of required **strategic sensitive interventions** necessary to connect and synergize investments chains in both **upstream** (e.g., extraction) and **downstream** (end- products production) technological and market operations.

This is the case, for instance, of **high-energy intensive sectors** where large public investments are needed to connect **steel production** to green energy sources such as with **green hydrogen**. At the different stages of these complex processes, it may be necessary to deploy a variety and tailor-made **financial incentives, infrastructural support and regulations**. These may include **carbon pricing or removal of perverse subsidies** to prompt research and

development in strategic areas and raise **consumer awareness** of the benefits of low-carbon alternatives that favor technological change, as is the case with electric mobility.

A **positive tipping point** in this area occurs when, as a result of multiple **R&D learning feedbacks**, the costs of investing in green technologies are reduced and the revenues generated from them increase to a **critical threshold** whereby it becomes more profitable to invest in **green development pathways**; and from there, multiple **self-reinforcing processes** supported by **policy interventions** further accelerate economic returns, social innovations and spill over positively to other sustainability goals.

- Policy Brief **"Deliberate Governance Innovations to Accelerate Just Decarbonisation Development Pathways"**

This policy brief draws on the results of TIPPING+ research, case studies, published and ongoing publications on how **deliberate governance multi-level innovations** can support the emergence of **fast, just and structural changes and agents transformative capacities in CCIRs.** In governance systems, tipping points can be understood as a discontinuity where a given system of reference fundamentally changes its original structure and dynamics. Enacting deliberate positive tipping points in governance requires innovations that put **justice as the core of new forms of actors' coordination and interactions**.

Moreover, whilst transformations may be achieved incrementally, the **governance of positive tipping points**, e.g. to achieve carbon neutrality or realise **Sustainable Development Goals**, entails identifying four types of phenomena: (1) the **social, political and economic contexts** where potential abrupt changes may occur (2) the possible **tipping events** that may accelerate or trigger the change, such as closing a coal mine (3) the feasible and more **just interventions** required to transform the system towards a desirable dynamic state and bring it towards a tipping point, and (4) the different kinds of impacts or **course of action** after the tipping point. All these aspects are interrelated in the way that a tipping event or process qualitatively disrupts the social and economic structure of a region.

Fostering experimentation and learning feedbacks at different levels of action thus becomes key in governance innovations deliberately aiming at refining strategic systemic interventions. Such policy experiments are also crucial in introducing new justice and alternative policy criteria and triggering further cycles of **positive feedback learnings** at different levels of governance toward sustainable decarbonisation trajectories. Hence, and besides combining a diverse portfolio of policy measures at different scales, a key issue for applying a **transformative incrementalist strategy** in governance is that of building upon **clear vision and orientation.**

- Policy Brief **"Cultural Identity, Behavioral and Demographic Issues in Public Engagement and Community Transformations"**

This policy brief draws on the results of the TIPPING+ research, case studies, published and ongoing publications underlying the role of cultural, demographic and identity issues in policy strategies aimed at fostering public engagement and support for the development of **energy communities** in support of sustainable transformations in Coal and Carbon Intensive Regions

(CCIRs). In order to do that, it places particular emphasis on the role of **trust, social representations,** collective meaning and **identity-making processes** and the role of behavioral factors affecting new forms of **collective action**, as well as of denial and resistance, related to decarbonisation processes.

Cognitive and psychological enablers as well as barriers exist that influence the way individuals cope with **abrupt change** or adopt low-carbon or more **resilient strategies** at household or community level. In CCIRs, of particular importance is the respect and visibility of **cultural heritage** (such as mining heritage) and the creation of participative local and inter-generational spaces of **community representation**. These spaces for **dialogue, experimentation and mutual learning** can also ensure accountability, fairness and transparency of regional and local decision-makers related to socio-energy transformations.

Energy communities not only can empower citizens to generate their own clean energy, reduce energy poverty and adopt more sustainable behaviors, consumption patterns and lifestyles; but also, they can help individuals to become active agents and local community ambassadors to overcome potential resistances associated to feared negative effects derived from tipping away of traditional coal and carbon intensive development pathways. In addition, low-carbon transformations trigger new **migration flows** and **demographic changes** at regional level, and in particular with regard to **gender, young and older** sectors of population that need to be anticipated and integrated in positive transformations processes using a justice lens. **Re-skilling** and training of the regional workforce to innovate and carry out low-carbon alternative socio-economic activities becomes an imperative.

- Policy Brief **"Tipping Towards Resilient Regional Development Pathways Through Socio-Economic Diversification"**

In Europe, **great regional differences exist in terms of economic and decarbonisation performance** that need to be taken into account in future re-regionalisation processes. Aligned with the goals of EU mission on Adaptation and Climate change to support the transformation of at least 150 regions to become climate resilient by 2050, this policy brief draws on the results of TIPPING+ research, case studies and published and ongoing publications to summarise the insights on **how to promote economic diversification in Coal and Carbon Intensive Regions (CCIRs) in order to accelerate the adoption of just and resilient development pathways at regional and local level.**

The policy brief addresses how policy makers could drive transformations from regional economies largely based on a single high-energy intensive sector to more diversified, inclusive and regionally resilient ones. It also addresses the potential expected resistances by emphasising **the need to design regional visions, that integrate sustainability goals and develop strategic, inclusive full-procedural processes to co-produce them**. The role of new forms of regionally place-based entrepreneurship, business models and investments in a variety of low emissions projects is emphasised. Finally, it formulates recommendations on how to address different kinds of actors including climate innovators, blockers, influencers or followers.

Overall, the recommendations seek how to trigger positive feedback processes to accelerate continuous cascading positive effects further boosting economic diversification and climate mitigation and adaptation also in other regions. Hence, **transitioning regions toward low-energy resilient pathways is not only about managing energy issues; but about understanding how to deal with full-societal transformations** that include multiple socio-economic and cultural dimensions and profound changes in governance mechanisms, individual capacities, local well-being, economic arrangements and even collective and cultural visions about the kind of just societies and communities we want to live (e.g., more socially, open and resilience-oriented or not). **Regional actors thus can be at the forefront of low-carbon transformation processes but also can also help to tip their and other regions to new structural patterns of development or even create actual new regions** based on low-carbon technologies, sectors and even cultural identities away from 'dirty' energies.

- Policy Brief **"Justice as Trigger and Outcome of Positive Low-Carbon Tipping Points"**

Justice, in its multiple dimensions, scales and understandings, **is both a trigger and outcome of any process aimed at tipping regions towards structural low-carbon systems transformations.** This policy brief draws on the results of TIPPING+ research, case studies and published and ongoing publications to share the insights on **how different considerations of justice influence, trigger and become a major outcome of low-carbon transformations in Carbon and Coal Intensive Regions (CCIRs**).

The policy brief highlights the importance of taking into account different **notions of justice** that not only consider traditional notions of recognition, distributive and procedural justice, but also that address more structural and ultimate causes of injustice, or transformative justice. Such more challenging notions of justice may consider various temporal and spatial scales at the same, that is not only local ideas of **fairness** and **distribution** but also other global issues such as **planetary boundaries** and **intergenerational justice**.

Equity criteria and the search for more equitable results derived from low-carbon energy transformations need to be made explicit at early stages in planning stages to ensure uptake and overcome potential resistances of more affected or vulnerable groups in society. Integrating justice therefore needs to move beyond the short-term compensation for the negative environmental impacts or job losses and take a more long-term systemic transformation approach. This may be achieved by ensuring that also **policy measures and processes** taken in the short term**,** such as the distribution of **EU just transition funds,** are also perceived as fair and include other players, oriented towards more **systemic changes**, beyond the usual big actors and consider other areas outside of coal mining regions that also require targeted economic support.

7 Conclusion

The Deliverable 7.2 "Full Project Knowledge Integration Report with Results, Procedures and Recommendations" has demonstrated a successful operational process of knowledge integration in the TIPPING+ project.

Firstly, the creation of the WP5-WP7 task force was one of the key elements of the project, which enabled the knowledge integration process across all the case studies and disciplines. The task force was created early in the project and ensured that the integration process was not delayed and timely conducted and accompanied all the tasks of the project.

Secondly, the regular WOCS and in the last year MOCS were crucial for team building, especially, during the pandemic. While it was not possible to organize in-person events (including the Kick-off meeting and the General Assembly), this platform served as a meeting point for getting to know each other, discussions, exchanges of ideas and creation and integration of knowledge.

Thirdly, the integration workshops were the most profound organizational tool, which enabled the process of knowledge integration across the entire project. "Working together" – as opposite to working in silos, meeting regularly to present one's work and critically reading in advance others' findings – in formulating questions, finding common narratives, enablers and barriers etc. were an appropriate tool to ensure synergies across the work package and case study teams.

The above-mentioned operational process has run through key three phases of knowledge integration: developing of the state-of-the-art literature reviews, elaboration of the case study guidelines and elaboration of the first draft of the analytical framework.

The methods of knowledge integration we elaborated and applied have led to four key achievements of the project – the special issue "Enabling Sustainable Transitions in Coal and Carbon-Intensive Regions: Interdisciplinary Social Science Perspectives" to Global Environmental Change; the book "Positive Tipping Points Towards Sustainability", the "Booklet Regional Strategies, Responses and Solutions for Enhancing Positive STEPs for Energy Transitions in CCIRs" and "Policy Briefs with Recommendation on SEPTs to Accelerate Low-Carbon, Clean Energy Transitions in CCIRs".

From the perspective of knowledge integration process, we have learnt that planning and commencing knowledge integration activities from the very beginning of the project, running them regularly and providing a very structured yet flexible process and platform for "working together" were the key to a smooth process producing relevant and robust knowledge products. However, having planned in the Document of Work the work packages along disciplinary lines appeared to be the biggest challenge in the project as it made more difficult to get disciplinary researchers out of their comfort zone and think in an interdisciplinary and transdisciplinary way.

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9 Annexes

9.1 Report of the First Integration Workshop

9.2 Report of the Second Integration Workshop

9.2.1 Phase 1

9.2.2 Phase 2

9.2.3 Phase 3

9.2.4 Phase 4

9.3 Report of the Third Integration Workshop

9.4 Report of the Fourth Integration Workshop

9.5 Report of the Fifth Integration Workshop

9.6 List of WOCS/MOCS

9.7 First Version of Analytical Framework

9.8 Guidance for TIPPING+ Coal & Carbon Intensive Region Case Studies: narrative development, stakeholder engagement and indicators

9 Annexes

9.1 Annex: Report of the First Integration Workshop

WP7 Integration Workshop
December 15th 2020, 1:30-4pm CET

Rationale

The overarching goal of the series of WP7 workshops (to be held every 6 months over the duration of the project) is to improve the existing understanding of the cross-scale, cross-system that affect low-carbon, clean transitions in CCIRs.
The first workshop of the series aims to:

- help everyone in the consortium understand the core perspective of the WPs 1-4 based on the literature reviews recently carried out
- test the WPs 1-4 perspectives on four volunteer case studies (Austria, Canada, Greece and Spain)
- start integrating the four perspectives into an analytical framework based on the draft jointly elaborated by WPs 3, 5 and 7.

Based on the insights gained in the workshop, WPs 5 and 7 will jointly elaborate guidelines for the case studies on how to use the analytical framework and help them identify:

- the narrative and context of the region and its transformative capacity
- the tipping event (deliberate or unexpected) that triggered the status quo to change
- the interventions (solutions/ innovations) that led or may lead to the tipping point
- the immediate and long-term outcomes of the tipping point

Modalities

Participants:
We encourage everyone in the consortium to attend. WP leaders and CS volunteers will need to attend.
Please **confirm your attendance by Thursday 10.12.2020** following the registration link
Means:
Zoom (https://zoom.us/j/96450328044 ;Meeting ID: 964 5032 8044) and Jamboard
Link for guiding questions on jamboard:
https://jamboard.google.com/d/1DKm10fMrZ_UQGaL8Ukair9IxuSiIpbGUZW1B_7g7tvQ/viewer?f=0

Prereading requirement
All participants must read the 4 case study descriptions and 4 literature review syntheses prior the workshop (WP 1 synthesis will be uploaded by the 09.12.2020):
https://www.dropbox.com/sh/zet43yib1otcegl/AABCj7JLTtoZTpWlRc1xKAe5a?dl=0

Rules and responsibilities
Organizers: Diana Mangalagiu, Jenny Lieu, and Amanda Martinez (Zoom host)

- Introduce the activities and lead them in plenary
- Assign breakout rooms
- Organize whiteboards on jamboard
- Raise questions from participants
- Ask for feedback

Breakout room facilitators: to be confirmed (4 people)

- Provide instructions in breakout room (role-playing scenario and rich picture)
- Make sure comments and figures are being added to jamboard
- Keep activities on time
- Oversee zoom chat and technical issue, if there is any from participants.
- Send jamboard link to Zoom chat
- Encourage everyone to join the discussion and avoid situations where only one or a few people share their opinions

Breakout room note takers: to be confirmed (4 people)

- Note taker is responsible to record the breakout room sessions
- Keep minutes of each session, as well as inputs from participants in order to keep facilitator, speakers and stakeholders informed
- One of the note takers will oversee the plenary sessions as well

WP leaders: Siri Veland (WP1), Mauro Sarrica (WP2), Franziska Mey (WP3), and Antoine Mandel (WP4)

- Provide (min 2 and max 3) guiding questions on jamboard: https://jamboard.google.com/d/1DKm10fMrZ_UQGaL8Ukair9IxuSiIpbGUZW1B_7g7tvQ/viewer?f=0
- Be the expert of another perspective (discipline) than yours in breakout rooms: help CS leaders and CS stakeholders analyze the case study from the assigned perspective
- Formulate further questions with CS leader and stakeholders during the breakout rooms
- Give presentation

CS leaders: Raphaela Maier (Austria CS), Luis Virla Alvarado (Canada CS), Jeremie Fosse (Spain CS), and Serafeim Michas (Greece CS)

- Provide inputs for the analysis of CS
- Do not loose time finding the most accurate data or figures, be rather descriptive instead
- Contribute to writing/drawing ideas on jamboard

CS Stakeholder role: to be assigned during the workshop

- Understand the role of the assigned stakeholder and adopt that perspective
- Provide inputs for the CS analysis from the role's perspective
- Contribute to writing/drawing ideas on jamboard

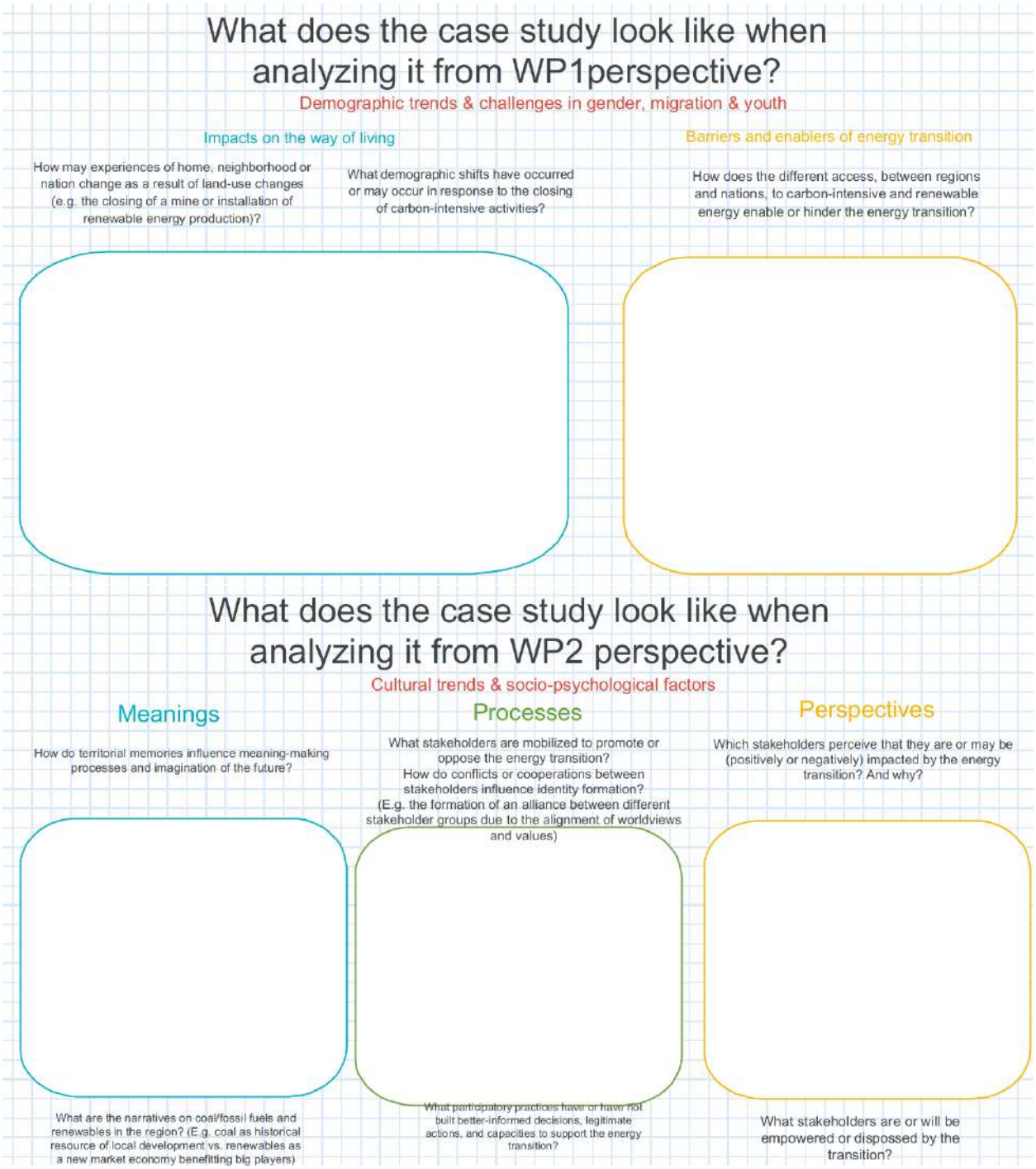
Agenda

Time	Activity	Activity PIC	Logistics	Logistics PIC
13:30 – 13:40 (plenary)	**Welcome** Recap aim and structure Clarifications if needed	Diana	Host receives participants to the Zoom call	Amanda
13:40 – 14:05 (plenary)	**Presentations by WP 1-4** Synthesis of literature review and research questions (max. 5 min. each)	WP leaders	Organizer does time keeping Host allocates CS, WP experts, note takers, facilitators. Host records in plenary Host creates 4 breakout rooms, one per CS Note taking in plenary	Diana Amanda Note taker
14:05 – 14:30 (breakout rooms)	**Role-playing scenario 1** WP leaders and CS stakeholders receive their role in that case study and have 5 min to adopt it CS leaders present their case study (max 3 min) WP leaders, CS leaders, and CS stakeholders analyze the case study from one perspective (WP 1-4) using	WP leaders CS stakeholders CS leaders	Facilitators provide jamboard link and make sure a visual is produced Note takers record sessions and take notes	Breakout room facilitators Breakout room note takers Amanda

	jamboard and the guiding questions as starting point		Hosts sends 5 min note to finish the first scenario	
14:30 – 14:50 (same breakout rooms)	**Role-playing scenario 2** Same breakout room participants analyze the same CS from another perspective using jamboard and the guiding questions CS stakeholders keep the same role	WP leaders CS stakeholders CS leaders	Swapping WP leaders Facilitators make sure a visual on jamboard is produces Note takers record sessions and take notes Host send 5 min note to finish scenario	Amanda Breakout room facilitators Breakout room note takers
14:50 - 14:55	**Allocation of new breakout rooms**		Host sends everyone back to plenary Host creates a jamboard with screenshots of the 8 visuals Host allocates participants in new breakout rooms	Amanda
14:55 – 15:30 (plenary)	**Rich picture** Facilitators present visuals on Jamboard On jamboard, participants connect ideas between the four perspectives using the visuals	Breakout room facilitators All other participants indistinctively	Facilitator gives instructions Note takers record sessions and take notes	Breakout room facilitators Breakout room note takers Amanda

			Host sends 5 min note to finish activity	
15:30 – 16:00 (plenary)	**Synthesis and discussion** Organizer asks for questions, reflections, and feedback. All participants write down 3 thoughts/comments/learnings on jamboard Organizers start discussion on documenting transdisciplinary work and invites participants to join the initiative. Organizers conclude the workshop	Organizers All participants indistintively	Host records in plenary Note taking in plenary	Amanda Note taker

Annex: Jamboard Visualisations



What does the case study look like when analyzing it from WP3 perspective?

Positions

Who are the governing actors and who is in opposition? What is their position on COAL or carbon intensive industries?

Policy & governance trends & challenges

Frames

How do the dominant and minority frames legitimise or delegitimise carbon intensive industries as regional economic resource?

Interventions

How has the national/ regional or local government intervened, which policies or programs, and what were their effects?

What does the case study look like when analizing it from WP4 perspective?

Economic trends & challenges

Changes in the economy

what are the main changes in the economic situation of the region that you have observed or anticipate?

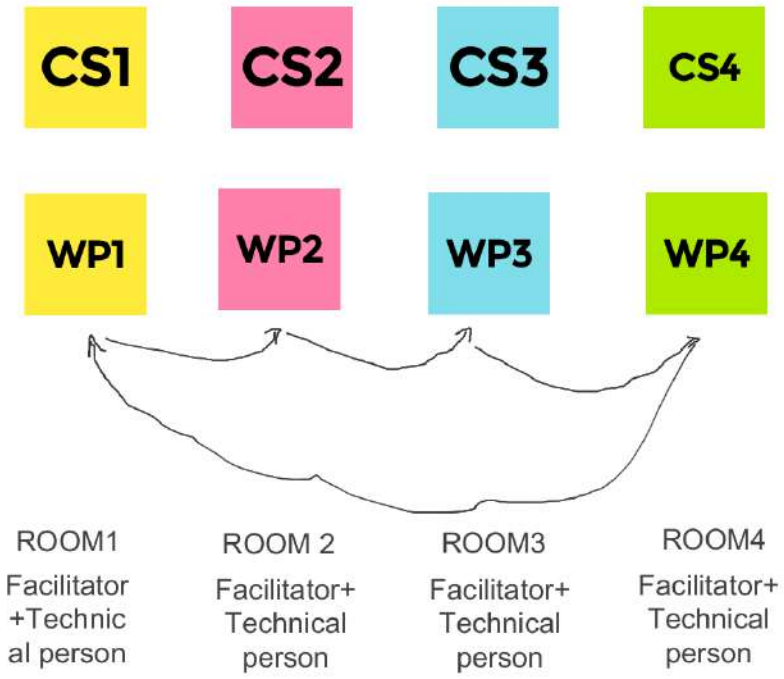
inputs

Policy

Do you think that economic policy measures have been or will be important in your case study? if so which ones?

Indicator

What is the most critical economic variable/ characteristic?


CS1
CS2
CS3
CS4
WP1
WP2
WP3
WP4
ROOM1
Facilitator +Technic al person
ROOM 2
Facilitator+ Technical person
ROOM3
Facilitator+ Technical person
ROOM4
Facilitator+ Technical person

Annex: Preparation for the Integration Workshop

TIPPING+

First integration workshop (M7.1)

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 824565.

Please, rename yourself as indicated in the list

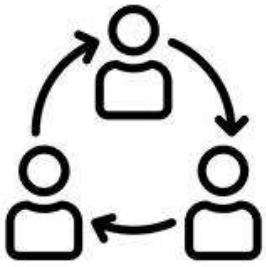
Name	Role name
Amanda R.	ES-Facilitator
Anne Merrild	ES-Regional government
Antoine	Antoine
Arpad	GR-RES companies
Baiba	AT-Facilitator
Bohumil	CA-Indigenous community
Brigt	CA-RES electricity consumer
Cynthia	CA-Facilitator
David	GR-Lignite power plant workers
Dimitra	GR-Regional authority
Emina	GR Public power corporation (lignite-based)
Franziska	Franziska
Fulvio	AT-note-taker
Indriani	CA-Federal government
Jakub	GR-Citizens of Megalopolis
Jan	ES-Energy Utility
Jenny	CA-Oil & Gas worker
Jeremie	ES-CSL
Johan	CA-Provincial government
Karl	AT-National government
Konstantin	AT-Iron and steel industry
Laia	ES-Environmental NGO
Lea	ES-note-taker
Luis	CA-CSL
Mauro	Mauro
Natasha	CA-note-taker
Raphaela	AT-CSL
Regine	AT-Cement worker
Saptorshee	ES-Tourism Industry
Serafeim	GR-CSL
Siri	Siri
Takeshi	AT-Regional government
Valentina	GR-Facilitator
Zois	GR-note-taker

Integration workshop: Why?

To help everyone understand the core perspective of each WP

To provide guidelines for case-study leads on how to apply the various perspectives in their analysis

To help integrate the four perspectives (WP 1-4 disciplines) into a framework



Overarching goal: To improve the existing understanding of the cross-scale, cross-system that affect low-carbon, clean transitions in CCIRs.

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 884565.

Structure of the workshop

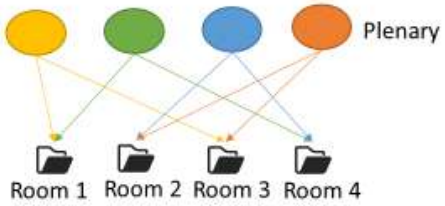
- Introduction
- WPL presentations

[give participants their role and 5 min to adopt their role]

- Role-playing scenarios (2x)

[break for 10 min]

- Rich picture (2x)
- Discussion



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Guiding questions

WP1: Demographic trends & challenges in gender, migration & youth

How may experiences of home, neighborhood or nation change as a result of land-use changes (e.g. the closing of a mine or installation of renewable energy production)?

What demographic shifts have occurred or may occur in response to the closing of carbon-intensive activities?

WP2: Cultural trends & socio-psychological factors

How do territorial memories influence meaning-making processes and imagination of the future?

Which stakeholders perceive that they are or may be (positively or negatively) impacted by the energy transition? And why?

Which stakeholders are mobilized to promote or oppose the energy transition?
How do conflicts or cooperations between stakeholders influence identity formation?
(E.g. the formation of an alliance between different stakeholder groups due to the alignment of worldviews and values)

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 834565.

Guiding questions

WP3: Policy & governance trends & challenges

Who are the governing actors and who is in opposition? What is their position on COAL or carbon intensive industries?

How do the dominant and minority frames legitimise or delegitimise carbon intensive industries as regional economic resource?

How has the national/ regional or local government intervened, which policies or programs, and what were their effects?

WP4: Economic trends & challenges

what are the main changes in the economic situation of the region that you have observed or anticipate?

Do you think that economic policy measures have been or will be important in your case study? if so which ones?

What is the most critical economic variable/ characteristic?

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 834565.

Jamboard links for scenarios

- Austria:
  https://jamboard.google.com/d/15LK805wp7fYdM_WQzA9wXH3-pjBGPpJgcDYwd1OF10M/edit?usp=sharing
- Spain:
  https://jamboard.google.com/d/1_PyZycSb3h9CAwI17HGmm_OYV-IXIe2VUj3udDYX1qs/edit?usp=sharing
- Canada:
  https://jamboard.google.com/d/1TCr430VumllBr7oKT-wYYuFjvZ2POYLXYbQZV-FxX2o/edit?usp=sharing
- Greece:
- https://jamboard.google.com/d/1E__6APh6QdcDtpKlpdE75qG5eGRllCGL6z940XxldWA/edit?usp=sharing

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Jamboard links for the rich picture

- Room 1: Austria + Spain
  https://jamboard.google.com/d/1lExMO1RdoE7uiwzpLI6DEufdlxrK0bez879NjzaML-k/edit?usp=sharing
- Room 2: Canada + Greece
  https://jamboard.google.com/d/1Thlf8KJtFMR7_VHmYNc-Zs3vGAZesQdLfimqoJh62RI/edit?usp=sharing
- Final comments:

https://jamboard.google.com/d/1DfqqdTFpKie6_ZLx0cfSqUs1dNu_tfjBRJCVSc0bcrM/edit?usp=sharing

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Integration workshop: What and How?

- We need all WPs and CSs to be represented
- Specific roles for WP1-4 leaders, CS volunteers (4) and facilitators (4)
- Duration: 2.5 hours
- Brief preparatory readings for all participants about CSs and WPs' lit reviews

We need you all!

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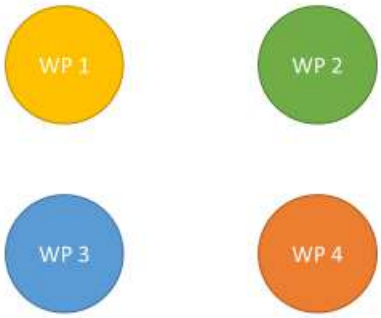
Agenda: understanding the four perspectives

1. **(20 min) Synthesis** of literature reviews by WP leaders in plenary (max 5 min per WP)



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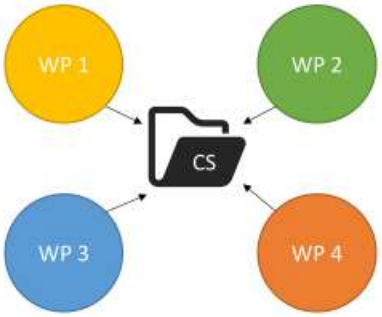
Agenda: applying the four dimensions to case studies

2. **Role-playing scenarios (**15 min x 2)

- Four breakout sessions, one per case study who volunteered.
- One "expert" (WP1-4) helps analyze the case study from one perspective.
- Output: one visual per analysis on Mural: 8 in the end.
- Participants provide their views and share insights.
- Facilitators keep timing and record the sessions.

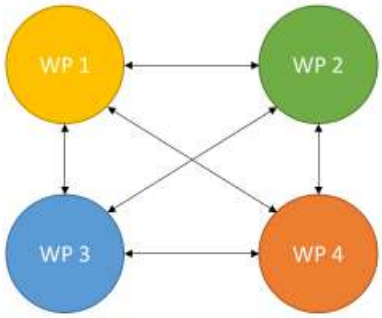


The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and innovation Programme under grant agreement No 834565.

Agenda: connecting the dimensions

3. **Rich picture** (30 min)

- In breakout sessions (3 to 4):
- We observe the 8 visuals
- Participants help connect perspectives thinking on case studies
- Facilitators help record sessions and with Mural



The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and innovation Programme under grant agreement No 834565.

Agenda: discussion

- Debrief in plenary: 20 min
- Was it helpful for case studies?
- Any suggestion? Anything you want to share
- Everyone writes 3 comments/questions on Mural (or in the chat or sends them via email).

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 864555.

Using Mural

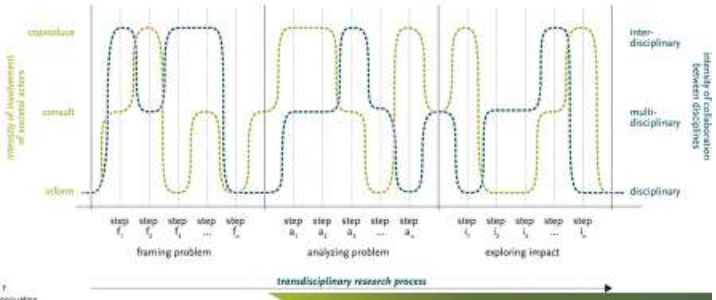
- Please, sign in to:
- https://app.mural.co/invitation/mural/tippingworkshop2013/1606791765828?sender=u22906b7d4f6dd474b8160309&key=9d3fa3d1-feed-453c-8116-feebf1cc8322
- Learning how to insert text and figures.

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 864555.

What is transdisciplinary research?

- Aims to go also beyond disciplines and understand the world by achieving "unity of knowledge".
- Several schools: Swiss and German, North American...): the challenges of the "real-world" become the focus of research but involvement of stakeholders varies.
- Involves intense interaction between academics and practitioners in order to promote a mutual learning process.
- Leads to **co-production of knowledge, problem framing with stakeholders** in society.
- **Applied in case studies**.

Intensity of stakeholder involvement in transdisciplinary research



Extracted from Pohl et al., 2017.

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 884565.

Let's discuss transdisciplinarity

- Discussing **transdisciplinarity** as an approach to integrate perspectives and analyses of case studies
- How to document evidence of participatory processes?

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Please, join us!

- December 15th from 1:30-4:00 pm CET
- Link to the meeting:

https://zoom.us/j/96450328044 ; Meeting ID: 964 5032 8044

- You will receive prereading by today December 8th

- Any questions and comments to workshop organizers:
  - Amanda Martinez: a.martinezreyes@tudelft.nl
  - Diana Mangalagiu: diana.mangalagiu@ouce.ox.ac.uk
  - Jenny Lieu: j.lieu-1@tudelft.nl

The Tipping Plus project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 824565.

9.2 Annex: Reports of the Second Integration Workshop

9.2.1 Phase 1

IDENTIFYING THE MAINSTREAM NARRATIVES: INTEGRATION WORKSHOP 1/4 REPORT

Date:	April 27th, 2021
Time:	15:00 - 17:00 h
Facilitation team:	(4 breakout room facilitators: Amanda (chair), Jenny, Diana, David, technical support (Marcel Endres), 4 note-takers (Carlo Jaeger, Konstantin Winter, Yvonne Mutua, Jonas Teitge)
Presenters:	Jenny Lieu, Amanda Martinez Reyes, Diana Mangalagiu
Participants	See Attendance

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Workshop timeline	3
Introduction	4
Mainstream narratives of case study regions	5
Synergies between case studies	10
Final reflections	11
Next steps	12
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1.1 Agenda: identifying the mainstream narratives (part 1/4)

Time	Activities	Moderation
15:05 – 15:10	Welcoming and agenda	Amanda
15:10-15:30	Confirming the clusters, case studies, and explaining what a mainstream narrative is.	Amanda, Jenny, and Diana
15:30 – 16:20	Discussing the mainstream narratives and synergies between case studies in clusters (breakout rooms).	Teams
16:20 – 16:25	Break	-
16:30 – 17:00	Debriefing (plenary)	Jenny and Diana

1.2 Workshop timeline

TIPPING+' second Integration Workshop is divided into four parts:

1) Identifying the mainstream narratives (27.04.21)
2) Characterizing case study regions (18.05.21)
3) Identifying off-stream narratives (15.06.21)
4) Identifying synergies between Case Studies and Work Packages (22.06.21)

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1.3 Introduction

The aim of the workshop is to identify the mainstream narratives in the case studies (CS). Each CS presents their region along the three focus questions:

- What is the mainstream narrative? (key sector that is explored in CS)
- Who is supporting this narrative? (institutions, stakeholders)
- What are the relevant components to focus on in the workshop (e.g. Technology, stakeholders, institutions, ideologies and policies)?

• What is a "mainstream narrative" (see also CS Guidelines document)

> By narratives in T+, we mean the storylines describing how the CCIR pathways (i.e., pathway broadly is a course of direction) was historically developed until the present and how some promising CCIR pathway can be potentially developed in the future.
>
> The mainstream narrative(s) identifies the pathway that represents the mainstream or dominant energy/high carbon **sector** (e.g. coal power sector). The mainstream broadly answers the question 'how did the CCIR get to where it is now' over a period of time?

• What are main "narrators"?

> Each narrative also has (multiple) narrators (i.e., story tellers) and a range of individuals who engage with it in peculiar ways. Narrators are stakeholders with a certain position (of power) in society. Individuals as well as groups that engage with the narratives or that the narrative "belongs to"/"is supported by" shall be made explicit.

• What are main "components"?

> Strong components that make the CS unique / particular aspects driving the sector (ideologies, populism, policy as key driver, etc.).

Each Case Study is allocated to one "Cluster" along recurring themes characterizing the CS regions (allocation can change):

- Coal-centric regions transitioning
- Coal-centric and populist ideologies
- Emerging/innovating industries/sector
- Local/indigenous knowledge and resource rich

 # Presentations of the CS have been collected and shared on Dropbox.

 # The discussions in the Break-out-Groups have been captured on 'Padlets'.

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1.4 Mainstream narratives of case study regions

CS REGION	CLUSTER	MAINSTREAM NARRATIVE	MAIN NARRATOR	MAIN COMPONENT
Germany	Cluster 1: Coal-centric regions transitioning	Coal Post-war growth and reconstruction thanks to coal, but started to change in the 60's	- Industry players - Unions - Political parties - Different level of government - Environmental NGOs	Stakeholders, Policies
Greece	Cluster 1: Coal-centric regions transitioning	Lignite plants To address 70's oil crisis, but now decisions to close them down – not viable economically.	- Public Power Corporation	Institutions, Policies
Italy	Cluster 1: Coal-centric regions transitioning	Coal - Historical energy dependency from coal - opportunity for exploiting existing resources - socio-demographic crisis, and negative chain effects - high unemployment, migration, lack of tourism, lack of infrastructure including digital ones. - lack of agency for customers/citizens critical to change the power relationships - passive view of population	- Private Power Corporations (ENEL, ENI) - Consumers/ End Users	Ideologies, Policies

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Bosnia and Herzegovina	*Not present*	*Not present*	*Not present*	*Not present*
Poland 1	Cluster 1: Coal-centric regions transitioning	Coal - Coal mining decreased steeply since the 90's when less efficient mines were closed - Also mining related industries were negatively affected by this development - EU accession changed rules for the industry and was a branching point for the region and allowed for new possibilities - New narrative of clean policy pathways is emerging, which some resistance from the political right and e.g. mining unions	- Public Power Corporation - Unions - Consumers/Miners/End Users	Institutions, Policies
Poland 2 (Baiba)	Cluster 2: Coal-centric and populist ideologies	"Grey" mainstream narrative, pro coal: - Economic nationalism (carbon as "black gold", energy independence argument, unemployment argument) - Political reasons (international relations: energy independence, EU-skepticism) - Cultural reasons (coal as "symbol of prosperity") "Green" mainstream narrative, pro decarbonization: - Decarbonization for economic (RE prices declining) and humanitarian	"Grey" mainstream narrative: - General public; - Most populist political groupings; - Coal corporations; "Green" mainstream narrative: - NGOs - Civil society	Ideologies (Populism)

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		reasons (local health and global responsibility)		
Romania	Cluster 2: Coal-centric and populist ideologies	*(Unique narrative missing,* *No collaboration towards solutions,* *No coherent regional development plan.)*	- Variety of stakeholders (Huneodara energy complex, Jiu Valley national society of mine culture, Romanian Wind Energy Association, Universities, civil society, trade unions, local public)	Stakeholders
Czech Republic	Cluster 2: Coal-centric and populist ideologies	"Worshipped" coal industry, historic perspective (building blocks of Socialist times), "Exceptionalist" narrative still prevailing; Nationalism (national gold, energy security and independence) Anti-elite and socialistic (keep jobs for normal people, coal mining should be subsidized by government) Anti-European (argument: collapse of industry caused by EU)	- Regional politicians - Regional media - Local academics	Ideologies
Mexico	Cluster 2: Coal-centric and populist ideologies	"Oil" narrative: Support for population under poverty line Investments in exploiting of oil resources for economic reasons VS. "Private sector" narrative:	Federal government VS. Private energy sector	Technologies, Ideologies (Populism VS. innovation)

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		Tendency to push for RE solutions and innovation		
Indonesia 1 (Fabian)	Cluster 2: Coal-centric and populist ideologies	Economic benefits from coal on national level; Energy independence. VS. Mining-induced deforestation (leading to floods)	State ministries, State-owned companies.	Institutions
Austria	Cluster 3: Emerging/innovating industries/sector	The Industries have strong historical backgrounds and are still highly successful Austrian Government supports them because of contribution to national GDP	Industrial companies: Upper Austria – Iron, Steel and Chemical industries Lower Austria – Cement, Chemical and Petrochemical industries Austrian government	Technologies & Stakeholders
Indonesia 2	Cluster 3: Emerging/innovating industries/sector	Banten – Heavy dependence on Coal and is center of heavy industry Bali – Reliance from mainland for power and tourism as a major sector (which fully supports coal energy)	Indonesian government State-owned businesses Monopolized electricity companies	Technologies & Stakeholders
Spain	Cluster 3: Emerging/innovating industries/sector	Balearic Islands – Tourism is a major sector and the islands have heavy dependence on fossil fuels Teruel – Transitioning away from Coal and oil (shut down 3 mines and 1 thermal plant in 2008) and focusing on global agreements (i.e. SDGs and Paris Agreement)	Monopolized electricity company (Endesa) Regional government Organized civil society Tourism Lobby	Technologies, Stakeholders & Policies

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Bangladesh	Cluster 3: Emerging/innovating industries/sector	On-grid electricity system Off-grid electricity system	Government and state-owned producers Private producers	Policies, Grass-root institutions Geopolitics (developme nt donors, allies)
Greenland	Cluster 4: Local/indigenous knowledge and resource rich	Hydropower plants Independency from imports Rebuilding energy system	Local municipalities Consumers/ end users Various political sectors Government owned companies (Nukissiorfiit)	Technology, Policies
Norway	*Not present*	*Not present*	*Not present*	*Not present*
Canada	Cluster 4: Local/indigenous knowledge and resource rich	Oil and Gas Oil Sand Natural resource exploitation	O&G companies (most local) Provincial Jurisdiction AB Government Indigenous communities Workers Association Federal Government Environmental NGOs	Policies, Ideologies
Australia	*Not present*	*Not present*	*Not present*	*Not present*

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1.5 Synergies between case studies

Cluster 1 (Coal-centric regions transitioning)	**Cluster 2** (coal-centric and populist ideologies)	**Cluster 3** (Emerging/innovating industries/sector)	**Cluster 4** (Local/indigenous knowledge and resource rich)
V. good to depict the changes in real use of coal with events and narrative changes, e.g. Germany example.	Among the post-communist countries - the presence of populist ideologies	historical companies could collaborate to innovate and move into a more circular economy	Dependent of foreign markets / Oil Price
Explore the role of EU influencing the transition pathways - But also it can have double-meaning, e.g. but saying 'the responsibility is from somebody else'.	The threat of violence is present in some CSs (e.g. Romania)	the transition for Tourism sector away from high carbon may be difficult (e.g. Aviation)	Governments (national or regional) have the say / Top-down
The main transition is not about changing the 'energy basis' but about changing the RELATIONSHIPS and self-perception of the regional actors in relationships to their own development, from 'waiting the change to come from outside to being the change'.	The unions are not united under a single voice	the mainstream companies may have a difficult time growing financially and creatively especially for state-owned companies	Boosting economy emerges as a priority
It would be interesting to explore how 'the narrative of inevitability' -both negative or positive' evolve over time. Temporal dimension in the change of narratives	Anti-EU discourse in populist ideologies across EU case studies	most cases involve big powerful old style companies	Strong geopolitical influence. International relations and international climate targets play a role in decision making
Changes in industrial identities (e.g., Greek and Italian CS)	Populism is present at the regional level in	the state-owned companies in Indonesia still have	Local knowledge (GL)/traditional knowledge (CA)

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	Europe but at the national level in Indonesia and Mexico	power and strong regulations	may play a role but varies among case studies
History of energy dependence from coal		clean initiatives are being discussed and probably will be introduced in Indonesia	
Narration of inevitability from SH with power (e.g., both in Italy and Germany) Divergent narrative from the locals (e.g., both in Italy and Germany)		lack of tourism is difficult but it is an opportunity to have a green transition	
Closure of coal mining - Role of EU can be because of saying that it is ' a responsibility of someone else' -		high energy dependency in all cases	
Necessity to map the position of actors along the carbon lock-in - decarbonization continuum and their rationale		high synergetic opportunities between tourism, clean energy (e.g. Solar power) and eco-tourism	

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1.6 Final reflections

a) Summary provided by Jenny (Co-lead of WP5)

Below are the common traits and points to explore in all four clusters:

- **Discussion on what Globalization drivers are** – this is in regard to the Paris agreement, which can be a driver, dependent on whether a country is obliged vs voluntary to implementation and can pose as a key component of mainstream narrative.
- **Regionalization** – this was more in the context of EU as a region, which can present a driver or a barrier to enacting green energy transitions. It was also noted that regionalization is negatively received in populist areas. Additionally, it would be interesting to see how other regionalization occur, like Geopolitics in South Asia, and to what extent international relations plays a role in the mainstream narrative.
- **Element of history is important** – this may present a barrier when it comes to erasing long standing institutions in the energy transition or it may present a potential opportunity in changing the vision of how these institutions would transition.
- **Element of top-down approach** – stakeholders with political or economic power are driving the mainstream narratives. However, non-mainstream narratives are not to be ignored, like in Greenland where a bottom-up approach exists.
- **Ideologies of populism** – it should be noted that not all ideas are the same and ideologies can be expressed very differently by wealth, power, resources and representation.
- **Scale (time, size, technology)** is important – there exists geographical, political and technological scales. An example of a technological scale could be a comparison between a small renewable sector and a large-scale industrial sector. Larger sectors are more associated with powerful people and these sectors have more inertia in transforming/transitioning.
- **Sub-narratives** – it is possible that mainstream renewable narratives also co-exist with mainstream coal narratives.

b) Comments from participants

- Mauro suggested that PPTs of other CS can be shared for inspiration, since they are well organized (incl. Cartesian plane and visualization).
- Jenny acknowledged the importance of using documents from other researchers while being attentive to referencing any content used.
- David remarked the figure on mainstream narratives in the guidance is also a good example for CS leads to refer to.
- Carlo noted how the narratives from marginalized communities are perceived. Previously, in any region facing transition, their narratives and opinions used to have high social power, however, now the mainstream narrators blame them for not being 'active or creative enough'. He commented how despite efforts from these communities to share their narratives, they never appear in the mainstream. He remarked to pay attention to the status in an energy transition, which is a crucial aspect of the narrative. He also remarked how the winners and losers of an energy transition should be looked at.
- Diana emphasized that not all stakeholders will ever 'win' a transition situation and it is difficult to find win-win conditions for all. She remarked it would be good to look at the

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different actors and their respective scales, and how the tipping interventions affect the consequences that follow.

- Jenny remarked the impacts of stakeholders on narrative; who are the winners and who are the losers? It would be an element to consider and to highlight the stakeholders and power dynamics in the role of the narratives.
- Jenny noted the advancement of Indonesian and Greek CS as showcases for other CS.

1.7 Next steps

Some things to think about in the next steps:

- Regions will be the next topic explored in the second phase of the integration workshop.
- How would CS leads define "regions" in their C)? More exploration of definitions of regions (like perceptual functions).
- Island nations present an interesting point of view because of their isolation, which could pose a barrier in transition especially if energy sources are dependent from the mainland.
- How climate change is not a driver for energy transition, but rather political power is.
- Populism could present a relevant "region" to study.
- Looking and comparing cases with local or indigenous knowledge and post-colonial countries and observing if both groups act similarly.
- Negative tipping-points, and grey areas are also important to understand how they affect prevention of positive tipping points.
- Analytical frameworks – it was pointed out that T+ is analytically agnostic, and researchers are encouraged to discover frameworks that can assist in analyzing narratives.

1.8 Attendance list

First Name	Last Name	Affiliation	Case Study/T+ group
Adijia	?	su-re.Co	Indonesia
Alexandros	Flamos	UPRC	Greece
Amanda	Ramadhani	su-re.Co	Indonesia
Amanda	Martinez Reyez	TUD	CS Leader
Antoine	Mandel	EEP PSE	WP4
Arpad	Todor	SNSPA	Romania
Baiba	Baltvilka	IBS	Poland
Bohumil	Frantal	PUO	Czech
Carlo	Jaeger	GCF	WP7
Christina	Costa Salavedra	EcoU	Spain
Clarissa	?	su-re.Co	Indonesia
Cynthia	Ismail	su-re.Co	Indonesia
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Franziscka	Mey	IASS	Germany
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Jan	Frankowski	IBS	Poland
Jenny	Lieu	TUD	CS Leader
Jeremie	Fosse	EcoU	Spain
Joanna	Mazurkiewicz	IBS	Poland
Jonas	Teitge	GCF	WP8
Konstantin	Winter	GCF	WP8
Laia	Segura	EcoU	Spain
Lea	Meltz	EcoU	Spain
Luis	Virla-Alvarado	Innolab	Canada
Marcel	Endres	GCF	WP8
Mauro	Sarrica	UR	Italy
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Robert	Udrea	SNSPA	Romania
Saptorshee	Chakraborty	EEP PSE	WP4
Sendzana	Muslic	WPC	Bosnia
Siti	Indriani	su-re.Co	Indonesia
Stanislav	Martinat	PUO	Czech
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Valentina	Rizzoli	UR	Italy
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1.9 Additional information

Feel free to contact any of us for questions, suggestions, or comments.
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1.10 Annex

You can find the case study presentations and the Padlet reports from the 4 breakout groups here https://www.dropbox.com/home/H2020 Tipping+/2 Work Packages/WP7 Integration, synthesis (GCF)/Second Integration Workshop files - April-June 2021/Phase 1-Identifying mainstream narratives

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9.2 Annex: Reports of the Second Integration Workshop

9.2.2 Phase 2

CHARACTERIZING THE REGIONS: SECOND INTEGRATION WORKSHOP 2/4

Date:	May 18th, 2021
Time:	15:00 - 17:00 h
Facilitation team:	3 breakout room facilitators: Amanda, Diana, Konstantin // Technical support (GCF), Note-taker for BoGs and Plenary (GCF)
Presenters:	Amanda Martinez Reyes, Diana Mangalagiu, Valentina Rizzoli
Participants	See Attendance

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1.1 Agenda: Characterizing the regions (part 2/4)

Time	Activities	Moderation
15:00 - 15:10	Welcoming and agenda	Amanda, Diana
15:10 - 15:20	Introducing the three concepts of a region Confirming the clusters and case studies Key questions	Amanda, Valentina
15:20 - 16:00	Discussing characterization of the regions and synergies between case studies in clusters (breakout rooms).	Teams
16:00 - 16:05	Break	
16:05 – 17:00	Debriefing (plenary)	Amanda and Diana

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1.2 Introduction

The aim of the workshop is characterizing the regions in case studies (CS). We will define the region through how it's called to *formally*, then through its *function* (sector), and finally through how the region is *perceived*.

- Consider how your region can be defined.
- In what ways might these three dimensions be expressed?
- Which of these three will be most effective for narrating the transition pathways in your case study?

Formal region: physical, social, or political boundary:

"has definite borders and shares cultural homogeneity (sameness); it is uniform in nature. For example, an area that follows the same laws or speak the same language or follows the same physical features would be a formal region" [1]{examples not limited to political/administrative/governance}

> *E.g., Alberta (province), Canada (country) (historical colonial group and present-day settler group), Jiu Valley, Romania (geographical boundary cutting across several administrative areas; valley with a history of 160 years of coal mining) or the Schengen region (free flow of goods and services, no visa needed)*

Functional region: based on horizontal spatial ***social*** and ***ecological*** flows across a geographic area:

i.e., functional links or interactions constituted around common interests, needs, goals or strategies, which are represented by flows of persons (commuting to work, for shopping, healthcare, etc.), or of capital, information, goods, resources or other related to stocks and flows of pollution (e.g., GHG) which also ultimate affect the dynamics of the region

> *E.g., the region receiving electricity from a coal fire plant; the region in which workers at a coal mine live and work (across nations); the region of oil sands open-pit mining supplying jobs to surrounding area; the region developing green hydrogen technology and infrastructure; the region across which electricity is transported, the region across which activist groups are sharing information and resources*
>
> *Note: a coal-and-carbon-intensive region is one of the functional definitions of a region.*

Perceptual region: based on shared perceptions and attitudes of people who live in a given area, linked to a shared cultural *identity* (e.g. character shaping) defined by people's feelings, sense of belonging and attitudes about that area.

> *E.g., oil sands region as a "cowboy wild west region"; the Appalachian coal mining communities, the Four Corners coal lands in the US, Northern Norway (similar history, shared dialect), Silesia (as an area with own ethnolect, flag)*

Perceptual boundaries are not fixed and can change, for example, depending on the narratives that each person or group proposes.

A) Where are the boundaries between "us" and "them"? How these boundaries affect interpersonal and intergroup relationships? Is it impossible/difficult/easy to cross this boundary?

[1] Washoe County School District, 2017

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E.g. Think about the mainstream narratives. E.g., One of the mainstream narratives is "Energy transition as a way of exploiting the abundant natural resources available, offering local people new economic opportunities instead of old jobs". We, the local, are Sardinian people, others are foreigners (the regional identity is more salient than national one). The engineer who coordinates a renewable energy project, works and lives in Sardinia, arrived from northern Italy, lives in the same place, but he is considered an outsider belonging to "them". It is possible to cross this boundary (even difficult) if we all lose the job and "we" all are unemployed. In this scenario, the engineer from the north of Italy is not seen anymore as the one who arrived to offer economic opportunity, but he is like us, is affected by the same regional/community burdens and destiny.

B) Who is attached (individual/group), what they are attached to (social place/physical place), and how they are expressing their attachment (through what behaviours, emotions, reasoning). Is there a place that represents the soul of the community? Is there a local environment (e.g. a river) that constitutes part of regional identity? [Reversed:] Which place, if destroyed, would destroy the soul of the community?

E.g., "Our mines represent our youth and our land". Some mines are museums, sites of the collective memory of the mining era. Reconverting these sites for energy transition would disrupt the place, emotions, memory, etc., connected with them. "Our agricultural land and landscape are part of our tradition, memory, but above all of our identity, even more, economic identity based on agriculture and tourism". Transforming rural areas by siting renewable energy infrastructures (e.g. biomass plants, wind turbines, solar panels) can be perceived as industrializing the area, as a threat to relevant places for the entire community identity and economy.

CASE STUDY CLUSTERS – PHASE 2

Cluster 1

(Islands/ islands/rural/isolated context regions)

- **Greece** (Megalopolis lignite mining)
- **Italy** (decarbonization of Sulcis, Sardinia & small Islands)
- **Norway** (LoVeSe region oil sector & Svalbard shift to renewables)**
- **Spain** (Balearic Islands downstream industry)
- **Indonesia** (cooking fuels in rural areas)
- **Bangladesh (solar rural)**

Cluster 2

(Urban regions)

- **Romania** (Jiu Valley)
- ***Germany*** *(Ruhr region (Essen & Duisburg)*
- **Poland** (Upper Silesia region)
- **Mexico** (Tijuana-San Diego region)**
- **Greenland** (Uranium mining)
- **Italy** (decarbonization of Sulcis, Sardinia & small Islands)

Cluster 3

(Large-scale regions)

- **Austria** (industrial clusters in Upper and Lower Austria)
- **Canada** (Alberta oil & gas sectors)**
- **Czech Republic** (Moravian-Silesian & South-Moravian Regions)
- **Bosnia and Herzegovina** (country-level decarbonization of electricity production & Republika Srpska public heating decarbonization)
- **Greenland** (renewable energy systems)
- **Indonesia** (country-level energy)
- **Spain** (Aragon-Teruel)

** did not present

 # The discussions in the Break-out-Groups have been captured on 'Padlets'.

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1.3 Characterizing the region case study regions

CS REGION	CLUSTER	WHAT REGION TYPES DID YOU IDENTIFY?	WHAT REGION TYPE(S) DO YOU FIND RELEVANT FOR YOR CS?	WHO IS/ARE DESCRIBING THE REGION?	ARE THESE REGION TYPES ALIGNED WITH THE MAINSTREAM NARRATIVE?
Greece	Cluster 1: Islands/rural/isolated context regions	- formal: region based on Population and geography, Central Greece - functional: was first a rural area until lignite exploitation started in 1969, Megalopolis is a power center. - perceptual: 'Us' - they are the only eligible area for the Just Transition and strong cultural identity	Functional and perceptual - crucial for energy transition.	- T+ researchers from literature review - 'us' – inhabitants of municipality of Megalopolis - 'them'- neighboring municipalities	Yes
Italy 1 (Sulcis, Sardegna)	Cluster 1: Islands/rural/isolated context regions	- formal: Admin/formal boundaries of Sulcis are still being debated. Southwest of Sardinia - functional: based on coal extraction and related production and transport chains - but also subject to crisis -> unemployment,	Functional and Perceptual region	- 'us' - Locals from Sulcis (poor region) and Sardinian people/workers - 'others' – locals from Cagliari (rich region) and tourists/foreigners	Yes

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		migration, underdevelopment - perceptual: important role of collective 'memory' we/us defined in terms of differentiated levels of development			
Spain 1 (Balearic)	Cluster 1: Islands/rural/isolated context regions	-formal: it constitutes an Autonomous Community with its own parliament and government; also v. dense area, with lots of fluctuant population due to tourism. - Cultural: Balearic-Catalan language, but very island-specific, not archipelago. - functional: tourist and energy in terms of transition. But there is a narrative that 'we the islanders want to be the pioneers' -role / benchmark model for the rest of Spain	Functional and formal region Conflict between tourism needs and local energy needs in all the four islands	- 'us' – locals of Balearic - 'them'- tourists	Yes because of just transition in the formal region
Norway	*Not present*	*Not present*	*Not present*	*Not present*	*Not present*

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Indonesia 1	Cluster 1: Islands/rural/isolated context regions	- functional: Two provinces which are Bali province and Banten province (Java Island). Banten province is more a larger urban area than Bali - formal: region - also described in terms of administrative units and contribution to economic sectors to GNP (e.g., tourism in Bali) - perceptual: famous belief in Bali which unites God, man, and nature, which pushes forward an eco-friendly society. Cultural dimension Islamic, with roots also in Hinduism. Migration	Functional and Perceptual regions	- Stakeholders	Yes Banten has coal power plants and serves as functional region
Bangladesh	Cluster 1: Islands/rural/isolated context regions	- functional: related to sustainable development - formal: affected by climate change - sea level rise (functional and formal overlap with each other) - perceptual: is about poor people who haven't got access to basic resources	Not so much functional, as here the key is how to meet basic needs sustainably to huge numbers of people, e.g. +14 M people	- International organizations such as the United Nations and OECD - Bangladesh government	The narrative is about transitioning to renewable energies for meeting basic needs -not just to move from fossil-fuel one

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		and energy for basic need - Education crucial here too. `We the poor'.			
Romania	Cluster 2: Urban regions	- formal: A geographical boundary cutting across administrative areas - functional: Coal Mining region - perceptual: from the beginning of mining the population was composed of the local people called "momârlani" and the population that came with the construction of the railway and industrial development of mining in the 60s in 19th century. Impoverished region and poor development region	most relevant would be the formal region in the sense that all the component cities of Jiu Valley should be united in a single administrative unit, in order to talk about the city of Jiu Valley instead of a region. In this way, the city would become more important for the West part of Romania and would gain more investments from a domestic and foreign dimension.	- Natives of Jiu Valley: Momârlani - but the distinction is no longer existent - Institutional government - Romanian and Austrian population (Barabel people) who were miners - Aging majority orthodox population - Jiu river inhabitants (i.e. Western and Eastern part) - researchers/students (Petroșani University)	They are aligned at a point when we speak about identity in Jiu Valley, but if we refer at a practice level of policies that can solve the problems from a governmental perspective, it is not really aligned.
Germany	Cluster 2: Urban regions	- formal: Not classified as a formal region, but there is some institutional cooperation. Rural region in Western Germany. Both cities are part of the largest metropolitan area in Germany. Regionalverband Ruhr is the local name given	Functional?	- Locals, but no strong difference between city and rural	Yes

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		- functional: Duisburg is identified by key industries; Essen is for service industries. - perceptual: Perceptual region is identified as the myth of Ruhr, related to the heritage of coal and steel, hard work and solidarity, coexistence of different cultures, large, immigrated population, local football culture and a particular football culture - Boundaries are more fluid			
Mexico	Cluster 2: Urban regions	*Was not presented*	*Was not presented*	*Was not presented*	*Was not presented*
Greenland 1 **(Uranium mining)**	Cluster 2: Urban regions	- formal: municipal boundary of Narsaq which was defined by sheep farming. South-Western Greenland, part of main South Greenland municipality - functional: region because of hydropower energy, and is known the food chamber of	Perceptual	- Sheep farmers - Narsaq Cowboys – residents of Narsaq who are considered more unconventional and also related to sheep farming	The formal regions were defined based on historic events such as the municipalities formation

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		Greenland (vegetable and fish farming) -perceptual: Different competing perceptions of uranium mining – deteriorating vs. improving. Some common cultural characteristics, which date back to history.			
Italy 2 **(Sardinia)**	Cluster 2: Urban regions	- formal: - functional: where different functions (like education and coal mining) connect differentiate regions in Sardinia - perceptual: Northern part is seen as a touristic region and Southern part is seen as a Bourgeoise region. Separation between Sardinians and the mainland Italy which is considered part of EU	functional region, perceptual region	- Sardinians - New generation classified as 'others'	Yes People from south Sardinia is seen as a colony of mainland Italy, but they resist it
Poland **(Upper Silesia)**	Cluster 2: Urban regions	- formal: Administrative region (voivodship). southern Poland, most industrialized region. - functional: Coal mines functionally linked to the	functional, perceptual	- Local community - Polish and German inhabitants	Yes because of plenty of coal mining activities are found in this area

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		region. Extensive trade route region- located in crossroads of trans-European transport corridors - perceptual: Coal is a very strong integral part of the regional heritage and culture.			
Austria	Cluster 3: Large-scale regions	- formal: administrative States: Upper Austria (large companies around Linz) and Lower Austria (South-eastern part) - functional: industry sectors - perceptual: Industry regions that provide economic opportunities for people. "Industry regions, not nice to live in"	- Functional perspective as the economic value of the industry is important for Austria as a whole - For people, the functionality (=industry) is positive as they benefit in terms of jobs, economic opportunities	- industry stakeholders in higher level positions - researchers perspective	- The functional dimension is important for transition in giving same economic perspective in scenario with climate neutrality compared to mainstream narrative
Czech Republic	Cluster 3: Large-scale regions	- formal: administrative units - functional: Flow of people working there. Polycentric, people commute to different cities	- Due statistical data availability for further research, the formal dimension most important		

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		- perceptual: strong regional identity formed in the socialist time and still have the image as a specific region (poor, lower educated, environmentally damaged)			
Bosnia and Herzegovina	Cluster 3: Large-scale regions	*Not present*	*Not present*	*Not present*	*Not present*
Greenland 2	Cluster 3: Large-scale regions	- formal: 5 hydropower plants in 5 regions, since 1993providing clean energy to six towns. region defined by the powerplant, search for regions with bigger potential for hydropower plants. - functional: places where the government invested. - perceptual: Perception has change since the 1980 where the focus was not on the ecological but the economical dimension. Today people also address climate change.	- perceptual: In the case studies the political narratives are analyzed hence focus on		

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Indonesia 2	Cluster 3: Large-scale regions	- formal: defined as a region - functional: much bigger since it is supplying many other regions with energy - perceptual: B. region highly influenced by its religion (perceptual region)	- functional	- mainstream stakeholders (mainly local govt influenced by national govt)	Yes. Banten (in the west of Java Island) is supplying the energy for many other regions including Bali province - B. region highly influenced by its religion (perceptual region)
Spain 2	Cluster 3: Large-scale regions	- formal: part of the Aragon community and a government defined region in connection to energy transition. - functional: big villages (less than 1000 people) and many micro-villages with just some houses. - perceptual: strong feeling of belonging to mining region but also feeling very abandoned from central government	- perceptual - no functionality (mining) in the region anymore		
Canada	*Not present*	*Not present*	*Not present*	*Not present*	*Not present*

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What difficulties did CS teams encounter in defining regions?

Cluster 1 (Islands/rural/isolated context regions)	Cluster 2 (Urban regions)	Cluster 3 (Large-scale regions)
Line between Functional and perceptual regions are blurry for Indonesia especially in defining boundaries	Defining perceptual boundaries with historical context is difficult because of how far back in time one should go to define them	Individuating the perceptual region
Identifying the shared identity between different regions	To observe how historical tipping events/legacies affected the outcomes regions today – if not, it should be ignored	Region definition depending on approach with possible conflicting results
Bangladesh energy transition main narrative is different because it focuses on sustainable development	Different actors will use different boundaries for different purposes, they are not fixed or more important universally.	historical attention from great importance in all methodologies
Pinpointing the different stakeholder perceptions in one region can be challenging	Identifying how the different functions of the boundary relate to the main narrative	functional definitions (flow of tourists, workers, money) also play important role
Distinguish between categorization of place and specific regions, or categorization of final different domain of life which has not to do with regional boundaries.	Locals differentiating perceptual boundaries – dependent on personal knowledge	
Perceptual and functional characteristics were most prominent, but Formal region neglected by small scale CS		
How to link the functional and perceptual characteristics of the region – focusing on how the elements of collective memory of the present can be embedded with the memory and aspiration of the communities		

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What differences in terms of region types did you identify between the case studies?

Cluster 1 (Islands/rural/isolated context regions)	Cluster 2 (Urban regions)	Cluster 3 (Large-scale regions)
Stakeholders have different perceptions dependent on identity type and where they come from	The regions were identified as formal regions in the past and most of them changed over time	Formal and functional regions are fixed and defined by statistical data
The differences between 'us' and 'them' is tricky because where them could be either locals from another city in the same region or tourists	Implication of choosing one regional type over the other in case studies and how the perceptual region will affect the tipping points in case studies	Each case study had different region types in terms of relevance depending on the different transdisciplinary focus of the study
Perceptual region is defined by the comparison that is based on place – the comparison is between the difference (in terms of development between different neighboring regions) and interdependence (economic activities and foreign activities in a region)	There is a risk over overlapping the issues of identities with boundaries, they are different things, e.g, us/them could be related to place (newcomers) but also related to other variables such as income -we need to be clear about the different criteria used to define them.	Historical context important for defining perceptual and functional region
	Build a matrix of all different boundaries and see in which situation they are aligned; when functional is aligned with place identity with historic; then understand the factors that support or hinder TPs, do they align or not; additive or negative interaction.	Banten province is more industrial with 20 power plant vs. touristic region
	Not all region types have spatial boundaries. No boundary is fixed, even geographical ones. Use boundaries for their own purposes	
	Different time dimensions should be considered together -it is possible to have nested identities in one region like different perceptual boundaries, or different functional boundaries	

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1.4 Final reflections

Plenary

- There is a risk of overlapping the issues of identities with boundaries, they are different things, e.g., us/them could be related to place (newcomers) but also related to other variables such as income – we need to be clear about the different criteria used to define them.
- Identify not only groups but also if distinction between groups can be tracked back to some typology of characterization;
- Distinguish between categorization of place and specific regions, or categorization of final different domain of life which has nothing to do with regional boundaries.
- We need to consider various factors together, to see how these factors at one point can / do trigger a disruption at one point in time.
- So, by defining the different boundaries we could define the different factors affecting identities.
- Different actors will use different boundaries for different purposes, they are not fixed or more important universally.
- The factors we will chose to define TP will depend on the why we define the region in the first place and may neglect other factors which can be crucial to explain TPs.
- No boundaries are fixed.
- Formal regions seem to be rather neglected by small scale CS;
- How to link functional (historical and infrastructural elements) and perceptual (collective memory, culture, aspirations) characteristics of a region could be an interesting question.
- Perceptual region is defined by comparison based on place/place identity: difference and interdependence. This is not static but always changing.

Open Discussion

- Formal and functional regions tend to be more ‘objective’, while the perceptual is about more subjective perceptions.
- All regions are understood as not fixed in time and dynamic. It is possible to have different perceptions of one region at the same time.
- Are formal and functional regions more inclined to be studied by quantitative methods and the perceptual by qualitative ones?
- The concept of region is developing. It is one of the basic concepts in geography. Originally, regions were objective phenomena. Just lately the region has been considered as a "social construction" and they are speaking about "perceptual regions". But even the perceptual regions can be studied by quantitative methods. For example, you can use questionnaire survey with combination with mental mapping for the delimitation of some region.
- Defining the region along formal lines does not imply that you study it only let’s say, with "formal statistics" or so.
- Functional and perceptual regions seem to be quite interlinked; the difference of the characterizations is difficult as region types are connected.
- Perception and acknowledgement of regions differ from formal and functional boundaries; one could perceptually identify a boundary even if there is no functional or formal difference.
- How defining the boundaries will help to identify tipping points?

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- Focus on identifying tipping points and we are already set out to look for them in certain types of regions (CCIRs), but in many cases the question of boundaries will not be the critical thing to investigate (see examples where boundaries were clear for all involved: conflicts within Northern Ireland, Upper Silesia and Jiu Valley in breakdown of Communism)
  In the first phases of the Integration Workshop we understand the context of tipping points by framing and by taking into account different perspectives on and perceptions of narratives, agents and regions that influence factors which affect change, before starting to identify tipping points. Moreover, transformative change might happen in a region defined differently from what you had in mind when you chose your case study region.
- Everybody already had a good reason in mind which region they wanted to study before knowing the details of human geography on definitions of regions, which are important but not essential to identifying tipping points. You can see a TP it might not change a lot how we look at regions, but the exercise is necessary for conceptual clarity.
- Focusing on one type of region makes one lose other narratives involved in a region. The factors we will chose to define TP will depend on the why we define the region in the first place and may neglect others factors which can be crucial to understand and explain other TPs.
- Need to look at the original regions system conditions in the first place before we look at how things change/d, and it's great we start with this. How do you see the role of Power in this fluid and strategic definition and use of both boundaries and identities?
- Power emerges in the negotiation and resistance towards boundaries that are proposed/imposed. Who has the right to impose? Who is trying to change boundaries? Who just passively accepts it?
- We should also keep in mind that CCIRs are being formally defined by the EU to provide just transition funding. EU policies perspective should also be included. It is an ongoing process to define the regions and also very political. One of the Spain CS (Balearic) is not defined as a CCIR. I have also the feelings that in some cases the boundaries are influenced by the industrial landscape and/or environmental impacts of (energy) facilities (visual, air, water pollution, etc.).
- Concrete examples are helpful to avoid misunderstandings. For example, Lusatia in Germany is a myth – it is a disappearing region (which is a tipping point) in a formal and functional sense which makes it impossible to govern or strategize upon. We are interested in the causal mechanisms involved in (especially positive) tipping points, to do this we have to pay attention to the complexity of the concepts of regions, but it is useful to focus on concrete examples. Also, new regions might emerge.
- This workshops session has been more than an exercise, it will expand the way we are looking at narratives and regions and how they change.

1.5 Next steps

CS leaders can reach out to WP1 & WP2 leaders for questions about regions.
Parts 3 and 4 for the 2nd Integration Workshop will continue on 15 and 22 of June.

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1.6 Attendance list

First Name	Last Name	Affiliation	Case Study/T+ group
Alexandros	Flamos	UPRC	Greece
Amanda	Martinez Reyez	TUD	CS Leader
Andrei	Taranu	SNSPA	Romania
Anne	Merrild Hansen	AAU	Greenland
Antoine	Mandel	EEP PSE	WP4
Arpad	Todor	SNSPA	Romania
Baiba	Baltvilka	IBS	Poland
Bohumil	Frantal	PUO	Czech
Carlo	Jaeger	GCF	WP7
Christina	Costa Salavedra	EcoU	Spain
Cynthia	Ismail	su-re.Co	Indonesia
David	Tàbara	GCF	WP7
Diana	Mangalagiu	GCF	WP7
Dimitra	Aglamisi	UPRC	Greece
Fabian	Peri Wiropranoto	su-re.Co	Indonesia
Franziscka	Mey	IASS	Germany
Fulvio	Biddau	UR	Italy
Jan	Frankowski	IBS	Poland
Jan	Witajewski	?	?
Jeremie	Fosse	EcoU	Spain
Jindrich	Frajer	PUO	Czech
Joanna	Mazurkiewicz	IBS	Poland
Jonas	Teitge	GCF	WP8
Konstantin	Winter	GCF	WP8
Laia	Segura	EcoU	Spain
Marcel	Endres	GCF	WP8
Mauro	Sarrica	UR	Italy
Nihit	Goyal	TUD	CS Leader
Nikos	Kleanthis	UPRC	Greece
Rafia	Zaman	UG	Austria
Raphaela	Maier	UG	Austria
Regine	Møller	AAU	Greenland
Robert	Udrea	SNSPA	Romania
Saptorshee	Chakraborty	EEP PSE	WP4
Siti	Indriani	su-re.Co	Indonesia
Stanislav	Martinat	PUO	Czech

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Takeshi	Takama	su-re.Co	Indonesia
Valentina	Rizzoli	UR	Italy
Yvonne	Mutua	GCF	WP8
Zois	Katiforis	UPRC	Greece

1.7 Additional information

Feel free to contact any of us for questions, suggestions, or comments.
Diana Mangalagiu (diana.mangalagiu@ouce.ox.ac.uk), Amanda Martinez Reyes (a.martinezreyes@tudelft.nl), Jenny Lieu (j.lieu-1@tudelft.nl).

1.8 Annex

You can find the case study presentations and the Padlet reports from the 3 breakout groups here https://www.dropbox.com/home/H2020 Tipping+/2 Work Packages/WP7 Integration, synthesis (GCF)/Second Integration Workshop files - April-June 2021/Phase 2-Characterizing regions

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9.2 Annex: Reports of the Second Integration Workshop

9.2.3 Phase 3

IDENTIFYING ALTERNATIVE NARRATIVES: SECOND INTEGRATION WORKSHOP 3/4

Date:	June 15th, 2021
Time:	15:00 - 17:00 h
Facilitation team:	4 breakout room facilitators: Raphaela Maier, Luis Virla, Cynthia Ismail, Franziska Mey // Technical support (GCF), Note-taker for BoGs and Plenary (GCF)
Presenters:	Luis Virla, Diana Mangalagiu, Jenny Lieu and Amanda Martinez Reyes
Participants	See Attendance List at the end of this document

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Agenda: Identifying Alternative narratives (part 3/4)

Time	Activities	Moderation
15:05 - 15:10	Welcoming, goal of workshop and agenda	Amanda, Diana
15:10 - 15:20	Goal of narratives Introducing the three types of alternative narratives with the Canadian case study Confirming the clusters and case studies Key questions Discussing the key questions in plenary	Amanda, Luis
15:20 - 16:00	Break-out group sessions (BoG) Discussing the alternative narrative types by reflecting on the mainstream narratives and region types	Franziska, Raphaela, Cynthia and Luis
16:00 - 16:05	Break	
16:05 – 17:00	Debriefing (plenary) Next steps	Franziska, Raphaela, Cynthia, Luis and Jenny

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Introduction

The aim of the workshop is to identify the alternative narratives in case studies (CS). After drafting the mainstream narratives, we search for narratives that deviate from the mainstream by applying the same three core components from the CS Guidance: technologies, stakeholders, ideologies and institutions as well as policies.

The alternative narrative(s) answer(s) the questions:
Where do stakeholders want the region to go from here?

These alternative narratives can provide us indications of changes or transitions that can potentially lead to a transformation.

The ***on-stream*** pathway can promote new low carbon technologies but **under the 'same' system**. They exist only in a special space within the mainstream pathway but do not challenge the current norms or the rules of the game. This might include carbon capture and storage technologies that support negative emissions but does not challenge the fossil fuel norms as they are added on technologies that could help fossil fuel companies continue to exist. Renewable energy technologies might so receive some subsidies but continue to operate within the existing energy system norms (e.g., with fossil fuel subsidies and within the centralised energy systems).

Policies and support mechanisms in the on-stream pathway can promote equal treatment (i.e., equal opportunity policies) of different technologies or gender perspectives. While the largely mainstream perspectives continue to be accepted, alternative technologies or gender perspectives are viewed as equally valid. However, the dominant pathway is not fundamentally questioned, and the underrepresented perspective only exists in special spaces **without challenging the underlying power dynamics** that keep the mainstream energy system in place.

The ***off-stream*** pathway refers to alternative perspectives that **depart from** the mainstream perspective and **challenges** the mainstream pathway. The narrators are often those stakeholders or institutions who are on the fringes of power in society, the economy and politics. Their narratives can challenge the very power dynamics of the mainstream narratives and narrators. Policies within the off-stream pathway promote **low-carbon innovations in a dedicated space** that is separate from mainstream technologies. Policies help to create protective spaces for low-carbon technologies, which exist outside the mainstream energy system. For instance, low carbon technologies may require new infrastructure to be built outside the existing infrastructure. These technologies may be supported through special incentives, programmes, and subsidies. In the off-stream pathway off-stream stakeholders may bring in new values and norms that challenge the mainstream power dynamics and (social) norms. The off-stream perspectives are viewed as distinct perspectives that do not reinforce the mainstream pathway. On the contrary, synergies of low carbon technologies

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supporting alternative narratives may emerge in an equality (gender) sensitive, off-stream energy transition.

Within the alternative narratives we explore the same four areas as the mainstream narrative of **technologies, ideologies, social-political and economic institutions, policies and other contextual factors and events.**

Transformative-stream narratives

Based on the alternative narratives, we identify those that have potential for transformative changes.

Transformative pathways involve a radical technological, social and/or policy change, on how individuals interact with their biophysical systems and the representation of diverse stakeholders and their perspectives that challenges the CCIRs mainstream pathways, its power dynamics and becomes the new norm. This new mainstream pathway no longer resembles the previous dominant pathway. A transformation may occur as a result of on- and/or off-stream pathways leading to a future where different stakeholders are part of the decision-making processes. Transformation pathways are supported by a mix of stakeholder groups, policies and/or technologies that lead to a **radically changed energy system** dominated by low-carbon energy. The transformation process changes the power dynamics of the previous mainstream pathway and includes groups previously marginalized. However, we also need to be mindful of how stakeholders can be further marginalised through a transition (see Sovacool et al, 2021). Transformative pathways also consider broadening the discussion of equality and gender beyond women by including gender with other intersecting social identities.

*The following figure summarises the different narratives that will be discussed above: **mainstream CCIR narrative** and **alternative narratives** that depart from the mainstream, consisting of on-stream and off-stream narratives that potentially could lead to a **transformation** pathway.*

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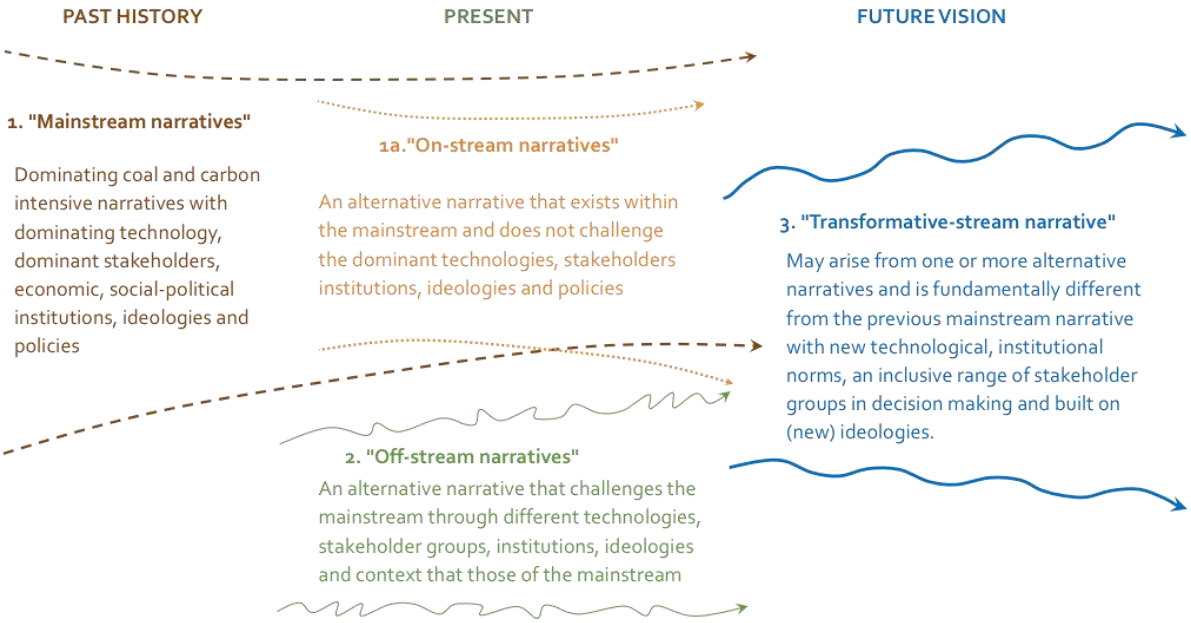
Figure 1: Mainstream and Alternative Narrative Framework



There are several streams of literature that have contributed to this framing: social ecological tipping points (Tàbara et al., 2018, p 120); Innovation literature techno-economic paradigm shifts (Freeman and Perez, 1986); social technological transition through policy perspective (Kemp, 1994; Grin et al., 2010; Kern and Smith, 2008;) and agency (Smith and Sterling, 2005); gender in Political Theory (Squires, 1999) and gender mainstreaming (Walby, 2005); political and economic evolutions (Sherman, 2021).

Table 1: Summary of traits of case study regions and perspectives for alternative pathway narratives

Components of the alternative narrative	**Identify key traits and key indicators for each component noting the *size (where?), time (when?), and level (what meaning?) scale* where relevant**
1. **Technology**	Description & indicators:
	Level. What types of technological sectors promote alternative pathways in the region? Size. Where have these technological sectors been located? Time. How long have these sectors been present or when are they expected to emerge?
II. Stakeholders	Description & indicators:
	Level. What types of stakeholders (including stakeholders' groups) have been the alternative voice(s) in the region? Size. Where have the roles of these stakeholders been located? Time. How long have these stakeholders been present?
III. Institutions	Description & indicators:

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	Level. What types of institutions have been supporting the alternative voice(s) in the region? Size. Where have these institutions been located? Time. How long have these institutions been supporting the alternative voice(s)?
IV. Ideologies	Description & indicators:
	Level. What types of ideologies do the alternative voice(s) in the region have? Size. Where have been these ideologies spread? Time. How long have the alternative voice(s) been identified with these ideologies?
V. Policies	Description & indicators:
	Level. What types of policies have been supporting the alternative voice(s) in the region? Size. Where have these policies been implemented? Time. How long have these policies been supporting the alternative voice(s)?
Other contextual factors	Description & indicators:
	Level. What types of [contextual factor] have been supporting the alternative voice(s) in the region? Size. Where have these [contextual factor] been located? Time. How long have these [contextual factor] been supporting the alternative voice(s)?

Example Box 1: Ready to say goodbye to the Oil Sands? Facing the need of economic diversification in Alberta, Canada

Mainstream narrative: The world has a demand for Canadian oil and gas, which has a reputation for being produced in a cleaner way by a country with strong ethical principles and democratic institutions. This justifies producing more oil and gas in Canada.

On-stream narratives: The Alberta regional government aims to maintain the fossil fuels sector because of economic advantages; also they plan to increase the production of Blue Hydrogen with CCS technology (carbon-capture storage) for cleaner energy and decreased emissions. The five largest oil companies in Alberta came together and aim to transform the fossil fuel sector into a Net-Zero pathway by 2050.

Off-stream narrative: Complete shut-down of oils sands, because it is the largest source of GHG emissions in Canada. There is resistance against the off-stream narratives from indigenous groups, policy makers and citizens who believe it is a 'crazy idea' and not feasible to shut the oil sands down.

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CASE STUDY CLUSTER SUGGESTIONS – PHASE 3: ALTERNATIVE NARRATIVES

1. Austrian CS (Raphaela)	2. Canadian CS (Luis)	3. Indonesian CS (Cynthia)	4. German CS (Franziska)
Greece (Megalopolis)	Spain 2 (Aragon-Teruel)	Norway 1 (LoVeSe)	Spain 1 (Balearic Islands)
Bosnia and Herzegovina	Czech Republic 2 (South-Moravian Region)	Italy 1(Sulcis)	Poland (Upper Silesia)
Czech Republic 1 (Moravian-Silesian Region)	Romania (Jiu Valley)	Mexico (Tijuana-San Diego)	Greenland (RES & Uranium mining)
			Bangladesh (Solar rural)

 # The discussions in the Break-out-Groups have been captured on 'Padlets'.

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Defining the alternative narratives

CS REGION	CLUSTER	WHAT ALTERNATIVE NARRATIVES WERE IDENTIFIED?	WHICH HISTORICALLY UNDERREPRESENTED STAKEHOLDERS WERE IDENTIFIED?
Austria	Cluster 1	On-stream narratives: 1. Green Hydrogen: How heavy industrial clusters (e.g. cement, steel) can achieve decarbonisation & what tipping interventions are needed. The technology for that is known, but enabling institutional issues are not known or assumed that they don't need to change so much. An appropriate policy bundle is needed. 2. Industrial circular economy which entails getting rid of perverse subsidies through CCS technologies. Off-Stream narrative: None was identified so far in Austria.	
Greece (Megalopolis)	Cluster 1	On-stream narratives: Economic diversification made up of four components which are: Gas (seen as clean energy) + small industries + 'smart agriculture' + Sustainable Tourism Off-stream narratives: Small-scale projects & strategies because of the perception that 'small is beautiful'. This entails social innovations.	Local communities, small business CSOs, new/green/digitalised economic actors in livestock production, agriculture and tourism
Bosnia and Herzegovina	Cluster 1	*Not present*	*Not present*

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Czech Republic 1 (Moravian-Silesian Region)	Cluster 1	On-stream narratives: 1. Focusing on large projects for circular economy. Small projects are not attractive in these mining regions because the tradition that 'big is good' still entrenched. Diversification is also part of the discussion, but 'big investors' are still expected ('Waiting for Godot Syndrome'). 2. Smart cities are considered but the key question is, what to do with the mining infrastructure once they are close? Currently, they have no use.	
Canada	Cluster 2	On-Stream narratives: 1. Net-zero alliance within the oil sands heavily reliant on CCS 2. A new hydrogen economy for clean energy Off-Stream narrative: Complete shutdown of oil sands industry	Indigenous communities, O&G workers and Women
Spain 2 (Teruel)	Cluster 2	On-Stream narrative: Extending renewables like solar and hydrogen as replacement for the shutdown power plant. Off-Stream narrative: Locals have a low entrepreneur mentality and the area has few smaller and medium size companies. Creating more of these companies could be an option to overcome the old dependency on one big company.	Young generation
Romania	Cluster 2	On-stream narrative: Re-training former miners with knowledge and skills needed in the new renewable energy sector in form of a cooperation of companies and government. Off-stream narrative: Chance of shifting into tourism, due to many tourist attractions.	Government, who still has not set a deadline on mining activities
Indonesia	Cluster 3	On-stream narratives: Gas, Biomass, Biodiesel, CCT (clean coal technologies) energy – perceived as cleaner than fossil fuels	The line to differentiate between mainstream and alternative narrative

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		On-stream stakeholders: manufacturing industries, Bali energy of agency Off-stream narratives: Wind, hydro, geothermal and solar energy	stakeholders is vague. The mainstream narrative actors also support off-stream technologies.
Italy 1 (Sulcis)	Cluster 3	On-stream narratives: Centralized and business as usual & energy mix: clean coal and CCS, island methanization, postpone phase out for energy security, and replacing coal-based generation with large scale RE technologies (centralized and private infrastructure) Off-stream narratives: renewable energy strategy focusing on self-sufficient energy, distributed energy generation, environmental restoration, public ownership or public benefits.	Municipalities and grassroots organizations (Community activist groups)
Mexico (Tijuana-San Diego)	Cluster 3	On-stream narrative: supporting energy demand and renewable energies in local communities. The national government supports centralized energy systems and would like to match renewable energies with local needs (e.g. cooking in rural areas). Off-stream narrative: not yet identified	Indigenous groups are against fossil fuels and no local groups support renewables (so far)
Germany	Cluster 4	On-stream narrative: a need to continue the coal extraction at the small scale (because of the energy security), as it is safe and important from the economic side (export of German technologies). Off-stream narratives: 1.Complete coal and nuclear phase-out is a must and the future should be based on the developing community- owned renewable energy installations. 2. Local off-stream narrative: thinking about hydrogen and logistics (Duisburg)	Coal miners, in the case of shaping future narratives about the region.

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Greenland 1 **(RES & Uranium mining)**	Cluster 4	On-stream narratives: the further development of hydro power plants and gas to some extent (top-down, steered by the government) Off-stream narratives: implementation of PV/wind power instead (as the more cost-effective and engaging solutions and oil prices are unstable); more bottom-up narrative	Younger generation, who are less concerned with technical aspects of energy transition and more vocal about the environmental aspects of going green.
Spain 1 (Balearic Islands)	Cluster 4	On-stream narratives: Fossil fuel phase-out as soon as possible; new efficient, renewable energy system shall be implemented instead. Although there exist different narratives in Majorka/Minorka/Ibiza and Formentera, the general consensus supports the fossil fuel phase-out, but the clue is in the implementation details. Off-stream narratives: NGOs and local groups oppose implementation of any installations by large companies.	
Poland **(Upper Silesia)**	Cluster 4	On-stream narratives: "clean coal" narrative. it is important from the point of using existing industrial potential in the region, maintain coal extraction to some extent. Arguments such as energy security and economic patriotism still prevail. Off-stream narratives: coal phase-out narrative. It is necessary not only from the perspective of climate change mitigation, but also to transform the outdated regional economy, promote healthier/living conditions, jobs in more promising industries and avoid the consequences of mining extraction for the local communities such as mining damages.	NGOs, younger generation, citizens of mining municipalities who are not connected to the mining sector.
Bangladesh	Cluster 4	On-stream narratives: building a grid to ensure the energy access to all rural communities (on grid electrification, dependent on fossil fuels, LNG, clean coal etc)	Farmers on the rural area without electricity access

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		Off-stream narratives: off-grid solar systems to replace traditional technologies and empower farmers.	

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Which difficulties or learning effects arose in defining alternative narratives?

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Not mentioned.	Differences in whether the tipping point has already occurred or is yet to come make it more complicated to identify them.	Both on-stream and off-stream narrative are not static but evolve with time, which can make it more challenging to identify them.	Alternative and transformative narratives were not so easy to distinguish.

What similarities or differences exist between CS in terms of alternative narratives?

Cluster 1	Cluster 2	Cluster 3	Cluster 4
In Austria collaboration between big firms would be needed, in the Greek case studies social innovations (e.g. energy communities) are central.	The temporal differences are important. In Canada the transition has not yet happened but is debated now, whereas in Spain and Romania it already took place and is now dealt with.	Local needs in politics and involvement. In Indonesia and Mexico, the energy mix cannot be fully renewable due to high demand. Locals and NGOs play an important role and become an important group. The question is how these narratives altered and how subjectivity does influence the data.	The CS show similarities in their On-Stream narrative regarding the relation of security and energy. Some studies like the Bangladeshi one, focus more on questions about the implementation e.g. on- vs. off-grid approach.

What additional points were made in the clusters?

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Cluster 1	Cluster 2	Cluster 3	Cluster 4
Large scale vs. small scale investments and can have a different influence on the transformation. For example, Czech stakeholders believe that large scale investors can save their region because general society lacks the capacity needed. Larger investments also help to create more publicity.	Finding out what led to the changes that occurred and what did not change (maybe a reason for the present problem) can help to think about possible ways to ensure a just transition for other regions in the future.	How can a narrative be created that includes all different voices and ensure an inclusive transition? Does it make sense to just ignore the On-Stream and push the Off-Stream?	*No other additional points.*

Final reflections in Plenary

Migration and different power of the stakeholder groups:

- Antoine:
  - People who already left an area are absent from the narrative. Narratives can focus on *people* or *places*. Most policies we are talking about are focused on places. The people might not be tied to a geographical dimension. The possibility of migration hence might also be debatable.[1]
- Luis:
  - On the other hand, there are for instance the Indigenous people in Canada with a deep relationship with the land and a close connection to the place. This would make it harder for them to migrate because they lose parts their identity. Some people only came because of the oil sands, they could also very easily leave again.
- Franziska
  - Other marginalized groups like coal workers in Germany have not been involved in shaping or contributing to the new narratives as their political power faded away. This political power dimension also makes a big difference in the creation of narratives.

[1] From Chat:

J David Tàbara: @Antoine: I like this idea that the absent are those who have already gone… but how 'absent' are they, as some younger generations return (e.g., who have been trained abroad or away from those regions) can also be a source transformative change. Great topic indeed.

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- Raphaela:
    - In Greece there is a shift regarding the mainstream stakeholders: from larger to locals. The question is if this has the potential to make the region livable in giving the local population a purpose, with a local involvement in reshaping their region.
- Diana:
    - There is a connection between the mainstream narrative and regional definition. Mainstream narratives are also existing in "good" just transition. Migration could be another important dimension connected to tipping points.[23]

Change induced from On-Stream narrative – from sectorial to systemic transformation:

- Jenny:
    - It may be even possible to create a useful positive tipping point with On-Stream narrative. Car producers are for example still in a powerful position and might follow the On-Stream narrative. The definition of the mainstream narrative is important because it interacts with the alternative narrative. One can lead to the other and there might be a combination of On- and Off-Stream narratives and in that way the alternative narratives can potentially help creating new On-Stream narratives.
- David:
    - The different narratives have different references regarding their scope, e.g., from sectoral transition or full-regional transformations - this could be mapped out in different scenarios.

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[2] From Chat:

Nihit Goyal: This discussion seems to highlight the relevance of the definition(s) of region in the narratives. For instance, those who identify the region as an economic region might be more willing to migrate while those who identify with the perceptual region might be less inclined to do so.

J David Tàbara: @Nihit -agree, it may be even possible to create a useful typology on this, which may be able to help us explaining TPs.

Luis D. Virla: Agree. I think about refugees who left their region by force. If you left family behind and recovery programs are in place could be influential forces along with international NGOs

[3] Takeshi Takama: I worked on migration issues on vulnerability on climate change in South Africa at the mining sector for 5 years. There migrants working at a mining is strong and local resident are more vulnerable because mining taking resources and not giving to locals. In contrast, when I worked on migration in Bali on climate change on rice farmers. Migrants are more vulnerable because they cannot access to good water and land. migrants do not have a power. In Bali, local was stronger. I found these opposite situations interesting.

J David Tàbara: very interesting Tak - and in particular the asymmetric relationships between energy-production migration and vulnerability -as T+ is also about resilience SD strategies

Anne Merrild: Great and interesting observation Takeshi Takama. Local contexts may promote different migration scenarios and different allocations of benefits and risks btw locals and migrants

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    - In Austria we are looking at a sectorial transition whereas in Greek it is about a full regional transformation. The scope of the different narratives is different. Coal to electric mobility is rather smaller in scope.
- Franziska:
    - There is an important role in the element of time, also for the mainstream narrative. It evolves and different aspects are changing with time, which can make it also harder to identify.
- Raphaela:
    - There are mechanisms how the on-stream narrative can lead to change. In the Austrian case, there is a new technology as an innovation driver that has huge saving potential. Because the transformation needed is not so deep, it will be easier to achieve. That transformation of one sector triggers a lot of side effects in the whole economy and other sectors. Despite following the mainstream narrative this can create a possible tipping point in the near future.
- Diana:
    - We have seen this kind of developments in the past already. Ørsted's renewable transition for example challenged large European players and created a dynamic, that led to big shipping companies like Merck changing their behavior and business model.[4]

- Jenny final remarks:
    - We started with mainstream narratives (based on energy carriers, economic security, etc.) for each region to set a baseline.
    - It was important to note that they differ not only in the content, but also in the temporal dimension. Some energy transitions are already underway and others yet to start.
    - Especially for alternative narratives, it also turned out to be important to think about the power dynamics.
    - On-Stream narratives tend to be dominated by big companies or governments and those stakeholders with huge power, and it is often that they might not contribute to green transition pathways.
    - Off-Stream narratives on the other hand, come often from small scale clusters with lower power dynamics, like the local population, who represent the voices of those living on the land (e.g. migrants and locals). They support off-grid infrastructure scales as opposed to on-grid scales on government levels.[5]

[4] J David Tàbara: v. nice Diana, indeed it may be well the case that an original envisioned sectorial transformation may lead to a full-regional transformation.

[5] Luis D. Virla: Off-stream narratives may seem "extreme" to some since really challenges the mainstream. Some would say extremes can't be achieved, but it could drive a new transformative narrative that offers a solution in between extremes

Anne Merrild: Interesting to look into who wins and who loses from different alternative narratives - transformational justice

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- It is also important to note that groups from similar power dynamics could be heterogenous.
- Alternative narratives can provide hints to identify transformations, but there is not only a single standard of what transformations look like. It can come from different sources like a sectorial transformation, from governmental level, new business models arising from new technologies or new groups coming into place.

Next steps

- Alternative narratives that focus on regions can be linked to identity, utility or economy and creation of this typology would be helpful and assist in region definition.
- CS leads should think about where the transformations come from, as it was observed that there are different scales (e.g. sectoral transformation or whole systems' transformation). It would be helpful to understand any tensions between regional and national governance in a certain region.
- CS leads should also note the importance of identifying or highlighting the absence of narratives, as it is possible that not every CS may have combination of off- or on-stream narratives.
- The next and final workshop will take place on Tuesday June 22nd, which will focus on identifying synergies between case studies and work packages. It will provide more insights on transformations and tipping points.
- CS leads have different frameworks and methods and should try to identify synergies with other case studies. They do not have to follow a 'forced' framework, but rather, share how they analyze the identified narratives and also then identify the potential for transformations.
- The Transformations 2021 Conference starts on June 18th and recordings will be available online for the TIPPING+ consortium.

Attendance list

First Name	Last Name	Affiliation	Case Study/T+ group
Amanda	Ramadhani	su-re.Co	Indonesia
Amanda	Martinez Reyez	TUD	WP5
Andrei	Taranu	SNSPA	Romania
Anne	Merrild Hansen	AAU	Greenland
Antoine	Mandel	EEP PSE	WP4

Nihit Goyal: While thinking about variations in onstream/offstream narratives and about transformations, it might also be useful to think about the broader state-society relationship (for example, liberal democracy, illiberal democracy, autocracy, and so on…) in different cases.

Bangladesh_Rafia: Also, inclusive liberalism.... to be enlisted

Diana MANGALAGIU: Absolutely Nihit, indeed this is very important as most studies are looking at liberal democracies

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Carlo	Jaeger	GCF	WP8
Christina	Costa Salavedra	EcoU	Spain
Cynthia	Ismail	su-re.Co	Indonesia
David	Tàbara	GCF	WP8
Diana	Mangalagiu	GCF	WP7
Dimitra	Aglamisi	UPRC	Greece
Fabian	Peri Wiropranoto	su-re.Co	Indonesia
Franziscka	Mey	IASS	Germany
Fulvio	Biddau	UR	Italy
Jan	Frankowski	IBS	Poland
Jenny	Lieu	TUD	WP5
Joanna	Mazurkiewicz	IBS	Poland
Jonas	Teitge	GCF	WP8
Konstantin	Winter	GCF	WP8
Laia	Segura	EcoU	Spain
Marcel	Endres	GCF	WP8
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Rafia	Zaman	UG	Austria
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Yvonne	Mutua	GCF	WP8
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Additional information

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Annex

You can find the Padlet reports from the 3 breakout groups here

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9.2 Annex: Reports of the Second Integration Workshop

9.2.4 Phase 4

IDENTIFYING TRANSFORMATIVE NARRATIVES AND SYNERGIES BETWEEN CSs AND WPs: INTEGRATION WORKSHOP 4/4

Date:	June 22nd, 2021
Time:	15:00 - 17:00 h
Facilitation team:	4 breakout room facilitators: Franziska Mey, Nihit Goyal, Baiba Baltvilka, Mauro Sarrica // Technical support (GCF), Note-taker for BoGs and Plenary (GCF)
Presenters:	Franziska Mey, Nihit Goyal, Amanda Martinez Reyes, Diana Mangalagiu and Jenny Lieu
Participants:	See Attendance List at the end of this document

The TIPPING.plus project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 884565.

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Annex 23

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1.1 Agenda: Identifying Transformative narratives and synergies between case studies and work packages (part 4/4)

Time	Activities	Moderation
15:05 - 15:10	Welcome, goal of the workshop and agenda	Amanda, Diana
15:10 - 15:30	Confirming the clusters and case studies	Amanda
	Reflection on narratives and their connection with SETPs	Nihit
	Introducing transformative narrative(s) with the German case study	Franziska
	Discussing the key questions in plenary	
15:30 - 16:10	Discussing the transformative capacities and reflecting on the narratives	Teams
	(breakout rooms)	
16:10 – 17:00	Debriefing (plenary)	Early-career researchers
	Next steps	Jenny

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1.2 Introduction

The aim of the workshop is identifying synergies between Case Studies and Work packages.

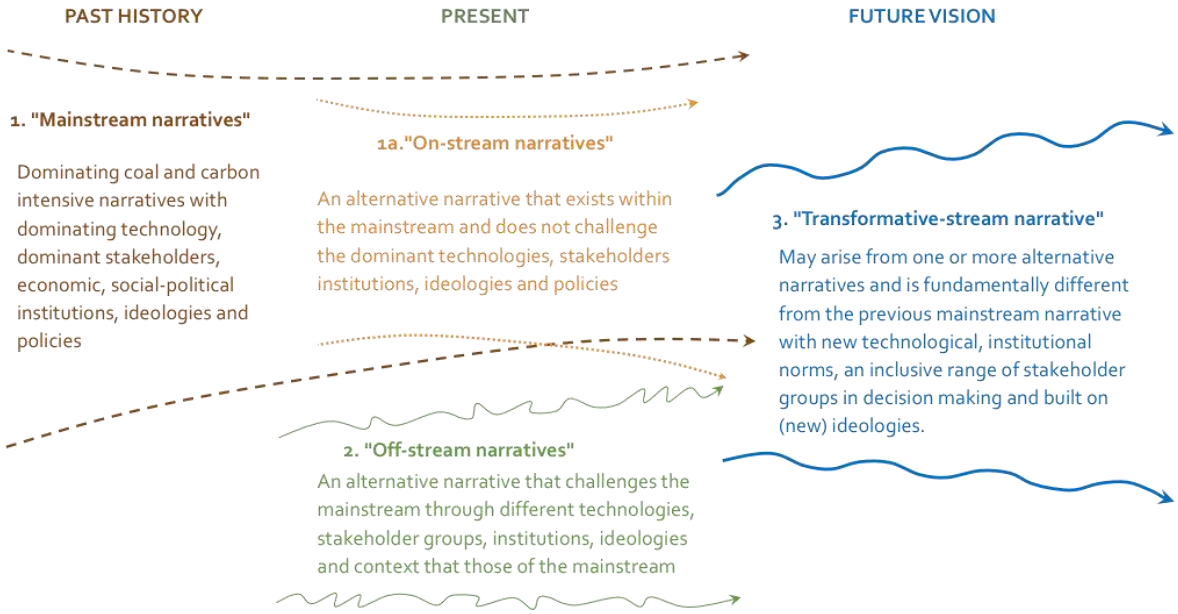
Transformative-stream narratives

Based on the alternative narratives, we identify those that have potential for transformative changes.

Transformative pathways involve a radical technological, social and/or policy change, on how individuals interact with their biophysical systems and the representation of diverse stakeholders and their perspectives that challenges the CCIRs mainstream pathways, its power dynamics and becomes the new norm. This new mainstream pathway no longer resembles the previous dominant pathway. A transformation may occur as a result of on- and/or off-stream pathways leading to a future where different stakeholders are part of the decision-making processes. Transformation pathways are supported by a mix of stakeholder groups, policies and/or technologies that lead to a **radically changed energy system** dominated by low-carbon energy. The transformation process changes the power dynamics of the previous mainstream pathway and includes groups previously marginalized. However, we also need to be mindful of how stakeholders can be further marginalised through a transition (see Sovacool et al, 2021). Transformative pathways also consider broadening the discussion of equality and gender beyond women by including gender with other intersecting social identities.

*The following figure summarises the different narratives that will be discussed above: **mainstream CCIR narrative** and **alternative narratives** that depart from the mainstream, consisting of on-stream and off-stream narratives that potentially could lead to a **transformation** pathway.*

Figure 1: Mainstream and Alternative Narrative Framework



Identifying transformative narratives and synergies between CSs and WPs

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– Presentation by Nihit Goyal (TU Delft)

Case studies started with identifying the mainstream narratives and different regions. Then they identified the alternative narratives, which were divided into on-and off-stream narratives, where possible. The language used by all CS is similar, which helps to look across cases for synergies.

To reflect on and identify transformative capacities, it is important to distinguish narratives in each region. Questions to ask include:

- Change in what?
- In which direction?
- In what order?
- To what extent?

Figure 2 introduces an illustrative two-dimensional matrix to think about capacities which include: the type of capacity and the level of operations. Three different types of capacities were identified, and they are:

1. Political capacity: capacity to change values in a system, to legitimize or delegitimize technologies, institutions etc.
2. Analytical capacity: capacity to process information, to analyze and so on.
3. Operational capacity: capacity to organize resources in a productive manner to produce outcomes.

For each of the capacities, the next level would be the levels of operations. These could be individual levels, organizational levels or systemic levels.

Figure 2: Thinking about Capacities

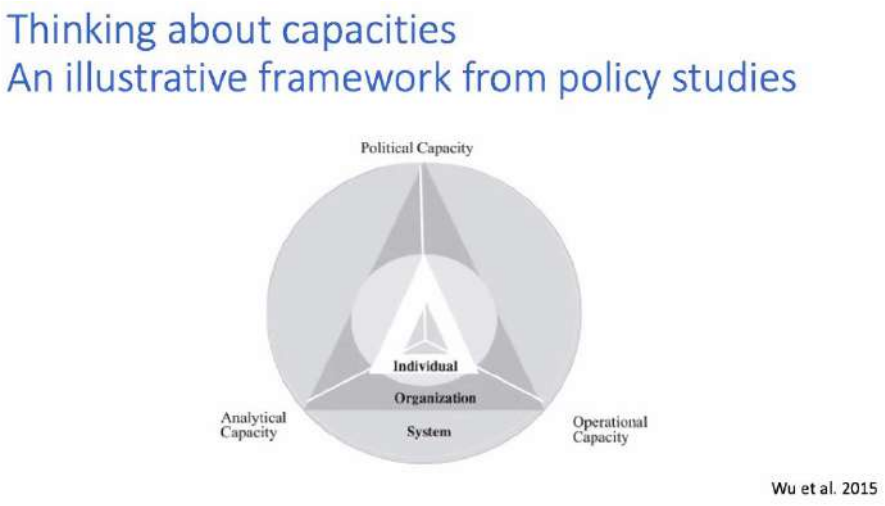

Figure 3 introduces four ways to think about outcomes. The framework is from McConell et al. 2020 and was presented for applicability to develop transformative narratives across case studies. These outcomes could be:

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1. Process: ethics, energy justice, etc.
2. Programs: more substantive outcomes from ground
3. Politics: power relations between different stakeholder groups
4. Time: whether the outcomes last or are short lived

One could use these outcomes to see a relation between outcomes and tipping points. It could be repeated for different stakeholder groups.

Figure 3: An illustrative framework from policy studies

What is success?
An illustrative framework from policy studies

Realm	Core issue	Success measures for any actor	Degree of actor success		
			High	Medium	Low
Policy Making Process	The ability of an individual, group, institution, network or community to shape and steer the direction of the policy development process	Degree of control over problem construction			
		Degree of control over format of policy development			
		Degree of control over final decision			
		Degree of actor ability to shape legitimacy of policy development			
Program	The congruence between a program and the actor's goals or expectations	Degree to which program outputs match the aims of the actor			
		Degree to which program outcomes match the aims of the actor			
Politics	The political benefits of the policy or program	Degree to which the policy enhances the actor's reputation			
		Degree to which the policy enables the actor to control the short-term agenda on this issue			
		Degree to which the policy enables the actor to control the long-term agenda on this issue			
Time	The sustainability of policy benefits	Degree to which the policy benefits (process, program, politics) for the actor are sustainable over time			

McConnell et al. 2020

Example Box 1: Transformative Narrative in Essen?

The Ruhr region, of which the city of Essen is part, started off with a symbolic mainstream narrative. This was because of the unprecedented rise of Germany after WWII, which would have not been possible without coal. It was the fuel for the reconstruction and the economic miracle in the young BRD. The largest mine in Essen, *Zeche Zollverein,* was in the past seen as the "Cathedral of industry culture".

As seen in Annex (2), the narrative development in Essen evolved over the years. From the formation of the mine until the 1960s, coal and steel were seen as fuel for national economic success. It was in 1986, when

CASE STUDY CLUSTER SUGGESTIONS – PHASE 4: TRANSFORMATIVE CAPACITIES

1. Economic diversity/energy mix By Nihit	2.Community energy/Social Innovation By Franziska	3. Tourism/Migration By Mauro	4. Economic diversity /energy mix By Baiba
Czech Republic 1 (Moravian-Silesian Region)	Germany (Essen)	Italy 1(Sulcis)	Poland (Upper Silesia)
Greenland (RES & Uranium mining)	Greece (Megalopolis)	Spain 1 (Balearic Islands)	Canada (Alberta)
Indonesia 1 (country-level/ and rural)	Spain 2 (Aragon-Teruel)	Mexico (Tijuana-San Diego)	Indonesia 2 (country-level/ and rural)
Austria ()	Italy 1(Sulcis)	Romania (Jiu Valley)	Norway 1 (LoVeSe)
Greece (Megalopolis)			Bosnia and Herzegovina

 # The discussions in the Break-out-Groups have been captured on 'Padlets'.

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1.3 Identifying Transformative narratives and synergies between case studies and work packages

CS REGION	**CLUSTER**	**AT WHAT STAGE** (E.G. PEAK OR DECLINE OF THE MAINSTREAM NARRATIVE, OR EMERGENCE OF AN ALTERNATIVE NARRATIVE, ETC) **IS YOUR CS NOW?**	**WHAT TRANSFORMATION CAPABILITIES DO YOU SEE?**	**HOW CONSENUSAL (AMONG THE STAKEHOLDERS) ARE THESE TRANSFORMATIVE NARRATIVE(S)?**	**CAN YOU FORSEE SETPs IN YOUR CASE STUDY?**
Austria	Cluster 1: (Economic diversity/ene-rgy mix)	Industrial circularity narrative: Mainstream narrative is still present but first pilot projects for the industrial circularity narrative are starting and are emerging.	Once these ideas are upscaled there is some potential, but macroeconomic analyses will show more.	Stakeholders in pilot projects have all consent and got just funded by government. General industrial transformation does not have high priority from the general government.	*Not clearly answered*
Greenland (RES & Uranium Mining)	Cluster 1: (Economic diversity/ene-rgy mix)	Hydropower as high support amongst different parties but not all.	Depends on which party in charge due to polarized positions.	Hydropower will be implemented in a top down manner.	*Not clearly answered*

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Indonesia 1	Cluster 1: (Economic diversity/ene-rgy mix)	Government started implementing renewables share target, but has not set a coal phase-out scenario. Not yet on the peak of the mainstream narrative.	Coal consumption is still increasing.	NGO and private companies are working on the transformative direction; however, the government is still implementing coal with bioenergy mix.	If compared to both case studies (Bali and Banten), Bali province might reach a SETP sooner.
Czech Republic 1 (Moravian-Sile sian region)	Cluster 1: (Economic diversity/ene-rgy mix)	Start of some implementation.	Investment in new jobs in landscape reclamation projects. Alternative use of coal mines (use of methane gas, carbon storage). Industrial and cultural Tourism; Green Tech, ICT, R&D; Cross-border cooperation with Poland (Silesia).	Officially agreed by government and regional authorities. The plans are guided more by how the EU sees the future of coal regions, rather than being actively shaped by preferences of local communities.	End of population decline; Decrease the amount of air pollution.

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Germany (Essen)	Cluster 2: **(Energy community/social innovation)**	After the German energy act was formed in 2010, the local energy community movement was high, and enabled local groups to setup RE projects. Local government of Essen also recognized its potential, and supported for a couple of years, until expectations from the energy groups increased, making the collaboration decrease. Green narrative is currently supported, despite concessions for large energy companies in the region.	In the energy narrative, community groups came together to present alternatives to their energy supply. This constitutes a different type of ownership. Collaboration between the local government and the community groups helped shaped the green narrative and green capital Ruhr. The bottom-up approach was 'captured' and supported by the local government.	Relatively close link between city government of Essen and energy community groups. The city government supported the groups by building solar panels locally (e.g. in kindergartens) and also to appear connected to these groups. Local energy groups are more critical of the green narrative pushed by the city of Essen because they believe more can be done.	Since the development of mainstream narrative, Essen transformed into cultural city (UNESCO) and then green city.
Greece (Megalopolis)	Cluster 2: **(Energy community/social innovation)**	Energy communities are a way to achieve a Just Transition away from fossil fuels; however, there exists lack of experience in its implementation in the region. Conducted survey with stakeholders on reasons for shutting down lignite	Financing for energy communities into green projects is available, but no clear distinction between for-profit and not-for-profit organizations. Off-stream narrative provides transformation capabilities because it is based on participatory innovations	Diverse group of stakeholders support Just Transition for different reasons. The aim is decarbonization in environmental sense and increasing of carbon credits as an economic reason. Opposition to shut down lignite power plant is from	Shut down of all lignite power plants by 2023 could be considered a tipping point for the region.

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		power plant. People responded that it is to support natural gas and has nothing to do with a Just Transition, but rather economic development.	regarding energy transition.	local miners.	
Spain 2 **(Aragon-Teruel)**	Cluster 2: **(Energy community/social innovation)**	Identified the current narratives. In 2018 (signing of energy transition act), the mainstream narrative changed from coal to supporting RE. Energy companies and government want to invest in large solar farm construction, but the on-stream narrative is opposed. Off-stream narrative pushing people to be more active and support new projects in the region, not only in RE.	The energy transition started well, with local stakeholder engaged. Despite the closure of the thermal powerplant, nothing transformative has happened.	Local stakeholders are not proactive to support the on-stream narrative, because of high economic dependency on Thermal plants and lack of initiatives.	There are currently delays passing Just Transition agreements from central government. These agreements have the potential to start relevant energy projects in the region.
Italy 2 **(Sulcis)**	Cluster 2: **(Energy community/social innovation)**	Identified two alternative narratives. On-stream narrative where the main industry and	Because of abundance of minerals in Sulcis, there was a 'golden period' in the past, and presently the mining sector	During the industrialization of the region, there was no ownership from the locals in their development	The phase out of coal triggered a negative tipping point because no innovations were pursued. Subsidies from the state continued, in combination with

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		regional and national government are pushing for the metallization of the Island and continuing to support fossil fuels. In energy security these narratives support an energy mix, because they cannot completely phase out or postpone the phase out of fossil fuels. They also want to replace coal-based generation with large scale and centralized RE projects.	evolved to be subsidized by the state. There was also migration within the region. As the region became industrialized, more subsidies took place and the mining sector was the mainstream narrative, because of a top-down approach.	pathways. Just Transition and external funding from EU regulations developed a counter narrative to take back control and ownership of development pathways. On-stream narrative also aligns with major environmental NGOs while off-stream narrative, also discursive narrative coalition, is supported by local environmental NGOs.	'therapeutic persistence' and no new industries were formed. The state focuses on tourism, even if it contributes minimally to the GDP.
Mexico	Cluster 3: (Tourism/migration)	Mainstream narrative where fossil fuels are on the rise again due to fossil fuel investments. Private sectors tend to focus more on renewables and no market for alternative narratives.	Small-scale local and community needs in off grid RE projects. Many small communities exist nationwide, which is an opportunity.	Alternative narrative is still a minority and regional and national government bodies have not yet taken part in an energy transition road map.	It is hard to identify, and the decline of the oil market price could have impact on economy and tipping events.
Spain 1 (Balearic Islands)	Cluster 3: (Tourism/migration)	Just concluded stakeholder workshop. Trying to interview local governments. Balearic climate and energy	The right policies are in place such as the Balearic climate and energy policy approved in 2019. However, underlying issues like structural dependency (on mobility and economy) to	Local NGOs are protesting the RE visual impact VS tourism. Some challenges, like the lack of political and	The approval of the Balearic climate and energy policy triggered a tipping point.

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		policy aims to reach 100% RE by 2050, mix of medium RE facilities and citizens-based and community energy (20%) and to ban ICE cars by 2030 and promote electric mobility. Decline of this transformative narrative due to lack of implementation, which results in rise of local conflicts and protests.	aviation and marine transport (based on fossil fuels) in tourism, slow down this transformative narrative. The financial capacity is provided by the private sector, like energy utility companies.	technical capacities in local and subregional governments, to create productive land-use (e.g. Tourism, food production) prevent the transformative narrative. There is also a lack of skills in the region need for transformative technologies. Although tourism could have been financially beneficial, the corona pandemic has changed it.	
Romania **(Jiu Valley)**	Cluster 3: (**Tourism/migration)**	Until 1998 the industry sector was subsidized, after that the mining sector did not have a future (because of shut down of mines). No unique narrative but things just evolved, through outmigration and other factors.	Tourism, RE for the whole country, GDP or capita increase in Romania. The economy at the national level is doing well.	The energy transition should be better organized, as the government is not capable of being the major actor of the transition. Because each municipality is on its own, there is diminished collective action and it is difficult to coordinate capacities. The mainstream narrative is still present.	There exists a tipping event when the power unions were 'washed away' and the mining sector started to decline. Tourism can become significant if it is invested in, as the shutdown mines could attract tourists.
Italy 2 **(Sardinia)**	Cluster 3: (**Tourism/migration)**	Identified local and national government as key actors. Top-down narrative is		The locals want to show the tourists their expectation.	

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		dominant and other narratives are framed as counter narratives.			
Greece (Megalopolis)	Cluster 3: (Tourism/migration)	Alternative narratives are the 'hot' topics in the region, where the off-stream narrative represents the closure of lignite power plants. PV Installations are currently underway in the region. Identified the potential in agricultural production (e.g. in Hydroponics) could lead to economic diversity	Exploding infrastructure, modernize industries, green energy sector, water resources from mountains could be explored for RES energy projects, high solar potential and projects that include young generation in Just Transition could be promoted.	Just Transition is supported by diverse groups.	Shut down of all lignite power plants by 2023 could be considered a tipping point for the region.
Canada (Alberta)	Cluster 4: (Economic diversity/energy mix)	Very behind in the energy transition and mainstream narrative is still dominant. Five years ago, there was an opportunity that would have followed the on- or off- stream narrative, but it didn't happen.	A lot of analytical and operational capabilities (following Nihit's framework). Huge number of engineers with transferrable skills. There are discussions to make them leaders (as a small niche) in the	Not consensual and very polarizing. No political capacities and resistance from younger population to mainstream narratives Will explore risk-blindness (lack of willingness to see risks) in fossil fuel sector in	

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		CCS technology is the most important factor to keep the on-stream aligned with the mainstream narrative.	green transformative technology, along with the IT sector Large area of land provides opportunity in entertainment sector (e.g. moviemaking)	stakeholder groups	
Bosnia and Herzegovina	Cluster 4: (**Economic diversity/energy mix)**	Private and public companies are now pushing for RE. Energy reform package currently being developed pushes the RE reform and discussions about shutting down coal power plant.		Mining culture still very strong like in Poland and patriotism and also trying to shift toward clean energy	Tipping point from Tuzla Plant because the government (entity) believes it to be cheaper to pay the penalties to Chinese investors than those which would entail from EU, as opposed to shutting it down completely.
Poland **(Upper**	Cluster 4: (**Economic diversity/energy mix)**	Upper Silesia is at the tipping point now: The mainstream narrative has been declining since 2019. There is an emerging discussion about the future orientation of the region. (CCS or heavy industry or cover chemistry VS green	Social acceptance (agreement between trade unions and governments), strategic lands (Polish energy policy, regional strategy) , additional money, (GND, JTF), previous experiences, good starting point (in terms of indicators in the area of GDP, employment, education)	there is a general consensus that the region should remain industrial, benefit from the transition , repair mining damages and respect the coal heritage. The main divide is: 1. Energy security and economic patriotism- we	Yes. Please see Annex (1).

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		industry or Electro mobility or modern services)		should base on our resources, keep decent and unique R&D 2.Climate change mitigation and own RE supply chains- we should be either globally responsible or competitive. Regional and central authorities, companies, trade unions and research institutions are crucial to choose or balance these narratives and create a viable transformative one.	
Indonesia 2	Cluster 4: (Economic diversity/energy mix)	Defined the mainstream and alternative narrative technologies. defining the criteria for a transformative narrative from both the on-and off stream narratives	Solar price decrease might change system Transformative narrative still being developed and uncertain because Indonesia is behind on transition compared to developed countries	the starting point in the identifying transformative narrative, is looking at the resources that stakeholders have, and which can affect the transformative technologies in the system	The political powers in Indonesia and the results of the election affect the divergence or convergence to the mainstream narrative.

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Norway	Cluster 4: (Economic diversity/energy mix)	*Not present*	*Not present*	*Not present*	*Not present*

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What synergies were identified between CS and WPs?

Cluster 1 (Economic diversity/energy mix)	Cluster 2 (Energy community/social innovation)	Cluster 3 (Tourism/migration)	Cluster 4 (Economic diversity/energy mix)
Stage of cases very different. At best at the start of an alternative transformation in Czech, while Indonesia quite far behind.	How alternative narratives can lead to a tipping point? Bottom-up initiatives (like in Germany) can lead to tipping points when collaborating with powerful actors for transformation.	The Tourism sector was a common point in some studies. Some case studies have developed ecotourism, while in other CSs see it as least option	Diverse cluster. Poland and Bosnia (most similar CSs) are in a post mainstream narrative and in tipping point, Indonesia moving to alternative, and Canada still mainstream.
Variety in key challenges that covers a wide range of different economic and energy-mix development pathways (e.g. Industrial competitiveness, challenges in energy supply, declining jobs and livelihood).	Energy transition is usually promoted to large infrastructure changes and leaves the question of how to promote ownership of local energy systems.	The role of expectations e.g. in Italy the locals want to sell the region as 'green' to match expectations of possible tourists	In terms of irreversibility, some case studies (Poland and Bosnia) have passed the point of no return (in terms of joining positive trends) and could 'backslide' through transformative technologies.
Some narratives are visible and offer opportunities, but it is not clear how they can be materialized.	Alternative narratives might be silent because there are no economic opportunities for development, and without their support, it is hard to lead to a change and challenge the status-quo.	Are the policies accepted from citizens and are they trusted? Top -down approaches sometimes get only partial support, because people fear industry interference.	Should a crisis happen to create a tipping point? No, but through a mix of several factors. it can also accumulate from a small sum of factors into a transformative trajectory. For large scale technological transformations, crises happened historically.

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	.	Issue of local capacity in terms of skills, training and retraining, jobs. The Top-down approaches to environmental transition impacts with local lack of capacity. Potential for big plans (i.e. energy transition) to conflict with the local capacities.	A region can be more permeable and open to innovations, external forces and transformations from external influence, e.g. the EU has constraining power in the region and controls the government's action in Poland and Bosnia.

Final reflections

The role of foreign influence on irreversibility and tipping points

- Raphaela
  - How was the potential tipping point in the Bosnian case study identified? How can one assess the transformative capacity that indicates a tipping event?
- Hamid
  - Initially the government has been planning to build two new thermal power plants.
  - Construction may be halted right now because of international obligation towards EU, since it is not allowed to build Coal Power plants for member candidates of the EU. This is relevant because Bosnia is a possible accession candidate for EU.
  - Reforming and drafting of new laws that leads and points to renewables.
  - Government says it's cheaper to pay penalties to cancel contract from Chinese banks, than EU fines and carbon taxes.
  - Traditionally, the area was focused on coal. But in the end, this could be a tipping point that still needs to be evaluated.
- Raphaela
  - EU intervention forcing Bosnia to adopt a specific policy which could lead to a potential tipping point.
- Amanda
  - This influence ended up putting Bosnia in a situation where the choice is irreversible.
- Diana
  - This is also happening in other western Balkan countries, where China wants to invest in e.g. traditional power industry, but EU will not allow this if the country is in the process of Accession. This way EU policies can trigger changes even at countries outside of the current EU.
- Jeremie
  - For new member states it useful to view banks (both private and public) who are looking to invest in accordance with the Paris Agreement. It plays an important role on where to spend the funds for development projects and CS leads should consider this in their research.

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- Not yet observed in CS and might come in the financial assessment of CS. These external investments might take the role of the financial regulations to become stranded assets because the investments will not be used till end of lifetime because of the Paris Agreement.

Silent narratives of groups with limited economic power

- Amanda
  - There are silent narratives from those with limited economic potential that are underrepresented and might be present in many case studies.
  - In the Canadian case study, the role of women was mentioned as an example.
- Jenny
  - The coal power sector in Canada is traditionally male dominated and also influenced by the 'cowboy' mentality which came with American workers immigrating there. There is an absence of narratives for women in this area and the few women who are present find it challenging to work in a 'macho culture'. This means CS and WP leads have to be explicit when talking about who is telling a narrative and which group they represent (demographically speaking). For example, in Alberta the narrative is dominated by generally powerful white men, older than 60 years old.
  - The younger generation has a completely different set of values, so there is not only difference in gender, but also in other socio-cultural factors.
- Amanda
  - As the voices of the underrepresented, especially women, play an important role in her case studies, she invites everyone who has something similar in their studies to contact her and exchange findings.
- Jeremie
  - In Balearic Island, there is a degrowth movement where citizens and NGOs don't want to put the economy before the people. They are opposed to more investments and rather support reducing usage of resources and even finding alternatives for expansion of ports and airports for tourism.
  - These groups should also be identified because it could disrupt the regional investments in the future.

Next Steps

- All PowerPoint presentations should be uploaded on the Dropbox which help other CSs.
- We have so far focused on mainstream narratives and are now **detecting changes over time**, in reference to the baseline set through the mainstream narratives.
  - Changes can be incremental, e.g. in policies, innovations, technologies, or they can be large-scale, radical innovation changes.
    - How do we know these are small changes, leading to some systematic change (a re-shift in society and economy)?
  - One way of detecting changes is to look for *trends*.
  - In detecting change over time, we can take a look at **indicators**.
    - In the CS Guidance Annex WPs 1-4 Leads provided indicators for detecting change.

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    - Another element is the potential for **capacity**. What has been mentioned today were the operational, analytical and political capacities (see Nihit's presentation).
        - Do we need all three, or is it sufficient to have just one?
    - When we are looking at **trends**, we are also discussing what influences these trends
        - Higher-level influences such as geopolitics.
        - Crises or shocks that adjust the system.
        - Series of small changes that over time become irreversible.
            - Looking at irreversibility of CS trajectories is important to indicate at what point the CS is in terms of the trajectory (leaving the mainstream narrative or going towards transitions or a potential transformation?).
- CS Leads are encouraged to
    - through their case study work, in a bottom-up fashion, come up with **own analytical frameworks or concepts** that fit best their CS.
        - From September, we are going to ask CSLs to share of some findings and different analytic frameworks/concepts which they are developing and that are potentially interesting to other CS.
    - go through the WP **Literature Reviews** (D1.1-4.1 and the upcoming D5.1), based on their research interest, to enhance their interdisciplinary views and thinking, and contact the respective WPLs for guidance and exchange.
    - revisit, with the knowledge background from the Integration Workshop sessions, the preliminary analytical framework developed by CS leads in 2020.
- **Special Issue and Book**
    - In view of the Special Issue and Book that are starting to be prepared all partners should start thinking about potential **abstracts** based on the most interesting findings in the case studies.
        - What are the most interesting mechanisms in the case study?
        - What explains the effects?
        - What story do you want to tell with the CS? (e.g. cascading effects, role of prices, technologies etc.).
    - There is a dedicated coordination group for the special issue and book, more information will follow in July.

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1.4 Attendance list

First Name	Last Name	Affiliation	Case Study/T+ group
Amanda	Ramadhani	su-re.Co	Indonesia
Amanda	Martinez Reyez	TUD	WP5
Arpad	Todor	SNSPA	Romania
Baiba	Baltvilka	IBS	Poland
Bohumil	Frantal	PUO	Czech
Carlo	Jaeger	GCF	WP8
Christina	Costa Salavedra	EcoU	Spain
Cynthia	Ismail	su-re.Co	Indonesia
David	Tàbara	GCF	WP8
Diana	Mangalagiu	GCF	WP7
Dimitra	Aglamisi	UPRC	Greece
Franziscka	Mey	IASS	Germany
Fulvio	Biddau	UR	Italy
Hamid	Mehinovic	WPC	Bosnia & Herzegovina
Jan	Frankowski	IBS	Poland
Jenny	Lieu	TUD	WP5
Jeremie	Fosse	EcoU	Spain
Joanna	Mazurkiewicz	IBS	Poland
Jonas	Teitge	GCF	WP8
Konstantin	Winter	GCF	WP8
Marcel	Endres	GCF	WP8
Mauro	Sarrica	UR	Italy

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Nihit	Goyal	TUD	CS Leader
Nikos	Kleanthis	UPRC	Greece
Raphaela	Maier	UG	Austria
Regine	Møller	AAU	Greenland
Saptorshee	Chakraborty	EEP PSE	WP4
Siti	Indriani	su-re.Co	Indonesia
Stanislav	Martinat	PUO	Czech
Takeshi	Takama	su-re.Co	Indonesia
Yvonne	Mutua	GCF	WP8
Zois	Katiforis	UPRC	Greece

1.5 Additional information

Feel free to contact any of us for questions, suggestions, or comments.
Diana Mangalagiu (diana.mangalagiu@ouce.ox.ac.uk), Amanda Martinez Reyes (a.martinezreyes@tudelft.nl), Jenny Lieu (j.lieu-1@tudelft.nl).

1.6 Annex

Poland (Cluster 4): Identification of SETPs in case study:

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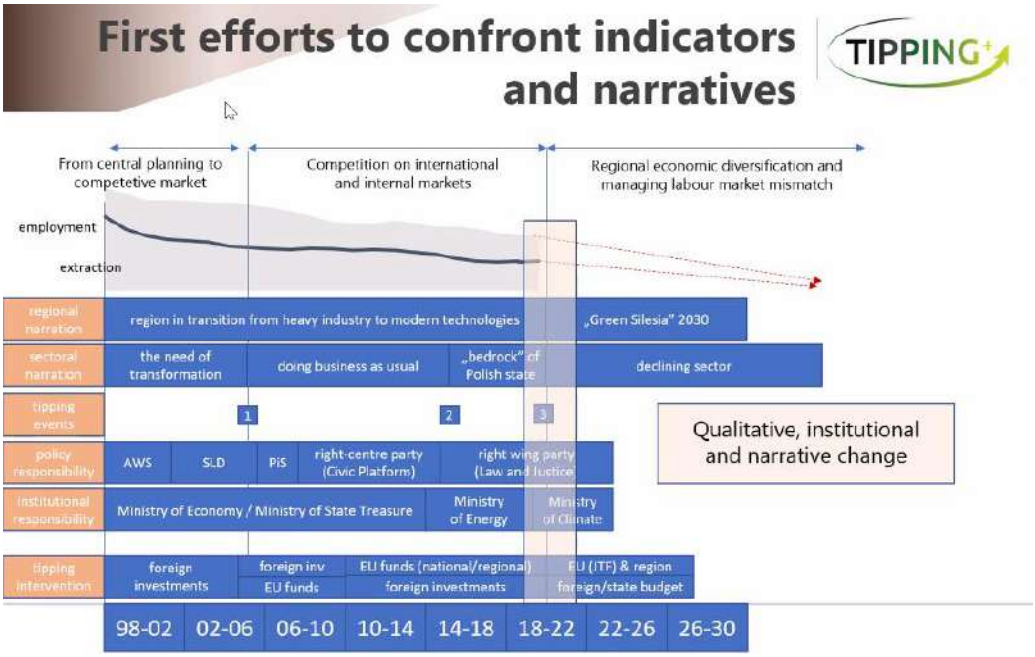

Germany (Cluster 2): Narrative Development and Events in the city of Essen

You can find the case study presentations and the Padlet reports from the 3 breakout groups here: https://www.dropbox.com/sh/2akere12eql9udw/AADr7Za3Rhy5983ljs6YUotFa?dl=0.

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9.3 Annex: Report of the Third Integration Workshop

THIRD INTEGRATION WORKSHOP: ANALYSIS OF CASE STUDIES' RESULTS AND VISUALISATIONS

Date:	March 22nd, 2022	
Time:	13:00 - 16:00 CET	
Presenters & facilitators:	Plenary and 3 breakout rooms: Jenny Lieu, Baiba Baltvilka, Amanda Martinez Reyes, Diana Mangalagiu	
Participants:	See Attendance List at the end of this document	

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Content

1. Agenda of the Workshop
2. Introduction
3. Analysis of Case Studies' Results and Visualisations
4. Final Reflections
5. Attendance List
6. Additional Information

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1. AGENDA: THIRD INTEGRATION WORKSHOP "Analysis of Case Studies' Results and Visualisations"

Location:	https://zoom.us/j/99651191438 Meeting ID: 996 5119 1438 Passcode: 404461	
Date:	March 22nd, 2022	
Time:	**13:00 - 16:00 CET**	
Facilitation team:	Baiba Baltvilka, Diana Mangalagiu, Jenny Lieu and Amanda Martinez Reyes	

	Time	**Activities**	**Moderation**
	13:05 – 13:10	Welcome, goal of the workshop	Diana
	13:10-13:30	Share overview table and feedback on case study reports Introduce the visualisation Discussing the key questions in plenary	Amanda, Baiba, Jenny
	13:30 – 14:00 **14:00-14:10** **14:10-14:30**	Break-out group session (BoG) Visualisations: - Each case study describes their visualisation for 5 min - Discussion between case studies - https://jamboard.google.com/d/1Qtm10MTudYSYsrnTTBjBFr4ouyP5Ki1EHBpQsyIbcLs/viewer?f=0 Break Come back to BoG to discuss interventions	Amanda, Jenny, Diana, and Baiba Amanda, Jenny, Diana, and Baiba
	14:30 – 15:15	Debriefing (plenary) Discuss external factors impact case studies (e.g., covid-19, Russia's Invasion of Ukraine and other issues).	Diana/Jenny Baiba/Amanda

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2. INTRODUCTION

The aim of the workshop is to discuss and present the visualisations of the case studies' mainstream, on-stream and off-stream narratives and identify common patterns across them.

Before the Workshop, the Case Study teams were asked to provide the first draft of their case study contribution to D5.2. Among others, they were asked to describe both mainstream and alternative narratives by including the six following components:

A. **Technology:**
   - Level. What types of technological sectors have been dominant in the region?
   - Space. Where have the technological sectors been located?
   - Time. How long have these sectors been dominant?

B. **Stakeholders**:
   - Level. What types of stakeholders have been dominant in the region?
   - Space. Where have the stakeholders been located?
   - Time. How long have stakeholders been dominant?

C. **Institutions:**
   - Level. What types of institutions have been dominant in the region?
   - Space. Where have the institutions been located?
   - Time. How long have these institutions been dominant?

D. **Ideologies:**
   - Level. What ideologies have been dominant in the region?
   - Space. Which area/where do ideologies steam from?
   - Time. How long have these ideologies been dominant?

E. **Policies:**
   - Level. What types of policies (policy mix) have been dominant in the region?
   - Space. Which areas/regions do the policies cover?
   - Time. How long have these policies been dominant?

F. **Other contextual factors** (e.g. external events, the environment, politics): provide a description considering the following
   - Level. What types of technological sectors have been dominant in the region?
   - Space. Where have the technological sectors been located?
   - Time. How long have these sectors been dominant?

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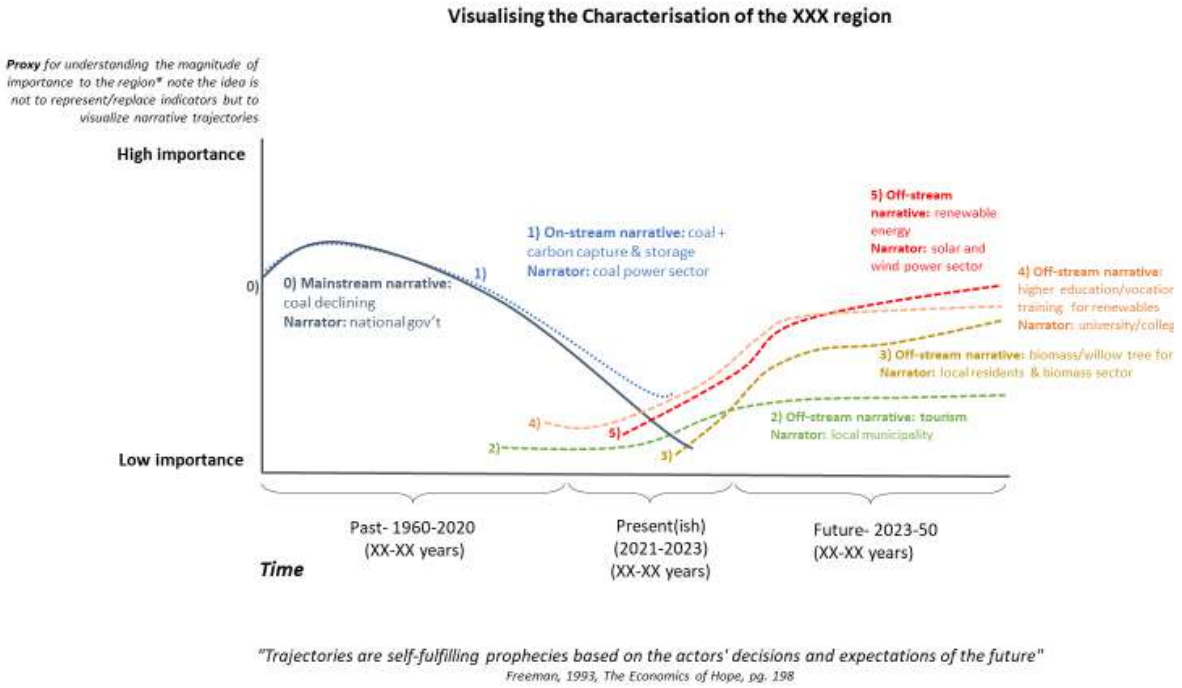
Based on the Description and Analysis of the Case studies' First Submission Reports, Case Study teams were asked to prepare (specifically for the workshop) a diagram reflecting the key narratives' dynamics of importance across time (see below).



The diagram aims to create a visualisation that allows easily capturing the core narratives and potential transitions that could lead to transformation. The idea is to see if one can already observe trends across case studies with these visualisations.

1. Mainstream narrative(s): *when did the decline of the coal and carbon intensive sector begin and what is its expected future development/decline?*

2. Alternative narrative(s): *what (emerging) sectors are starting and what is their anticipated level of importance in the upcoming years and future?*

Clarification:

1) This illustration is the ***researchers' interpretation*** *of the narratives and understanding of the context thus far.*

2) This diagram aims to illustrate ***the relative importance*** *of the mainstream sector (coal and carbon intensive sector)*

3) The idea is to not to combine exact values from indictors to create the proxy but to ***illustrat****e the (approximate)* ***relationships and interactions*** *and to* ***visualise the trend*** *(i.e., downward or upward trend) of the potential outgoing sector (coal and carbon intensive region) and incoming dynamics (alternative narratives).*

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To stimulate in-depth discussions, the Case Study teams were grouped into three clusters based on similarity of the patterns in their narratives' visualisations.

Cluster 1 **"No Significant Decline of Mainstream Narrative"**

Indonesia
Italy: Carloforte
Denmark: Greenland
Spain: Balearic Islands
Canada

Cluster 2 **"Growing On-Stream Narrative"**

Poland: Silesia
Germany: Ruhr
Italy: Sulcis
Austria
Romania: Jiu Valley

Cluster 3 **"RET Growth and Diversification of Economy"**

Norway: Svalbard
Spain: Teruel
Norway: Lofoten
Greece: Megalopolis

After the presentation of the summary of the case study reports, the Case Study teams continued working in the breakout rooms to present and discuss the narratives, identify tipping points and highlight their further steps.

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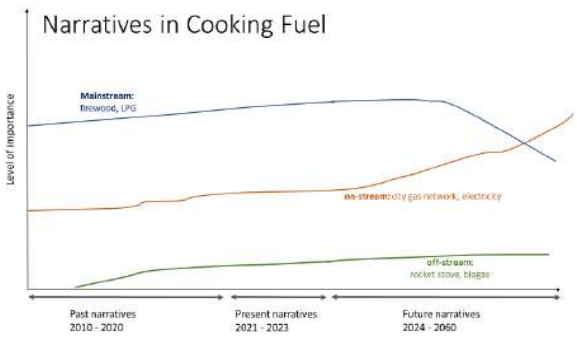
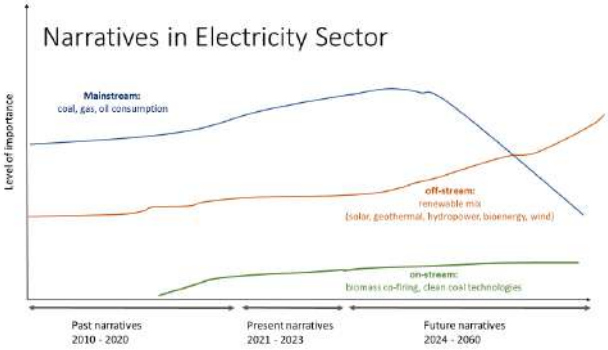
3. ANALYSIS OF CASE STUDIES' RESULTS AND VISUALISATIONS

3.1. Presentation of Visualisations

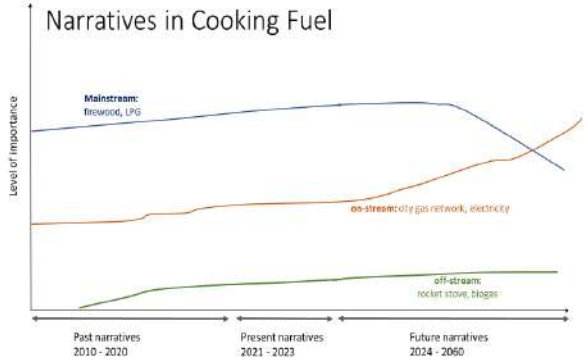
CLUSTER 1: Separate identity from the mainstream national identity present in all cases

Indonesia

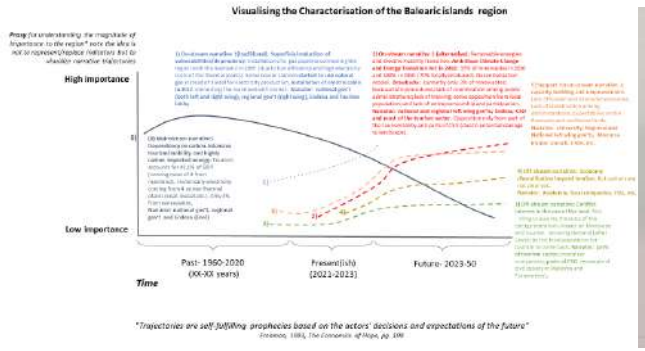




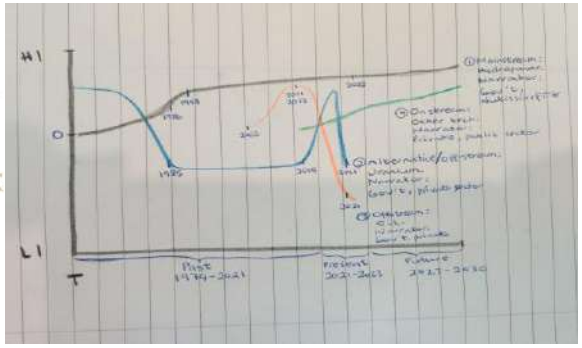
Italy: Carloforte



Spain: Balearic Islands



Denmark: Greenland



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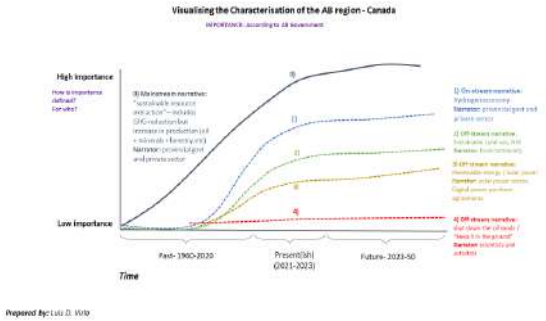
Canada



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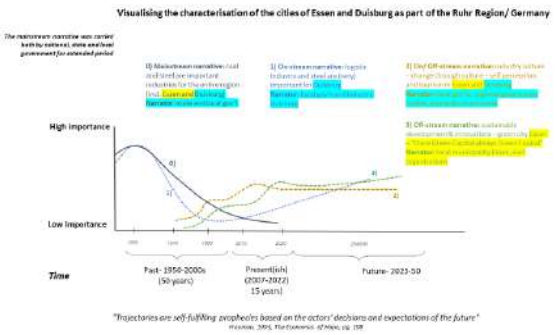
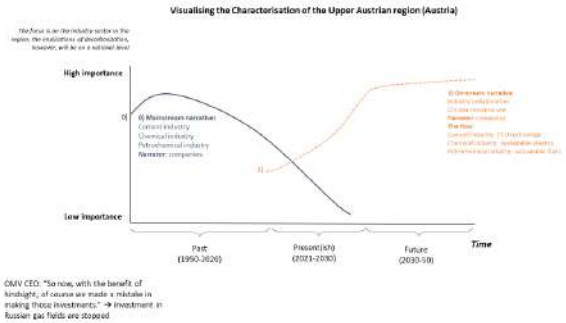
CLUSTER 2: High-intensive coal and carbon narratives are replaced by low-intensive coal and carbon narratives

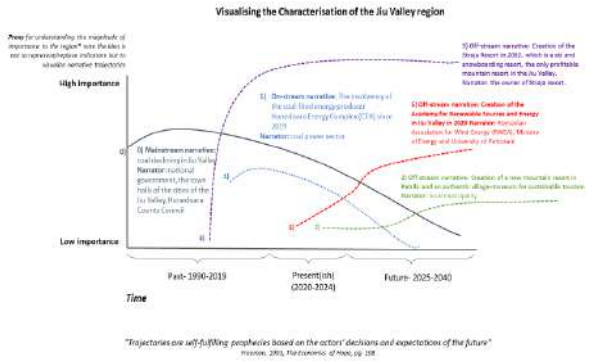
Germany: Ruhr



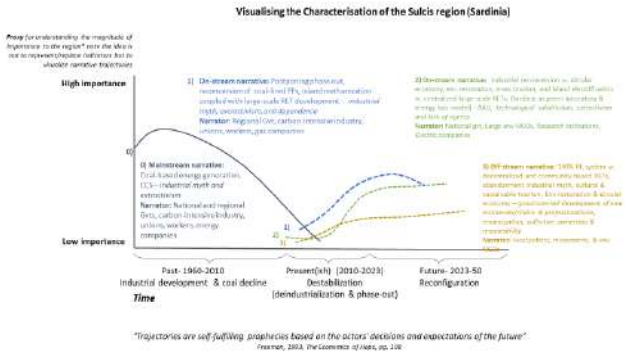
Austria



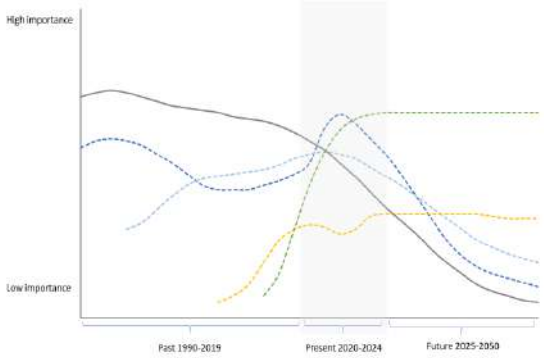
Romania: Jiu Valley



Italy: Sulcis



Poland



CLUSTER 3: A diversified economy has been key for the regional phase out of the fossil fuel narrative

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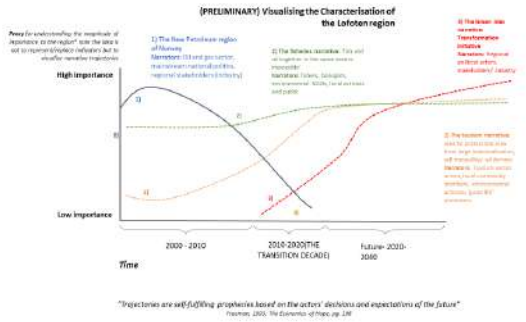
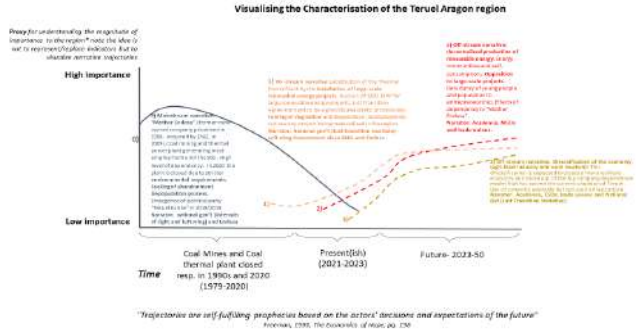
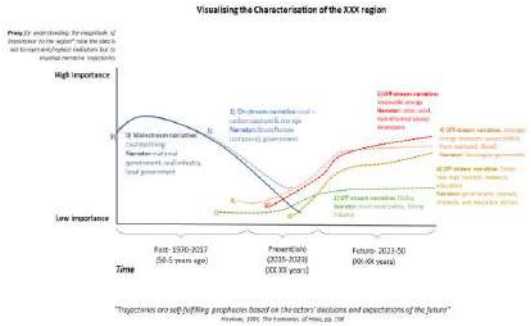
Norway: Lofoten



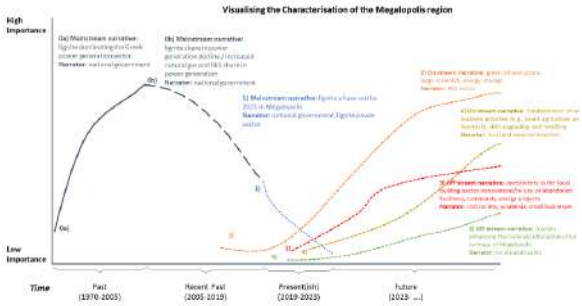
Spain: Teruel



Norway: Svalbard



Greece: Megapolis



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3.2. Case Studies' Narratives and Narrators

Cluster	Country	Narratives	Narrators	Remarks
Cluster 1	**Indonesia**	There are two sectors that are the focus of the Indonesian case study: electricity and cooking fuel. Both have no significant decline in the mainstream. In the electricity sector, dominated by fossil fuels (mainstream), the off-steam narrative consists of renewables and on-stream technologies to support coal power plants (e.g., biomass co-firing at coal power plants).	Mainstream: government, state-owned company (i.e., PLN) because this organisation controls the electricity market. On-stream: state-owned companies (PLN and other companies, or we called IPP), academia. Off-stream: local government, state-owned companies are testing biomass co-firing and clean coal technologies, NGO, academia, Development bank.	Currently, the main hindrance is the fossil fuel subsidies and the tendency of 'choosing the cheapest' attitude by PLN and the government to maintain energy security. In parallel, more push on renewable deployment with some policies. The significant policies related to disrupting mainstream narratives include carbon tax for coal power plants, decreasing costs of solar and wind, and the latest PLN (the mainstream actor) recently issued its electricity supply plan to achieve 51.6% renewable mix in the sector as part of a low carbon scenario.
	Italy: Carloforte	Mainstream: no change towards decarbonisation. Onstream: tourism with green technology is being pushed forward. Offstream: there are communities that really support sustainable technologies.	Mainstream: national and regional governments, carbon-intensive industry, unions, workers, energy companies. Onstream: regional governments, carbon-intensive industry, unions, workers, gas companies. Offstream: local politics, movements, & environmental NGOs.	The Italian case study team also worked closely with different demographics, elderly women for instance to collect the historic memory and educators to work with youths. (*Currently the team is conducting ethnographic research engaging with local communities to understand how local energy transition initiatives could be an obstacle/driver of tipping points*.)

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	Spain: Balearic Islands	Mainstream: carbon-intensive tourism. Onstream: renewable technologies (currently 40-50% from renewables) and electric mobility transition. Offstream: supporting on-stream but there is a conflict of interest in land-use; need more capacity for wide transformation.	Mainstream: government, Endesa. Onstream: left-wing government, Endesa, CSO, tourism sector. Offstream: academia, some CSO and tourism sector.	Overall, there are political and cultural factors affecting the narratives.
	Denmark: Greenland	Mainstream: hydropower, not declining as the government plans to install more capacity. The government is an important driver in the mainstream. Onstream: other technologies. Offstream: uranium, oil.	Mainstream: government, Nukkisorpit. Onstream: Private, public sector. Offstream: government, private sector.	The transformation aimed in the Greenland case is the independence from Denmark as the country relies highly on Denmark. Again, depending on the political influence.
Cluster 2	**Germany: Ruhr**	Mainstream: coal and steel are important industries for the entire region (including Essen and Duisburg). Onstream: Logistic industry and steel are important (Duisburg). On/off-stream: industry culture-change through culture self perception and tourism (Essen and Duisburg).	Mainstream: state and local governments (Essen and Duisburg). Onstream: local governments and industry (Duisburg). On/off-stream: local and regional governments, arts and culture (Essen and Duisburg).	

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		Offstream: sustainable development and innovations (Essen).	Offstream: local municipalities, civil organisations (Essen).	
	Austria: Lower & Upper	Main-stream: cement, chemical, petrochemical industries & iron and steel industry and fossil-based technologies. Onstream: industrial cooperation, circular resource use & green hydrogen.	Mainstream: companies. Onstream: companies.	
	Italy: Sulcis	Mainstream: coal-based energy generation - industrial myth and extractivism. Onstream narrative: postponing phase-out – industrial myth and extractivism. Onstream: industrial reconversion w. circular economy, environmental restoration – technological substation, extractivism and a lack of energy. Offstream: 100% RE system, abandonment of industrial myth – grass-root led development of new economies.	Mainstream: national and regional governments, carbon-intensive industry, unions, workers, energy companies. Onstream narrative: regional governments, carbon-intensive industry, union, gas companies. Onstream: national government, large environmental NGOs, research institutions, electric companies. Offstream: local politics, movements, environmental NGOs.	

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	Romania: Jiu Valley	Mainstream: decline of coal. Onstream narrative: the insolvency of the coal-fired energy company. Offstream: sustainable tourism. Offstream: academic centre. Off-stream: ski resort.	Mainstream: national government, city/town municipalities. Onstream narrative: coal power sector. Offstream: local municipalities. Offstream: Romanian Association of Wind Energy, Ministry of Energy, University of Petrosani. Off-stream: owner of Straja resort.	
	Poland	Mainstream: coal is a backbone of the energy system. Onstream: energy security plus CCS. Onstream: labour market impact. Offstream: transition narrative Offstream: health and living condition improvement, investments and growth.	Mainstream: national government, coal mining companies, coal power sector. Onstream: coal mining sector. Onstream: coal municipalities, trade unions. Offstream: regional administration. Offstream: green NGOs, local civil society, business entities.	
Cluster 3	**Norway: Svalbard**	Mainstream: decline of coal. On-stream: coal plus carbon capture storage. Offstream 1: fishing.	Mainstream: national government, coal industry, local government. On-stream: Store Norske, government.	

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		Offstream 2: three new legs – tourism, research, education. Offstream 3: stop-gap energy measures. Offstream 4: renewable energy.	Offstream 1: local municipality, fishing industry. Offstream 2: government, tourism, research and education. Offstream 3: Norwegian government. Offstream 4: solar, wind, hydrothermal power developers.	
	Spain: Teruel	Mainstream: Mother "Endesia", pro-coal. Onstream: renewable energy. Offstream 1: decentralised production of renewable energy. Offstream 2: diversification of the economy.	Mainstream: national government and Endesea. Onstream: national government and Endesea. Offstream 1: Academia, NGOs and trade unions. Offstream 2: academia, civil society organisations, trade unions and national governments.	Why did it start to decline? The power-plants were not competitive - due to environmental regulations their running became too expensive. In 2018, the thermal plant was closed. The society was unhappy as there were no longer benefits for locals. How did the transition plan start to emerge? The in-coming left-wing government was an important factor in pushing the transition. Due to the war, there might be a delay of coal phase-out (energy security considerations).
	Norway: Lofoten	Mainstream: the new petroleum region of Norway. Alternative 1: fisheries.	Mainstream: oil and gas sector, mainstream national politics, regional stakeholders. Alternative 1: fishermen, biologists, environmental NGOs, local activists and the public.	There was potential for oil extraction. This mainstream narrative was important before. It is declining now as state-holders were very sceptical, there was strong NGOs opposition and lobbying from fisheries. In the 2001 elections, there was strong opposition to the oil industry. The elected

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		Alternative 2: tourism. Alternative 3: Green Isles narrative.	Alternative 2: tourism sector actors, local community members, environmental activists, 'good life' promoters. Alternative 3: regional political actors, industry.	politicians postponed oil extraction. They downplayed the oil narrative and looked for the alternatives. In 2018, a clear no to oil extraction. The fisheries' narrative: there was never oil production, tourism and fisheries can be the future. The war might change the trajectory of Norway's oil and gas and the need to extract fossil fuels to phase-out Russian gas.
	Greece: Megapolis	Mainstream 0: lignite dominating the Greek power generation sector - lignite share in power generation decline -lignite phase-out by 2023. Onstream1: green infrastructure. On-stream 2: establishment of business activities, skills upgrading and reskilling. Off-stream 1: investments in the local building sector. Off-stream 2: tourism – enhancing the natural heritage of the region.	Mainstream 0: national government, lignite power structure. Onstream 1: RES sector. Onstream 2: local and external investors. Off-stream 1: civil society, academia and business. Off-stream 2: local municipality.	The fourth narrative is more important than the third one. Change from 0 to 1 - intervention: the government's decision to phase out lignite. The government in Megalopolis decided to phase out lignite because it was not competitive for many years. But now the situation is changing because of the war.

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3.3. SUMMARY OF DISCUSSION

CLUSTER 1

On Content

It is noteworthy that **not all transition/transformations are based on technological change**, **but also other factors** such as identity (Italy case, and Bali, Indonesia case), political influence or trigger from other sectors such as movement in the tourism sector.

There is **diverse understanding regarding transition/transformation among case studies**. For example, the transformation referred to by Greenland is a shift from dependency to independence.

The aspect of **(separate) identity** from the mainstream national identity or relative to stronger nearby countries **was present across all narratives**. There is a sense of 'us' and 'them' within the mainstream narrative identities that could be further explored.

Government is present in all narratives.

On Methodology

Mauro suggested editing **the y-axis to be more specific** on a factor (e.g., policy), just as influence.

One partner mentioned **it was difficult to create the diagram since they were not used to trying and thinking quantitatively.**

It could be interesting to ask stakeholders to work on the visualisations to see the different perspectives.

Differentiating between the three time periods, past, present and future was important. The past and present were more straightforward to draw. We might want to focus on a diagram only in the future.

During the pandemic, **early and frequent engagement with stakeholders are important** to build trust. Hence, now there is enthusiasm in sharing their narrative.

The importance of stakeholder engagement to understand what stakeholders expect so we can bring benefits to our stakeholders from our research outcomes (fit-for purpose).

The Italian case study team noted that they are **carrying out stakeholder research with a more egalitarian approach**, working with existing community initiatives and engaging in activities together rather than only getting/extracting knowledge from stakeholders.

All of the case studies are on narrative collections (interviews, attending conference, observation).

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CLUSTER 2

On Content

General decline of the CCIR /coal narratives, but at different rates and historical timespans (some are quite old).

There seems to be a kind of **common tipping point in the narratives**, around the present times, where the old high-intensive narratives are being replaced by the low-intensive carbon ones, but still some on-stream narratives still hold or need to hold, like those related to keeping labour.

Narratives lack a dimension of justice or just transitions, **but more about some power interactions**, like in the case of Sulcis in Sardinia. However, the key role of not-state actors in avoiding excluding strategies and making more emancipatory ones.

The greener/transformative narratives mean very different things in different contexts, e.g. whether an industrial sector or region in Austria or in an urban context in Austria.

The different cases relate the narratives in different ways on how they portray structural change. For instance, some of these declining narratives are also linked to declining power structures (communism). Some new narratives may be used to justify and legitimise the status quo and keep on high-intensive trajectories.

The case studies **should also include different agent transformative capacities or leadership.**

CLUSTER 3

On Content

There is **no competitive fossil sector** in the future for **Lofoten and Teruel.**

.Common points on the incentive for phase out:

- **economic reasons (not competitive);**
- **unease with oil dependency**;
- **multi-layered process** – cannot identify a chain of tipping points;
- **political and cultural aspects** (the majority of the population is against oil).

The war is changing governments decisions on phasing out coal and oil.

Energy security considerations are important in shaping the politicians' decision on fossil phase out. This concern is present in Megapolis, and might also be in Lofoten.

On Methodology

One has to rethink SETPs to define them as not irreversible & how do we go about locked-in trajectories & how do we cement new types of lock-in?

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4. FINAL REFLECTIONS

From the Plenary

David:
In general, policy narratives have 4 components, and looking at these four framing elements can help to analyse them and distinguish them from each other: 1. PERCEPTIVITY: what needs to be looked at and paid attention or not. 2. LOGIC/RATIONALE: to make sense, interpret and explain things 3. NORMATIVITIES: The values that are used to assess things as good or bad, according to 1&2, and 4 PRESCRIPTIVITY: specific actions ('prescriptions) that are told to be done according to 1,2&3 [Pahl-Wostl, C., et al. 2007]

The relationships between policy narratives and social-ecological structures is not straightforward. In fact, and regarding the interplay between narratives and social-ecological structures: a) There is no direct causality b) In fact autonomy among both is possible and often likely c) both are multi-dimensional, non-linear dynamics in any of both; hence, always no single trajectory, but many: open-ended; d) Tipping possible in both (e.g., in public opinion, disruptions in growth…), e) There is an ambivalent role of knowledge systems, expert systems and values. (Also it may be useful to look at how the narratives of the past are used to justify either the present or challenge statu quo one or/and create alternative trajectories).

Also it may be useful to look at how the narratives of the past are used to justify either the present or challenge statu quo one or/and create alternative trajectories.

Finally, it would be useful to distinguish between - deliberate /intentional TP and between positive or negative effects of these TPs. So in T+, we are especially concerned with TPs that can generate positive outcomes, e.g. through deliberate policies and actions. So we define positive TPs as those "Moments in which, due to previous deliberate and targeted interventions, a relatively small additional action or disruptive event flips a social-ecological system towards: a sustainable trajectory: e.g. TPs towards clean energy sectoral transition a sustainable new system's basin of attraction: TPs toward full systems transformations. - Thanks to the building of prior transformative conditions and capacities for systemic change". But taking into account that many positive and negative effects in all transformations as well as many deliberate and unintentional driving forces occur at the same time

Questions to Consider

Mauro: Do narratives mean a shift of justice? Or does it apply only in technology/economic sectors?

Brigt: We need to consider the war as an external factor that impacts trajectories and energy security.

Nihit: Is energy justice, energy security, and environmental impact the new trilemma? Why are the changes of trajectories happening at that time?

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5. ATTENDEE LIST

First Name	Last Name	Affiliation	Case Study/T+ group
Alexandros	Flamos	UPRC	Greece
Andrei	Taranu	SNSPA	Romania
Anna	Sveinsdottir	NRI	Norway
Anne	Merrild Hansen	AAU	Greenland
Antoine	Mandel	EEP PSE	WP4
Amanda	Martinez Reyez	TUD	WP5
Baiba	Witajewska-Baltvilka	IBS	Poland
Brigt	Dale	NRI	Norway
Carlo	Jaeger	GCF	WP8
Cynthia	Ismail	su-re.co	Indonesia
David	Tàbara	GCF	WP8
Diana	Mangalagiu	GCF	WP7
Dimitra	Aglamisi	UPRC	Greece
Elena	Apostoli Cappello	UR	Italy
Francesc	Cots	EcoU	Spain
Franziska	Mey	IASS	Germany
Fulvio	Biddau	UR	Italy
Jan	Frankowski	IBS	Poland

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Jenny	Lieu	TUD	WP5
Jeremie	Fosse	EcoU	Spain
Joanna	Mazurkiewicz	IBS	Poland
Mauro	Sarrica	UR	Italy
Nihit	Goyal	TUD	CS Leader
Nikos	Kleanthis	UPRC	Greece
Raphaela	Maier	UG	Austria
Regine	Møller	AAU	Greenland
Siti	Indriani	su-re.Co	Indonesia
Siri	Veland	NRI	Norway
Takeshi	Takama	su-re.co	Indonesia
Valentina	Rizzoli	UR	Italy
Zois	Katiforis	UPRC	Greece

6. NEXT STEPS

The results of this workshop will be used to prepare the Internal Meeting which will be held in Potsdam on 27-28 April 2022.

7. ADDITIONAL INFORMATION

Feel free to contact any of us for questions, suggestions, or comments.

Amanda Martinez Reyes (a.martinezreyes@tudelft.nl), Diana Mangalagiu (diana.mangalagiu@ouce.ox.ac.uk), Jenny Lieu (j.lieu-1@tudelft.nl), Baiba Baltvilka (baiba.baltvilka@globalclimateforum.org).

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9.4 Annex: Report of the Fourth Integration Workshop

FOURTH INTEGRATION WORKSHOP: WORKING TOWARDS ELABORATING THEORETICAL FRAMEWORK AND CO-DEVELOPMENT OF STRATEGIES

Date:	June 22nd, 2022	
Time:	10:00 - 16:00 CET	
Presenters & facilitators:	Plenary and four breakout groups: Diana Mangalagiu, Jenny Lieu, Amanda Martinez Reyes, Baiba Witajewska-Baltvilka	
Participants:	See Attendance List at the end of this document	

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FOURTH INTEGRATION WORKSHOP: WORKING TOWARDS THEORETICAL FRAMEWORK AND STRATEGIES

REPORT

Date and location:	June 22nd, 2022, Athens, Greece
Time:	10:00 - 16:00 CET
Presenters and facilitators:	Plenary and four breakout groups: Diana Mangalagiu, Jenny Lieu, Amanda Martinez Reyes, Baiba Witajewska-Baltvilka
Participants:	See Attendance List at the end of this document

Content

1. Agenda of the Workshop
2. Introduction
3. Part I Working Towards Elaborating an Overarching Theoretical Framework
4. Part II Working Towards Co-Developing Strategies
5. Final Reflections
6. Attendance List
7. Additional Information

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1. AGENDA OF THE WORKSHOP

Location:	Oasis Hotel Glyfada, Athens, Greece	
Date:	June 22, 2022	
Time:	**10:00 - 16:00 CET**	
Facilitators:	Diana Mangalagiu, Jenny Lieu, Amanda Martinez Reyes and Baiba Witajewska-Baltvilka	
Time	**Activities**	**Moderation**
9:30-10.00	Welcome coffee	
	Part 1: Working towards elaborating an overarching theoretical framework of social change supported by empirical evidence from case studies	
10:00-10:30	Introduction in the plenary	Diana, Jenny
10:30 – 11:30	Breakout group session I: Clusters of CSs to contribute to developing overarching framework (of change) supported by empirical evidence (D7.1)	Amanda, Jenny, Diana and Baiba
11:30-12.00	**Coffee break**	
12:00-13:00	Breakout group session I continued	Diana, Jenny, Amanda, Baiba
12:45-13:00	Sum-up in the plenary	Diana, Jenny
13:00-14:00	Lunch	
	Part 2: Working towards co-developing strategies	
14:00-15:30	Breakout group session II: ● discussion on co-development of future regional strategies; ● learning from case studies (D5.3) ● discussion on how CSs intend to co-develop the strategies with a justice lens (who will they approach, how) etc. ● what are the key components to discuss in strategies)	Amanda, Jenny, Diana, and Baiba
15:30-16:00	Sum-up in the plenary	Diana, Jenny
16:00-18:00	Open space for small group discussion on papers for SI	

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2. INTRODUCTION

The aim of the workshop was to discuss and elaborate an overarching theoretical framework of social change and future regional strategies supported by empirical evidence from case studies.

Before the Workshop, the case study teams were asked to provide the second (and final) draft of their case study contribution to D5.2. They were asked to update their case studies based on **key questions** and **key indicators** agreed upon at an in-person meeting in Potsdam on April 27& 28th 2022.

The main goal of the update was to consider an interdisciplinary perspective to the case studies - the questions and indicators were to be mainly considered in the narratives (values and identity, policy and politics and economic potential) and in the context discussion (geography and migration).

The following questions and indicators were chosen for each WP.

Geography & Migration (WP 1) questions:

A. Are there any population/migration movements in the region?
   - If so, what are the demographics of migration by age, education, gender, rural/urban etc. (based on easily available secondary data)?

B. What is the key motivation for migration (based on the data already collected)?

Geography & Migration (WP1) indicators:

Indicators	Examples
population NUTS 1, 2 & 3 composition of gender education levels age pyramid migration patterns life expectancy *(only relevant over a longer time frame)*	Presentation of population and demographic data graph.

Values and Identity (WP2) questions:

A. What are the key identity and values dominant in the region (based on the data already collected)?

B. Has there been value and/or identity change over the course of the transition in the region?

C. Does identity (change) and values (change) reflect on electoral behaviour and electoral platforms?

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Values and Identity (WP2) indicators:

Indicators	Examples
political parties' positions political parties' representations *(used as proxies for value orientations)*	A list of key governing and opposition parties. Description of political parties' stances on energy transition. Share of seats of political parties (i) supporting pro-coal and carbon intensive energy and (ii) supporting any alternative pathways (national government, regional government).

Policy & Politics (WP 3) questions:

A. What have been the key policy interventions over the course of the case study leading to energy transition? (Note: intervention can be policies, strategies, programmes and projects.)
B. Has there been specific support/lack of support of policies by political parties?

Policy & Politics (WP 3) indicators:

Indicators	Examples
public investments investment support subsidies taxes policy planning documents	A list and short description of key relevant policy interventions and if relevant, indicate if/how the policies are supported/not supported by political parties.

Economic Potential (WP 4) question:

A. Is there an alternative to the mainstream that is seen as economically viable?

Economic Potential (WP 4) indicators:

Indicators on economic opportunities	Examples
Key stakeholders' opinion on (new) economic opportunities	Presentation of the narratives of the interviewed stakeholders.

Moreover, as preparation for the integration workshop, the case study teams were also asked to prepare on site a poster accompanied by a short presentation ("extended elevator pitch") focusing on the following elements:

- an updated visualisation – diagram from the Third Integration Workshop (capturing the core narratives and potential transitions that could lead to transformation);
- reference to the social theory applied;
- situation in the transition trajectory/tipping trajectory in the region (supported by the narratives and indicators);

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- transformative capacities and strategies needed;
- how issues of justice and just transition are being framed in the CS;
- impact of COVID and of the Russian invasion in Ukraine.

The outcome of the poster was to get a clear interdisciplinary understanding of each region. See the posters produced by the case study teams here.

During the Workshop, to stimulate in-depth discussions, the case study teams were grouped into three clusters based on the stage of energy transition they are currently in. Some case study teams split up to better represent the complexity of transition.

Cluster 1 **"No Significant Change"**

Indonesia
Italy (Carleforte)
Greenland
Canada

Cluster 2 **"Growing On-Stream Narrative"**

Spain: Balearic Islands
Poland: Silesia
Romania: Jiu Valley
Czech Republic: Moravia
Austria
Italy: Sulcis

Cluster 3A **"Renewables' Growth and Diversification of Economy"**

Greenland: Svalbard
Norway: Lofoten
Spain: Teruel
Greece: Megapolis
Indonesia
Romania

Cluster 3B **"Renewables' Growth and Diversification of Economy"**

Bosnia and Herzegovina
Poland: Silesia
Germany: Ruhr

Having nearly completed their research on the case studies before the meeting, the case study teams were asked to reflect on the work of their own and others and start looking together for commonalities, differences, patterns and possible future strategies.

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3. PART I: WORKING TOWARDS ELABORATING AN OVERARCHING THEORETICAL FRAMEWORK

During this session, the break-out groups were asked to reflect and discuss on:

- (surprising) commonalities across case studies;
- units of change (policy, society, technologies, futures);
- scale of change (time, space, governance).

3.1. CLUSTER 1 "No Significant Change"

Discussion

The group discussed the key narratives and commonalities across cases, as well as, particularly, what would destabilise the energy system.

Commonalities

- Male dominated narrators (sailors, hunters, fishermen etc.).
- Historical narrative claiming they are strongly different.
- Remoteness of the places (insularity).
- Continuity of entity/stability of region – unwillingness to change or shake it.
- Limited debate about energy transition and its possible alternatives.
- Small communities provide energy and wealth (Greenland, Canada).
- Land ownership/access to land.
- Alternative narratives such as trading, services, knowledge centres, caregiver services.

Mainstream narratives

- Narrators - male dominated.
- Key identities are based on vocation/profession.
- Production/consumption relationships important?

Key factors potentially destabilising the current energy system

- Destruction of environment and climate, lifestyle changes (Canada).
- Health impact, availability of external resources, stakeholders (Indonesia).
- Stable customers and economic system (Canada).
- Climate and environmental disaster (Italy).

Unit of change: production (Greenland, Canada and Italy) and consumption (Indonesia and Greenland).

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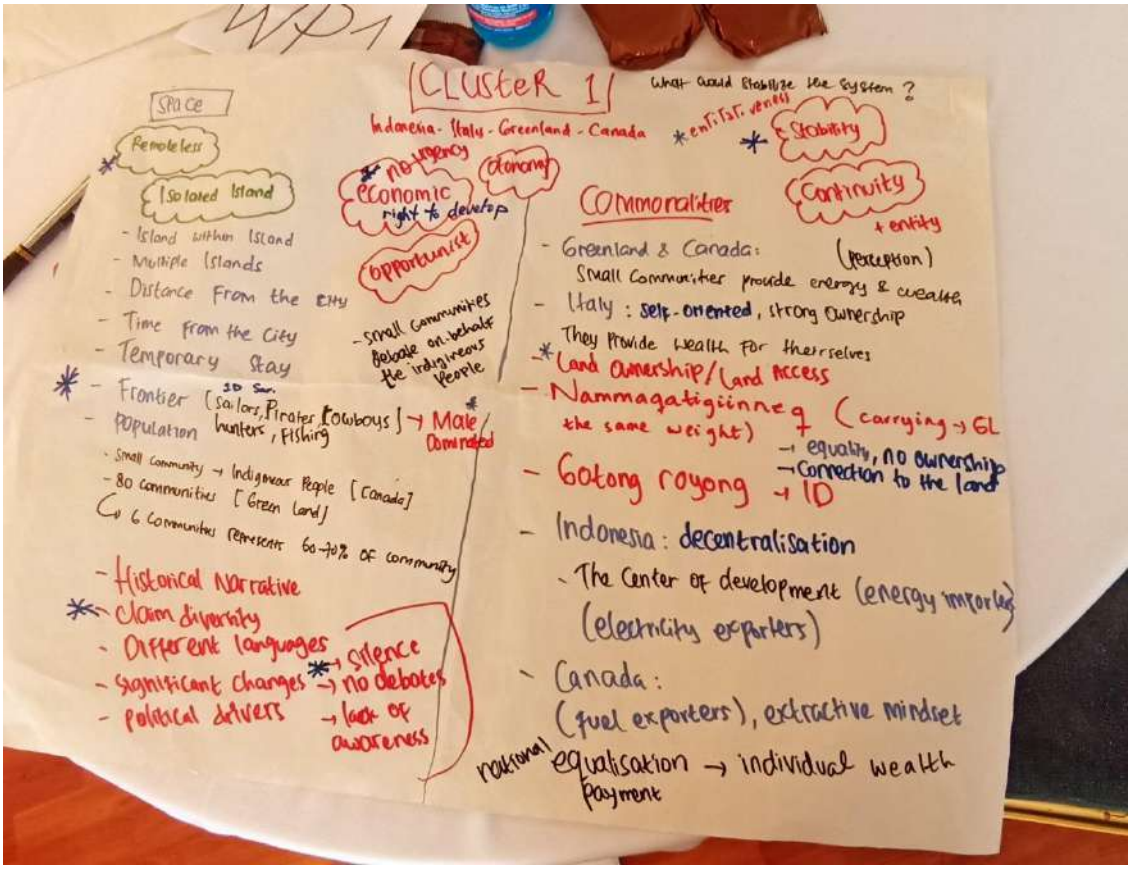
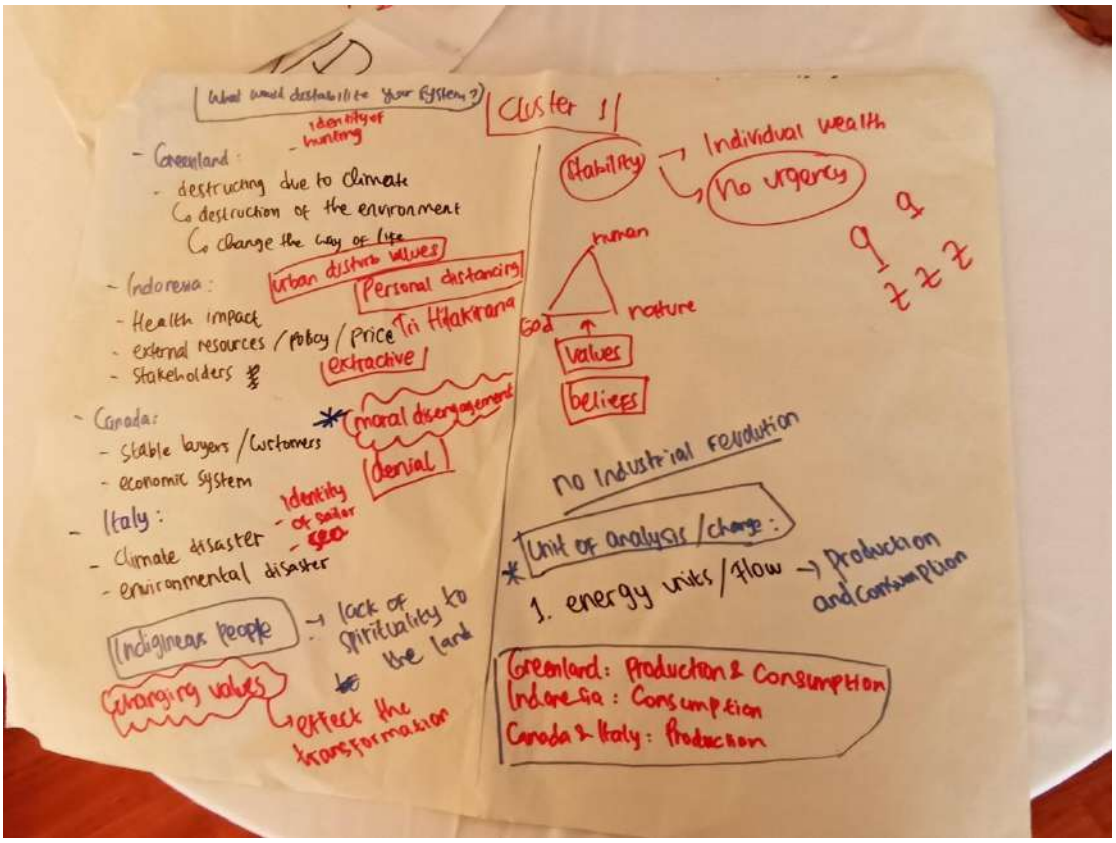
Visuals





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3.2. CLUSTER 2 "Growing On-Stream Narrative"

Discussion

The group discussed the questions on what are the common narratives across the cases, which stakeholders hold the narratives, what is the key driving force behind the change, what are the key conditions keeping the transition going and how the society perceives the change.

What are the key common narratives across the cases?

- **De-growth narrative:** only in Balearic Islands. Maybe in some sectors in Austria.
- **Labour market driven narratives:** Poland, Romania, Czech Republic.
- **Tourism narrative:** not oriented towards mass tourism, but certainly some perspective of tourism (e.g. conference tourism), plays a different role in Spain and Poland, for example.
- **Knowledge centre narrative:** regional knowledge perceived as an opportunity; the key questions are what to do with coal and what to do with land after closure of coal mines.

Which stakeholders hold the key narratives?

- **Central government:** leading the climate policies in most cases.
- **Regional government**: leading the climate policy in Spain, equally important (compared to central government) stakeholder in Poland; in Romania and Czechia not, but they are (more) unitary countries.
- **Trade unions:** important only in Poland. In other cases – fragmented and/or weak, not a significant stakeholder.
- **Industries:** fragmented; not among the most important.
- **NGOs, academia, communities:** formal participation, but not respected in the country.

What is the key driving force behind the change?

- **Dynamics of the economy and competitiveness.**
- **EU pressure and imposed as top-down policies (no choice)**.

What are the key conditions keeping the transition going?

- **Access to funding & capacity and willingness to plan and acquire the funds:** in Spain and Poland.
- **Certainty of policy restrictions:** in Austria the industry is waiting for it.
- **Strong local and regional leadership:** Poland and Czech Republic.
- **Skilled and motivated civil service:** Poland.

How does society perceive the change?

- **Strong prevalent sentiment for coal mining** in all cases.
- **Class identity** in Romania and **miners' identity** in Poland and Czechia.
- **No strong identity** in either Balearic Islands or Austria.

Units of change: Transition is obvious but the pace and direction is under discussion.

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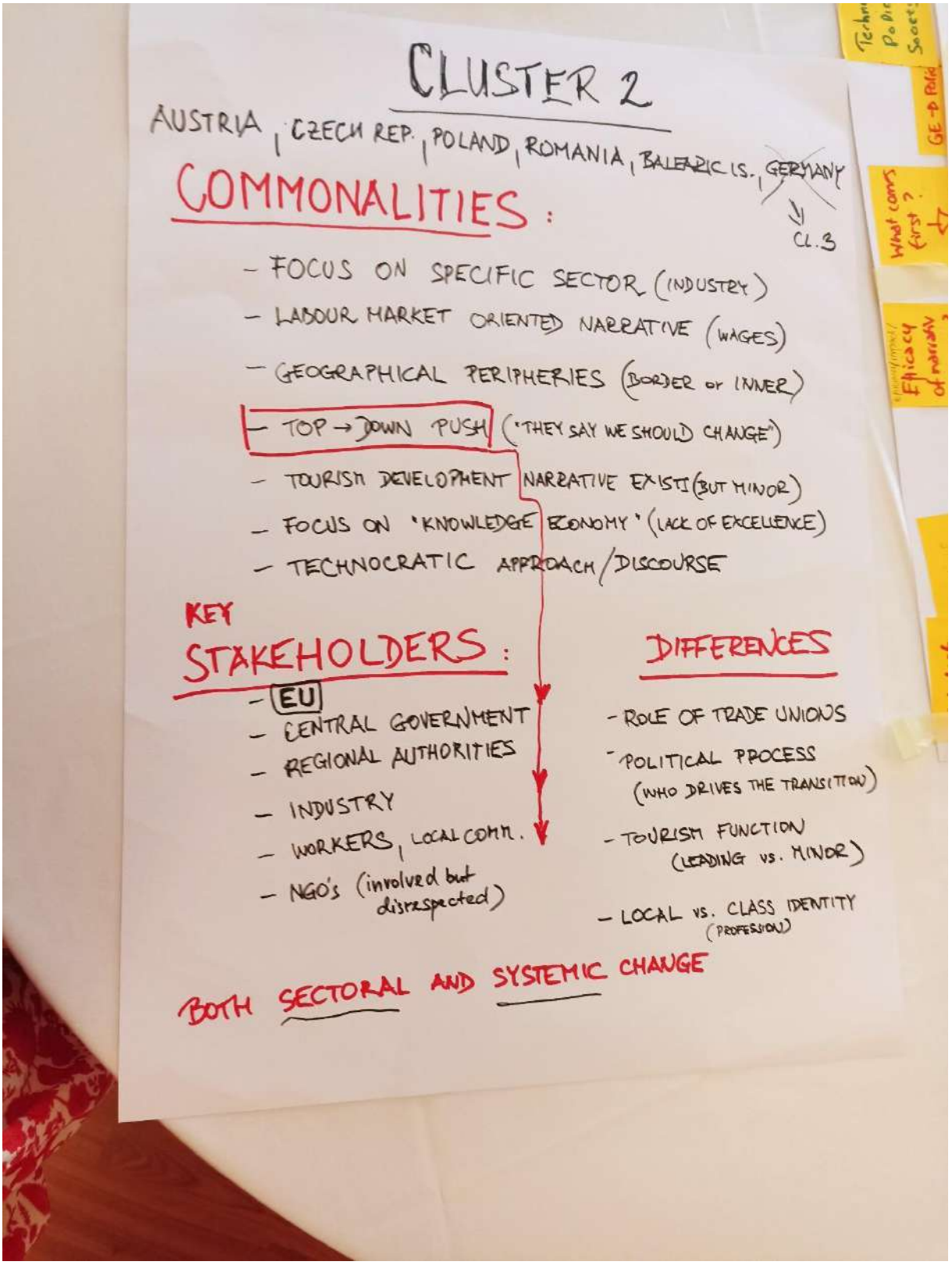
Scale of change: systemic and/or sectoral.

Visuals



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3.3. CLUSTER 3A

Discussion

The group discussed the questions on why some regions experience politicisation and whether identity plays a role in it, how energy transition is being regionalised and whether the change has taken place top-down or bottom-up.

Decision to decarbonise – a top-down decision

- In some cases, there is a push back against the government decision to, like in Lofoten, to exploit oil, which is seen as an energy source of the 'past' and not moving towards the future.
- In some other cases, such as Teruel, there is no push back towards the decarbonization decision of the government, which is perceived as a move towards the future and accepted.
- In again some other cases, such as Svalbard, the perspective of closing the last coal mining raises complex geopolitical issues based on the Svalbard Treaty which allow any signatory of the Treaty to exploit non-exploited resources. This in turn could result in even higher fossil fuel resources exploitation making the region higher carbon.

Identity – important element in transition

- Key identities - coal worker and/or blue collar, religious – Hinduism (Indonesia) affecting geothermal energy exploitation perceived as drilling in the ground is not accepted.
- Often, the transition involved substitution of jobs (e.g., in renewables in Spain), but the identity is still the same.
- When companies change their branding, workers do not necessarily take up the new identities.

Energy transition is seen in some cases as **a way to mobilise** for the youth and other groups and to articulate their vision.

Units of change: economy, institutions, policy, society and technologies, electricity sectors (Indonesia).

Scale of change: sectoral and systemic.

One important finding is that the way the energy is regionalized can make new energy regions change their boundaries and be territorialized.

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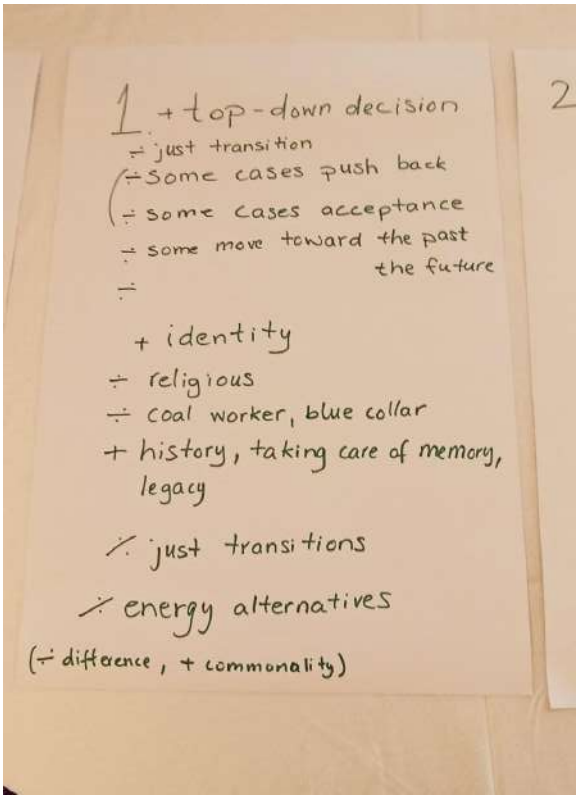
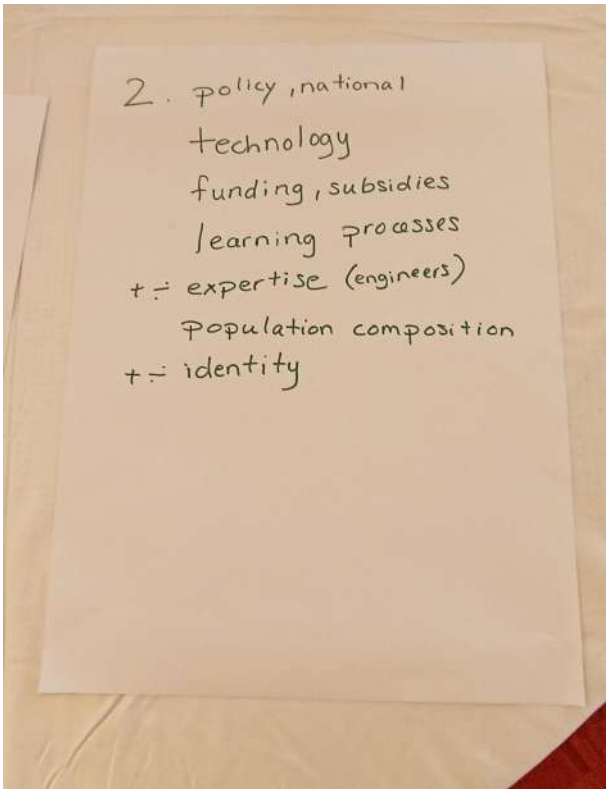
Visuals





3.4. CLUSTER 3B

The group discussed challenges of energy transition, aspects of diversification of economy and uncertainties the regions are facing now.

Uncertainties

- Economies dependent on coal, rich tradition of coal mining, fundamentally different conditions due to Russia's War in Ukraine – all contributing factors to the lingering uncertainty in the case studies (especially Poland, Greece and Bosnia and Herzegovina).
- Transition from coal to renewables with natural gas – one possible pathway.
- A high number of workers still employed in the coal mining sector – still an unsolved problem (Poland).
- Avoiding the discussion on consequences (especially in Poland).
- Other countries (e.g. Bosnia and Herzegovina) are eager to use Poland as an excuse to justify a slow closure of mines.
- The local population is afraid of losing fisheries (Norway).

Key traits of transition

- Top-down policy change driving the transitions (clearly in Norway, in Germany it triggered a narrative change also at local level).

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- Hybrid – partly top-down and partly bottom-up driving the change in Poland (EU driven, responded by regional and local level, no sufficient policy planning at national level).
- A clear gap between the bottom-up and top-down approaches.
- There is some awareness of policy change in the population.

Still necessary to continue the transition successfully

- Change in mindset as currently no one is willing to take responsibility to become the agent of change.
- Framing and communication is very important for changing the perspective of the people.

Possible diversification of economy

- Extraction of lignite.
- Renewables – bottom-up movement, but hard to do it.
- Closure of educational facilities for coal miners.

Visuals

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4. PART II: WORKING TOWARDS ELABORATING AN OVERARCHING THEORETICAL FRAMEWORK

During this session the break-out groups were asked to reflect and discuss on:

- **What** strategies for the region to transition/transformation?
- **Who** will lead the change and who will participate in it?
- **How** will the co-development happen?

4.1. CLUSTER 1 "No Significant Change"

Discussion

What strategies?

- Changing dependencies of energy flows to become more independent.
- Creating a sustainable energy community.
- Centralisation of energy transition (Indonesia).
- Different scenarios for reducing oil.
- Increasing ownership.
- Increasing decentralisation or centralisation (depending on the case).
- Increasing resilience.
- Continuing the stability of the energy system and not threatening the current system.

How?

- Social learning (framework, interactions, institutions).
- Increasing resilience.

With whom?

- All levels of government.
- Community.

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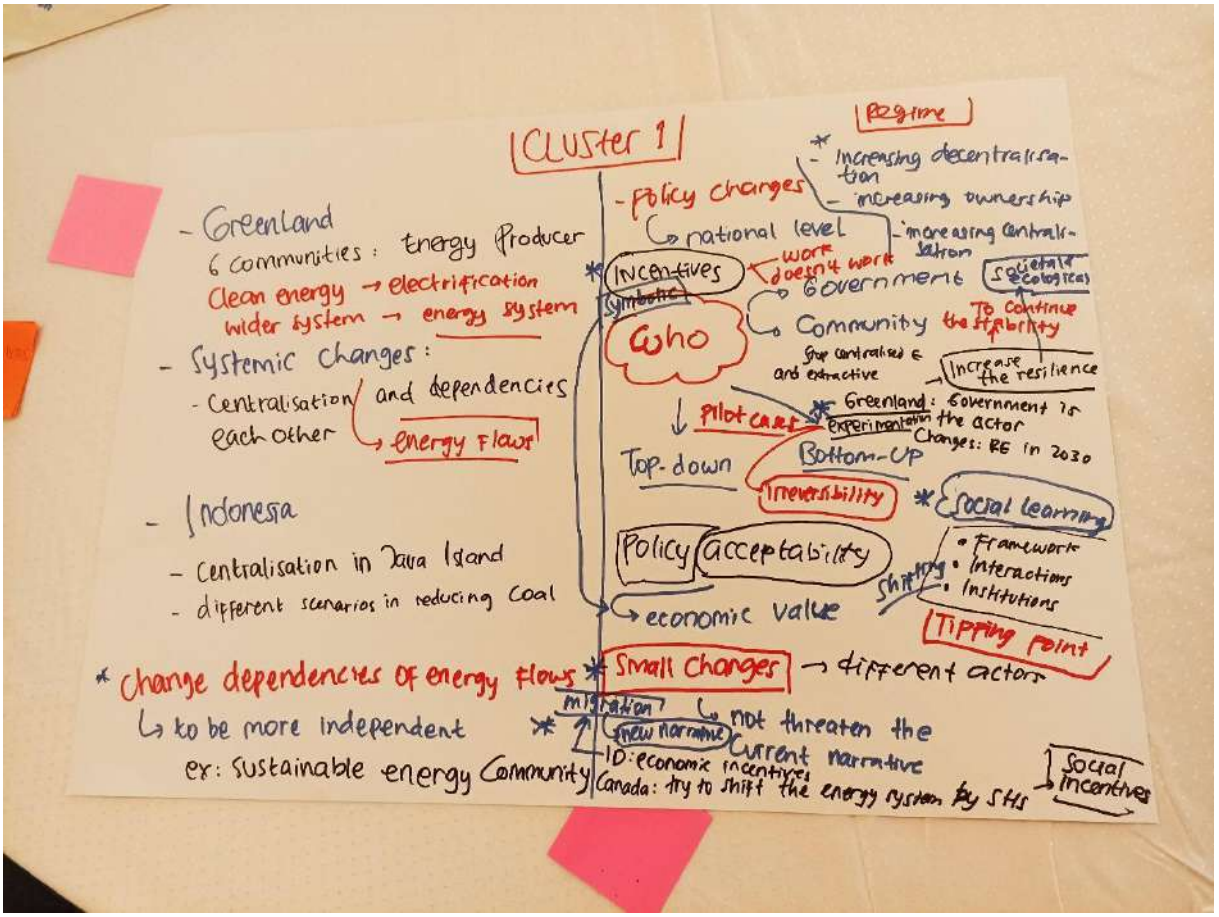
Visuals



4.2. CLUSTER 2 "Growing On-Stream Narrative"

Discussion

What strategies?

- Decarbonisation of economy.
- Economic diversification.
- Increasing energy efficiency.
- Revitalisation of the economy (society, post-mining landscapes).
- Energy independence (also at regional, not only national level).
- Rebranding (image, identity).

How?

- EU funding and other financial instruments.
- Capacity building measures (education, consultancy, best practices).
- Balance of mega-projects and small-scale projects.
- Mobilisation of local knowledge (stakeholders' involvement).
- Innovative multifunctional projects.
- Public-private partnerships (desirable, but still missing in all cases studies).
- Monitoring system (present only in Poland; desirable in others).

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- Cross-border cooperation (desirable, not still present).

Who (key stakeholders):

- Key stakeholders currently already involved in the policy process (central, regional and local government, miners and their trade unions, industry).
- Others are currently underrepresented (youth, NGOs, academia and other educators, families).

Visuals

4.3. CLUSTER 3A "Renewables' Growth and Diversification of Economy"

Discussion

What strategies?

- Centrally planned just transition plans with specific targets of phase-out fossil fuels (Spain, Greece, Romania, Indonesia and Norway).
- Identifying the best mix of alternative sources of renewable energy sources and securing their supply (Norway, Svalbard).

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- Economic diversification – education, research and tourism (Norway Svalbard, Romania).
- Changes of socio-ecological systems – more difficult to happen.

With whom?

- Planning unit, industry (electricity company) (Indonesia).
- National policy makers
- Private investors in wind energy, energy industry in general.
- Local authorities (e.g. Romania).

4.4. CLUSTER 3B "No Significant Change"

Discussion

What strategies?

- Decarbonisation roadmap (Bosnia and Herzegovina)
- Phase-out of coal mining.
- Top-down just transition plan.
- Economic diversification.
- Unification and empowerment of citizens.

How?

- Projections of labour market changes.
- Data simulation of transition.
- Communication of risks of indirect effects of mines' closure.

With whom?

- Politicians and national policy makers.
- Regional and local municipalities (should reach an agreement among them).
- Tourism sector.
- Social movements and NGOs (should strive to achieve "unification" as a single actor in policy making).
- Miners.

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Visuals

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5. NEXT STEPS

The results of this workshop will be used to elaborate an overarching theoretical framework of social change supported by empirical evidence from case studies and co-develop strategies.

Before commencing the work on drafting the theoretical framework and strategies, the WP 5&7 teams will perform a review of the case studies. The WP 5&7 will do a review of all the case studies which will be supplemented by additional review for each case study performed by one case study team.

During the meeting, the teams were asked to choose one case study for a detailed revision.
A table indicating allocation of case study reviews is below:

TIPPING+ CS Feedback				
		Case Study	**Case Study Reviewer**	**WP5&7 Overseer**
CS1	AU	Austria	Cynthia	Diana
CS2	BA	Bosnia & Herzegovina2	Arpad	Baiba
CS4 CS5	CZ	Moravian-Silesian Region / South-Moravian Region	Andrei	Baiba
CS6	DE	Germany Ruhr	Jacob (two case studies)	Baiba
CS7	DK	Greenland	Luis	Amanda
CS8	GR	Megalopolis	Franziska	Amanda
CS9	GR	Keratsini-Drapetsona	Francesc	Baiba
CS10 CS11	ID	Banten / Bali	Raphaela	Diana
CS12	IT	Sulcis	Zois	Diana
CS13	IT	San Pietro - Carloforte	Brigt	Amanda
CS14	NO	Svalbard	Zois	Baiba
CS15	NO	Lofoten	Elena	Diana
CS16	PL	Populism case study	Not reviewed for case study	Not reviewed for case study
CS17	PL	Upper Silesia	Hamid	Jenny
CS18	RO	Jiu Valley	Jacob	Jenny
CS19	ES	Balearic Islands	Joanna	Amanda
CS20	ES	Aragon-Teruel	Fulvio	Jenny
CS21	CA	Alberta	Regina	Amanda

The submission date for case study revisions is **August 15, 2022**.

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After completing the revision of the case studies, the project team will move on with elaboration of the theoretical framework and codevelopment of strategies.

The team of WP5&7 will contact all other WP leaders to discuss the objectives and the preparation of the 5th and last Integration Workshop.

6. ATTENDEE LIST

1 Nikos Kleanthis (WP6 + CS Greece)
2 Alexandros Flamos (WP6 + CS Greece)
3 Jeremie Fosse (eco-union) (WP6 + CS Spain)
4 Amanda Martinez (TUD) (WP5 + CS Mexico)
5 Mauro Sarrica (Sapienza) (WP2 + CS Italy)
6 Elena Apostoli Cappello (Sapienza) (WP2 + CS Italy)
7 Antoine Mandel (PSE) (WP4)
8 Takeshi Takama (su-re.co) (CS Indonesia)
9 Cynthia Ismail (su-re.co) (CS Indonesia)
10 Raphaela Maier (Uni Graz) (WP4 + CS Austria)
11 J David Tàbara (GCF) (WP8)
12 Joanna Mazurkiewicz (IBS) (WP4 + CS Poland)
13 Lucia Brisudová (PUO) (WP1 + CS Czech Republic)
14 Stanislav Martinát (PUO) (WP1 + CS Czech Republic)
15 Bohumil Frantál (PUO) (WP1 + CS Czech Republic)
16 Brigt Dale (NRI) (WP1 + CS Norway)
17 Arpad Todor (SNSPA) (CS Romania)
18 Baiba Witajewska-Baltvilka (IBS) (WP7 + CS Poland)
19 Diana Mangalagiu (GCF) (WP7)
20 Hamid Mehinovic (WPC) (CS Bosnia and Herzegovina)
21 Andrei Taranu (SNSPA) (CS Romania)
22 Jakub Sokołowski (IBS) (WP4 + CS Poland)
23 Dimitra Aglamisi (UPRC) (WP6)
24 Franziska Mey (IASS) (WP3 + CS Germany)
25 Siri Veland (NRI) (WP1 + CS Norway)
26 Francesc Cots (eco-union) (WP6 + CS Spain)
27 Anna G. Sveinsdóttir (NRI) (WP1 + CS Norway)
28 Siti N. Indriani (su-re.co) (CS Indonesia)
29 Nihit Goyal (TUD) (WP5&7)
30 Zois Katiforis (UPRC) (WP6 + CS Greece)
31 Regine Moller (CS Greenland)

7. ADDITIONAL INFORMATION

Feel free to contact any of us for questions, suggestions, or comments.

Amanda Martinez Reyes (a.martinezreyes@tudelft.nl), Diana Mangalagiu (diana.mangalagiu@ouce.ox.ac.uk), Jenny Lieu (j.lieu-1@tudelft.nl), Baiba Witajewska-Baltvilka (baiba.baltvilka@globalclimateforum.org).

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9.5. Annex: Report of the Fifth Integration Workshop

FIFTH INTEGRATION WORKSHOP "ELABORATION OF INTEGRATION FRAMEWORK AND NEW SOCIAL THEORY"

Location:	In person: **6 rue Vandrezanne, 75013 Paris, France** & Online: *https://neoma-bs.zoom.us/j/8859234348?pwd=dzdiSnYvVGxEeTd3M0VQalZBaVpGQT09*
Date:	December 1-2, 2022
Time:	Day 1: 9.00-18.00 Day 2: 9.00-16.00
Presenters & facilitators:	Plenary and break-out groups: Diana Mangalagiu, Jenny Lieu, Amanda Martinez Reyes, J. David Tabara, Jeremi Fosse and Baiba Witajewska-Baltvilka
Participants:	See Attendance List at the end of this document

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Content

1. Agenda of the Workshop
2. Introduction: Preparation for the Workshop
3. Elaboration of the Integration Framework and the New Social Theory
4. Towards Regional Strategies and Policy Briefs
5. Final Reflections
6. List of Participants
7. Additional Information
8. Annexes

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1. AGENDA: FOURTH INTEGRATION WORKSHOP

"Elaboration of Integration Framework and New Social Theory"

Day 1 - December 1st 2022	
08:30-09:00	**Welcome Coffee**
09:00-09.15	**Welcome & Agenda Overview** *Moderators: Diana and Jenny* *Journey of integration: on-line during covid- Amanda; slides: Potsdam (came up with interdisciplinary questions in WP1-4; listed key indicators); Greece (first outcomes of case study narratives); Paris: reflection on how useful it was and how it can help with strategies forward? Wrap up of project*
09.15-10.00	**Session I: Integration Framework & Discussion** *Moderators: Baiba and Amanda* *Short presentations by WP1-4 (Siri, Mauro, Franziska, Antoine)* 1 slide/diagram reflecting the key concepts of your **disciplinary perspective** provided for case study analysis (3 min each): 1) the key concept(s) to understand a transition in CCIRs; 2) the key stages of transition; 3) the triggers of transition. *Discussion (possible questions):* - How are these disciplinary perspectives applied in each case study? - What timeframe are those concepts referring to? - Are various WP's concepts of transition complementary? - For your case study, what conceptual frame, concepts etc. would you apply now? - What would you do differently in your case study? (e.g. applying a different framework)?
10:00-10.45	**Open time slot I: Open for case studies and work packages. Reflecting on the Integration Framework** *Moderator: Diana* Reflections on the disciplines, theories and methods you used in your case study and how helpful there were *Presenters: Ad-hoc volunteers*
10:45-11:15	**Coffee Break**

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11.15-12.00	**Session II: New social theory on SETPs in CCIR & Discussions** *Moderator: Jenny* *Discussant: Nihit* Insights from the empirical case study work that can contribute to a new social theory or revising current theories *Output:* What theoretical concepts & components help explain the enablers and barriers in your regions' transition process? *Reflection questions:* - Can these theoretical concepts & ingredients contribute to a new social theory that better explains the actual process of transition and not only the outcome? - Integration framework applied through narratives (indicators, questions covering WP1-4 theories concepts?) How did you find this? Was it useful or not?
12.00-13.00	**Open time slot II: open for case studies and work packages. Reflecting on the new social theory: reflect on enablers and barriers in the case study clusters** *Moderator: Amanda* *Presenters: Ad-hoc volunteers*
13:00-14:30	**Lunch**
14:30-16.00	**GEC Special Issue Papers' Presentations & Discussion** *Moderator: Diana* *Presenters: Siri, other lead authors* (Part of the session in break-out groups with case studies to be included in the papers) A session in parallel could be organised on the TIPPING+ Book (David)
16.00-16.30	**Coffee Break**
16.30-17.15	**Open time slot III: open for case studies and work packages** *Moderator: Jenny and Diana* *Presenters: Ad-hoc volunteers*

17.15-18.00	**Discussion: Reflecting together on the Integration Framework and New Social Theory** Where have we got so far? Sum-up of Day 1 & Adjust plans for Day 2 as needed *Moderators: Diana & Baiba*

20:00	**Dinner at La Felicita, https://www.lafelicita.fr/ (to be covered by the participants).**

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Day 2 - December 2nd 2022	
08:30-9:00	**Welcome Coffee**
9:00-11:00	**Discussion: Regional strategies, responses, and solutions for enhancing positive SETPs for energy transitions in CCIRs: case studies' contribution to D5.3** *(Part of the session in break-out groups with clustered case studies?)* *Moderators: Jenny and Amanda*
11:00-11:30	**Coffee Break**
11:30-13:00	**Discussion of papers and/or book- Policy Briefs -> strategies booklet** *Moderator: Diana* *(Part of the session in break-out groups?)*
13:00-14:00	**Lunch**
14:00-14:45	**Open time slot IV: open for case studies and work packages** *Moderator: Jenny and Diana* *Presenters: Ad-hoc volunteers*
14.45-15:30	**Discussion: Integration Deliverables** - Advancement of Deliverable 7.1. "New social theory on SETPs in CCIRs including the overall project knowledge Integration Framework" - Expected contributions from partners for the D7.2 "Full project knowledge integration report" *Moderator: Diana*

15:30-16:00	**Next steps & ideas for future collaborations** *Moderator: Jenny*

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2. INTRODUCTION: PREPARATION FOR THE WORKSHOP

The objectives of the integration workshop were to:

- finalise the integration framework of the TIPPING+ project based on the initial version and the work done in WPs 1-5 and the empirical findings of the case studies;
- advance the new social theory on SETPs in CCIRs;
- advance on cross-work-package and cross-case-study understanding and insight.

Before the Workshop, the Work Package Leads were asked to submit their contributions for development of the Integration Framework and the New Social Theory. They were asked to reflect on the following nine points (see from A to I below).

A Based on your multi-/inter-disciplinary knowledge and empirical findings, what **transition stages** would you use to describe the transition process and **time scale** in coal and carbon intensive regions? Please indicate the related theory or framework.

Example of transitions stages (feel free to suggest other stages):

- **Emergence**. The emergence stage is marked by experimentation, innovation in the laboratory, and demonstration in the field, to produce technologies and system architectures (Geels 2005).
- **Early adoption (pre-tipping point). Technologies go from the laboratory to limited commercial application.**
- **Diffusion (at the tipping point). Technologies become mainstream.**
- **Stabilisation (past the tipping point). New technologies, systems, and behaviours are both standardised and insulated from rebound effects and backsliding (Andersen and Gulbrandsen 2020).**

Time scale (Tabara): Time dimension is crucial in T+ but this needs to accommodate the different disciplines and perspectives that are present in the project, as they range from personal biographies at community level, EU policy targets, macro-economic trends or biophysical/climate processes. Epistemic diversity needs to be made explicit for each of the case studies and avoid that one particular perspective of time is imposed upon others.

B How would you describe the **type(s) and sequence of change(s)** (e.g. sectoral change, power shift, etc.) in the transition of coal and carbon intensive regions that your discipline helps analyse? What measures (if any) is used for each type of change?

Qualitative structural change (Tabara)**:** It is important that TIPPING+ focuses on making explicit what we mean by qualitative structural change at different scales/across a continuum of action from individual, based on the matrix of WP1-4 indicators.

C What is the **stance on justice** in the study of transitions in coal and carbon intensive regions? (either of the stakeholders or of the researchers: do they/you view justice as a trigger, a process, or an outcome in the case?)

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Justice (Tabara)**:** A core aspect in enacting positive tipping points is to move to a more just world. Justice then can be understood as a trigger, a process and an outcome. However, most mainstream accounts of justice in energy transition analyses tend to take an anthropocentric stance or simply focus on economic compensation. A more transformative nuanced view of justice and of all its multiple dimensions is required and TIPPING+ has the opportunity to build such a perspective upon empirical insights from the case studies.

D Based on your multi/interdisciplinary knowledge and empirical findings, how do you understand the **shaping of regions going under transition** (do regions change their boundaries and are territorialized)?

Shaping of a transitioning region (Tabara): We're interested in the transformation of regions themselves and in particular those which can emerge as benchmarking positive transformations towards sustainability, otherwise referred by the EU Mission on Climate Change and Transformations (Hedegaard et al. 2020) as 'Accelerator Regions'.

E Based on your multi-/inter-disciplinary knowledge and empirical findings, how, if so, does the transition process relate to the concept of **multiple stable states** (Milkoreit, 2018)?

Multiple stable states (Tabara): The notion of stability is contested in social sciences and therefore, in transformations research. Societies are constantly changing, although it is true that what is considered in sociology as structure (by authors like Bourdieu, Archer or Giddens) refers to those relatively stable components of society in contrast to those dynamic ones which are mobilised by different forms of agency[1]. In other words, talking about multiple stable entails that such systems exist or can be identified, besides deciding at which level of the system or of agency are we talking about. According to Bourdieu stable structures are not 'out there' but embedded in people's minds and in normalised behaviours, but other more whole-systems approach may find it important to think in terms of changes in *basins of attraction* (see Byrne and Callaghan 2014).

F Based on your multi-/inter-disciplinary knowledge and empirical findings, how, if so, does the transition process relate to the concept of **(Ir)reversibility** (Milkoreit, 2018)?

(Ir)reversibility (Tabara based on Milkoreit 2018): The evolution of all societies is always irreversible. A basic reason for that is that all societies are organised upon dissipative structures the development of which are subject to both social and biophysical entropic processes (i.e., the millions of barrels consumed today in the world cannot be consumed again tomorrow). For instance, as noted by Lenski (2005), out of the 100.000 or more societies that existed in the World about 9000 years ago, there are less than

[1] The rigid assumption of stability and 'end points', was actually what got me away from transitions research and moved me to transformations research. One of the first large compilation of transformations research was this one: *World Social Science Report 2013*. Paris, France: International Social Science Council, OCDE / UNESCO, pages 112-18. ; https://doi.org/10.1787/9789264203419-15-en

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300 today (and probably will only be a few dozen left at the end of this century). However, some of these macro-sociological processes may be slowed down or modified (i.e., by turning into renewable energies); while some social forms, practices and contents may apparently 'come back', when for instance, some rights and liberties that were achieved at one point are lost again (i.e. as a result of illiberal policies or unlearning). Therefore, such irreversibility can be negative or positive.

G Based on your multi-/inter-disciplinary knowledge and empirical findings, how (and at what stages) do positive and negative **feedback loops** influence the transition process (Milkoreit, 2018)?

Feedback loops (positive and negative adaptive cycle) (Tabara based on Milkoreit 2018): In TIPPING+ we are mostly interested in learning transformative feedbacks i.e. those self-propelling, amplifying processes that create multiple cascading benefits across social, economic and ecological domains; and particularly, those that at *one point in time* are able to substitute those perverse feedbacks that thus far operated in the opposite direction (like growing inequality, environmental degradation and loss of economic opportunities). Hence the growing emphasis in regenerative strategies (i.e. as in coal mines) and those which are not only less harmful (<0) neutral (=0) but mostly that are net positive (<0) so that those social-ecological capitals and conditions can be restored and in time move the whole system towards a sustainable trajectory or basin of attraction. In my view a strategy that contributes to achieving SDGs and mostly towards creating transformative capacities to go beyond them is going towards a positive direction.

H Based on your multi/interdisciplinary knowledge and empirical findings, what are the **key triggers** of change and/or tipping points in transitions?

Key triggers of transition:

- **services and sectors (***What services and sectors drive consumption of fossil-fuels?);*
- **technology** (*Were/are there alternative technologies to replace fossil fuels considered to be available in the region? Under what conditions can they become available?);*
- **finance and investments** *(Are finance and investments for mitigation policies available in the regions?);*
- **political economy** *(The stance of incumbent political and economic actors on energy policies. What have been the key narratives and narrators? How have different narratives evolved? How have vested interests been addressed?);*
- **equity and fairness** *(how have equity and justice interests been taken into consideration? Has it been a hindering or facilitating factor?);*
- **social innovation and behavioural change** *(What role does identity (change?) play in energy transitions? Are there (new) behavioural patterns facilitating or impeding the transition?);*
- **policy impacts** ***(****What has been the role of (top-down) mitigation policies in energy transitions?);*

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- **legal framework and institutions** (*New forms of partnership and cooperation practices?)*

Key triggers (Tabara): A trigger is what ignites the process of qualitative change. It is important to notice that a combination of triggers may be possible and may be necessary to explain the emergence of TPs.

I What additional **concepts/theoretical elements** were useful but not found in this list of concepts?

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3. ELABORATION OF THE INTEGRATION FRAMEWORK AND THE NEW SOCIAL THEORY

3.1. Presentations of the WP Leads

On Day 1 of the meeting, the WP Leads gave short presentations on:

- the key concept(s) to understand a transition in CCIRs;
- the key stages of transition;
- the triggers of transition.

The **key concepts** highlighted by the WP Leads:

- WP1: regional characteristics – formal, perceptual, administrative; geographical (i.e. depopulation); energy governance;
- WP2: energy-scapes, identities, sense of place, power;
- WP3: plasticity of tipping points; disruption, social change, transformative incrementalism; slow paced transformation; managed transformation;
- WP4: socio-economic dynamics (technological change, structural change); economic growth.

The **key stages** highlighted by the WP Leads:

- WP1: adaptive cycle;
- WP2: pre-development; acceleration/take-off;
- WP3: shock of coal crisis, patterns of decline, avoidance of decline in denial until they lost, acceptance of the situation after many years, new opportunities for development, no stable states;
- WP4: N/A.

The **key triggers** highlighted by the WP Leads:

- WP1: finance and investment, political economy, policy, geographical context;
- WP2: sense of place, identity, stability, trauma;
- WP3: political power, policy interventions;
- WP4: technological change as a driver for structural change.

See Annexes for the detailed presentations of all the WPs.

Key take-aways from the discussion:

- Shifted agency from national to regional level. Regions perceive a responsibility to take a lead on the transition;
- One should differentiate between shocks vs triggers vs enablers;
- One should map concepts and theories applied across all the case studies.

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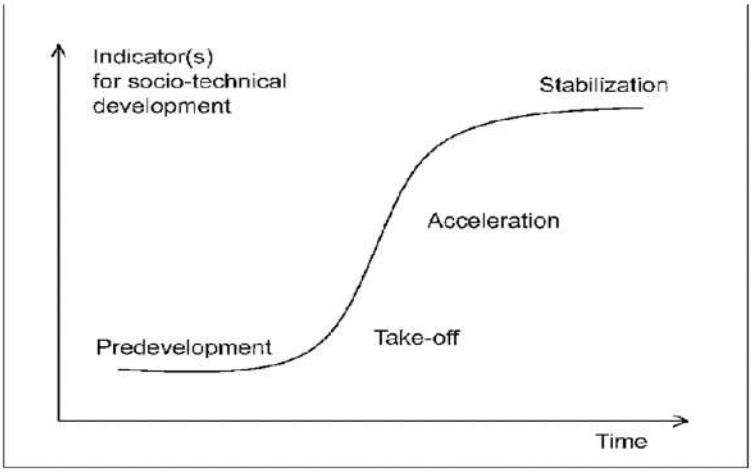
3.2. Session on Triggers and Enablers

A working session on Day 1, led by Amanda, was devoted to the identification of triggers and shocks of transition.

Part I

During the first part of the session, Amanda gave a short presentation highlighting four clusters of the case studies and the key hinders and enablers for transition.

Based on the transition stage (see Rotmans, 2001), the case study trajectories were categorised into four clusters (see the picture below):



A **Stable mainstream CCI**

B **Declining mainstream CCI and pre-development/take-off of on-stream**

C **Closed mainstream CCI**

D **Take-off of off-stream narratives**

A **Stable mainstream CCI**

Four country regions correspond to this cluster: Greece, Megalopolis (transition from coal exploitation to natural gas); Denmark, Greenland (hydropower plants and oil imports); Indonesia, Bali (coal, oil, and gas national dependency); and Italy, Sulcis (coal-to-gas transition).

B **Declining mainstream CCI and pre-development/take-off of on-stream**

Two country regions correspond to this cluster: (Indonesia, Bali; Greece, Megapolis; Austria, Upper and Lower (green hydrogen and circular industrial economy); Spain, Balearic Islands (Energy connection, renewable energy system, reduction of local energy production)).

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Enablers for transition:

- Clean energy policies (IND)
- Natural gas price (GR)
- REPowerEU Plan (GR)
- Funding mechanisms (GR)
- Sense of place (GR)
- EU level policies: phase out of emission, funding mech (AT)
- Climate Change and Energy Transition act
- Advanced economic position (ES)

Hinders for transition:

- Market monopolies (IND)
- Renovation costs (GR)
- Lack of industry policy (AT)
- Job and identity dependency.
- Lack of CO_2 tax for industry
- Lack of market regulations and market for CCU/S.
- Insular identity (ES)
- National energy dependency: large capacity of electric grid interconnection
- Self perception as green (IT)

C **Closed mainstream**

One country region corresponds to this cluster: Spain, Teruel (decline of mainstream, reached a tipping point, stabilisation of on-stream. Just transition, installation of large-scale renewable energy projects).

Enablers for transition:

- Spain's entry into the European Union (1986) led to adoption of coal regulations
- Non-competitive coal
- Just transition criteria for companies

Hinders for transition:

- COVID-19 pandemic delayed participatory processes
- Lack of policies for alternative narratives

D **Take-off of off-stream**

None yet.

Part II

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Afterwards, the participants worked in three break-out groups to identify key triggers and shocks, as follows:

- end of communism
- end of subsidised coal sector
- liberalisation of energy market
- Paris Agreement

- globalisation
- EU pressure
- harmonisation of legislation with the EU
- environmental awareness - protests at the end of 80s and beginning of 90s
- lack of administrative capacity
- Russia's War in Ukraine
- inefficiency of coal.

During the plenary discussion, a number of other points to consider emerged:

- shocks can be either internal or external;
- enablers or barriers can be double-edged (example, infrastructure for hydrogen is a barrier when missing and an enabler when present);
- control parameters and other parameters (independent and dependent variables at the same time) could lend more rigour to the discussion.

3.3. Sessions on Social Theory Building

David Tabara gave a presentation on theoretical considerations of theory building.

The key take-aways from the presentation:

- The new Social Theory should be a mid-ranged theory;
- Building propositions (previous stage before hypothesis and theory) is important, but they will not necessarily always lead to hypothesis and theories, sometimes it stays at the level of argumentation;
- Good propositions tend to challenge general assumptions, reveal clearly what we want to research, are grounded in solid concepts and theoretical frameworks, as well as limit the system of reference to the smallest number of elements and explain the maximum number of relevant phenomena;
- The selection of explanatory variables and variables to be explained are inevitably influenced by existing theoretical paradigms and subject epistemological conflicts, often that appear in the form of dualisms. The form is also influenced by specific methods, besides the paradigms to be used;
- In social environmental sciences we need to add an explicit reference to their social-ecological context / system of reference, as sustainability sciences are always science in context, although good theories should help understanding different kinds of contexts / SES.

Key steps to consider when building a theory:

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- Try to make your own ‘theory’ (or proposition/hypothesis): explain WHY something happens in the social world / given social system;
- Discuss and try to identify whether your theory is ‘good’ (e.g., learn about the parsimony criteria);
- Decide which main sociological paradigm best describe the phenomena you have observed.

To do so:

A. Decide upon a phenomenon you want to explain (e.g., a crisis, a structural dynamics, a local event, etc). Make a good question you want to answer!
B. Select a limited set of (social) variables: can be people or other more aggregate concepts.
C. Operationalise them (decide its direction and behaviour) and try to find the interrelationships between them and the possible context of application.

The key highlights/reflection on theory building from other participants:

- In the TIPPING+ project we promised social-ecological tipping points and to discuss the interactions with human systems;
- Examples of sociological paradigms to explain change and structure - Marx, Weber etc.;
- Epistemological dualism in social environmental theory;
- When developing the new Social Theory, we need to consider the core disciplines, economic, social psychological, policies, demographics. Our ideas will involve some of these 4 components as well as the ecological part.

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4. TOWARDS REGIONAL STRATEGIES AND POLICY BRIEFS

On Day 2, Jeremie led a session on the regional strategies and policy briefs.

According to the DoW, a set of **4 Policy Briefs** should be elaborated.

a. 1st PB on factors affecting SETPs in **population, migration, gender and youth challenges,** in CCIRs (WP1)
b. 2nd PB on factors affecting SETPs in **cultural and psychological responses to clean-energy transitions** in CCIRs (WP2)
c. 3rd PB on factors affecting SETPs in **public policies and governance trends and challenges**, in CCIRs (WP3)
d. 4th PB on factors on **economic and resource trends** and challenges in CCIRs (WP4).

It was emphasised that the approach to policy briefs is **flexible and open to suggestions,** encouraging cross-fertilization between WPs and CSs.

The **suggested timeline** for the policy briefs:

- Draft versions by **31st December 2022**
- Feedback by **mid-January 2023**
- Finalised versions by **mid-February 2023**
- Drafts' overview to be presented during the clustering event in Brussels (**24 January 2023**)
- Consolidation, final proofreading, and submission by **end February 2023.**

Key points for writing-up the policy briefs:

What policy briefs should be:
+ Short and concise (3-4 pages A4) document
+ Easy and visually attractive for a (quick) read
+ Highlighting few **key messages and/or recommendations** for targeted policy or decision-makers
+ Focusing on **ONE main policy or thematic issue**
+ Related to concrete **existing or in-development policies** (soft/hard regulation or law, investments or incentives, voluntary or mandatory actions, institutional programs etc.)
+ Aiming to (positively) **influence the Policy cycle** (design, validation, implementation, monitoring etc.)
+Targeting **specific policy or decision-makers** (at any level or topic)

What policy briefs should NOT be:
- Long, reflective or detailed documents
- Complex, conceptual or hard to read
- Mixing **diverging messages** for **different audiences**
- Using research or academic languages
- Sending confusing, misleading or hard-to-interpret information
- Not related to concrete institutional policies or programs

Key points for framing the policy briefs:

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- **Identify well the TARGETED audience**
    - Local, regional, national, EU and/or global (IOGs) level ?
    - Public authorities (which ones?), Civil Society Organizations (CSOs/NGOs) and/or private sector(s)
- **Frame clearly the KEY messages**
    - 1-2 sentences in plain language with the main research learnings
- **Illustrate with concrete examples**
    - Use the Case Studies **and** WPs results to ground the messages
    - Give data or (policy) references to support your recommendations
- **Specify relations with concrete policies,** such as:
    - EU Just Transition mechanisms
    - European Green Deal
    - Climate package (Fit for 55)
    - RePowerEU
- **Add external links** to websites, reports or papers with useful information

Based on your research / Case Study:

- What is/are the **key learning(s) / message**s to be considered by policy/decision makers?
- What is/are the key barrier(s) to advance the (Just) Energy transition?
- What is/are the key opportunity(ies) to advance the (Just) Energy transition?
- Which stakeholders should be targeted in priority?

During the working session, it was decided that **WP6 will prepare the first draft of the policy briefs** (based on the information provided by the WP1-4 Leads and CS Leads in Deliverable 5.3). Afterwards, the WP1-4 Leads and CS Leads will be asked for a review.

All the participants were once again invited to join the preparation of the videos (on a voluntary basis) – activity, led by Serafeim Michas. The purpose of the videos is telling the stories of the stakeholders and providing a platform for those who have not had a platform to express themselves.

For the elaboration of the Policy Briefs, this template and this background note as a starting point will be used.

During the discussion, the participants highlighted several points to be considered, which were included in the guidelines for the Deliverable 5.3. “Regional Strategies Report”:

- The purpose of the regional strategy - to change a position, create a new dialogue, contribute to the policy debate, engage in current conversations, bring in new perspectives, think together with policymakers or other stakeholders;
- Key audience - regional policy makers, business decision-makers in the secondary sector, community associations;
- Final engagement with the stakeholders - to share case study findings and co-identify strategies (e.g., a policy instrument, change in participation processes, etc.);
- Key messages for the stakeholder – propose new perspectives, narratives, scenarios, strategies, policies; or comment on the existing policies; or propose changes in participation process and/or decision-making;

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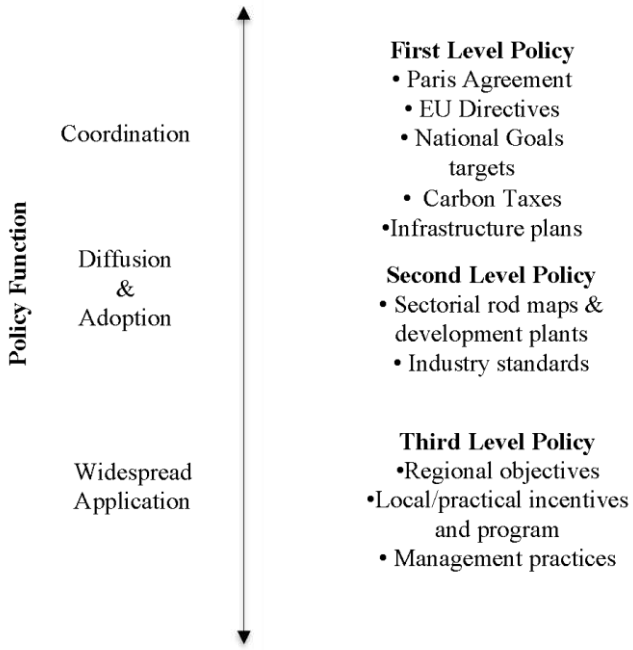
- One might want to consider the following presentation of policy function and instrument when designing regional strategies (see below).



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5. FINAL REFLECTIONS

The progress of the **Special Issue and the Book** is going well. During the workshop, a few participants presented their paper outline and invited others to join the paper. Special attention was paid to the discussion of ethical issues (authorship, contribution, involvement of stakeholders), as well as the open access policy. Diana Mangalagiu and David Tabara gave an update on both the Special Issue and the Book which are advancing as planned. The papers and book chapters can also be produced as open or close working documents.

The **Final Conference** of the **TIPPING+** project will take place on **14-15 June 2023 in Brussels**. The project will end on 31 October 2023. In the coming months, everyone should think about the invitations (policy makers, industry associations, MEPs, DG representatives, sister projects etc.), as well as about the content of the project (results, engage and create future opportunities for collaboration). In January 2023, Jeremy Fosse and David Tabara will prepare a concept note to share with the Consortium to suggest topics, people to invite etc.

In January 2023 WP7 leads will share the draft of the **Deliverable 7.1** which will include the discussion on the elaboration of the integration framework, how we build on existing work and empirical results relying on the case studies and components of the (WP1-4 teams reflections.

A draft of the **Deliverable 7.2,** which is more procedural, will also be shared with the whole Consortium early 2023. D7.2 will include a discussion on how we attempted to bring all the project components together and where it has ended as well as reflections on our transdisciplinary work. This Deliverable will reflect on the methodology of integrating knowledge and embracing the diversity of the project team, as well as on the difficulties and challenges of the project.

The TIPPING.plus project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 884565.

6. LIST OF PARTICIPANTS

1 Diana Mangalagiu (WP7)
2 Antoine Mandel (WP4)
3 Jenny Lieu (WP5 + CS Canada)
4 Amanda Martinez Reyes (WP5 + CS Mexico)
5 Baiba Baltvilka Witajewska (WP7)
6 Anne Merrild Hansen (CS Greenland)
7 Jeremie Fosse (WP6)
8 Francesc Cots (WP6 + CS Balearic Islands & Teruel)
9 Joanna Mazurkiewicz (WP4 + CS Upper Silesia)
10 Jakub Sokołowski (WP4 + CS Upper Silesia)
11 Jan Frankowski (WP4 + CS Upper Silesia)
12 J. David Tàbara (PI)
13 Serafeim Michas (WP6 + CS Megalopolis)
14 Nihit Goyal (WP5)
15 Bohumil Frantal (WP1 + CS Moravian-Silesia & South-Moravia)
16 Raphaela Maier (WP4 + CS Austria)
17 Regine Møller (CS Greenland)
18 Mauro Sarrica (WP2)
19 Franziska Mey (WP3 + CS Ruhr region)
20 Elena Apostoli Cappello (CS Carloforte) (online)
21 Andreas Tuerk (WP4 + CS Austria)
22 Arpad Todor (CS Romania)
23 Stanislav Martinat (WP1 + CS Moravian-Silesia & South-Moravia) (Online)
24 Johan Liliestam (WP3 + CS Ruhr region) (Online)
25 Fulvio Biddau (WP2 + CS Sulcis) (Online)
26 Takeshi Takama (CS Indonesia) (Online)
27 Cynthia Ismail (CS Indonesia) (Online)
28 Brigt Dale (WP1 + CS Norway) (Online)
29 Siri Veland (WP1 + CS Norway) (Online)

7. ADDITIONAL INFORMATION

Feel free to contact any of us for questions, suggestions, or comments.

Amanda Martinez Reyes (a.martinezreyes@tudelft.nl), Diana Mangalagiu (diana.mangalagiu@ouce.ox.ac.uk), Jenny Lieu (j.lieu-1@tudelft.nl), Baiba Witajewska-Baltvilka (baiba.baltvilka@globalclimateforum.org).

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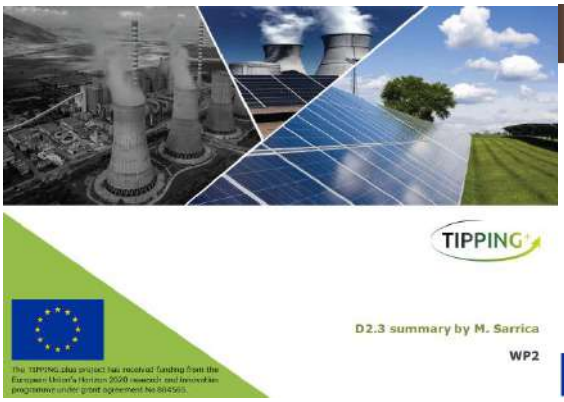
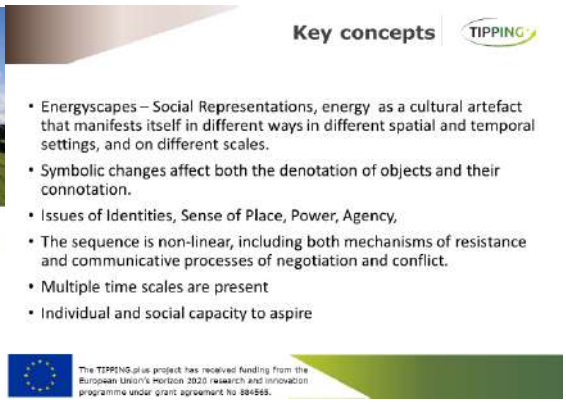
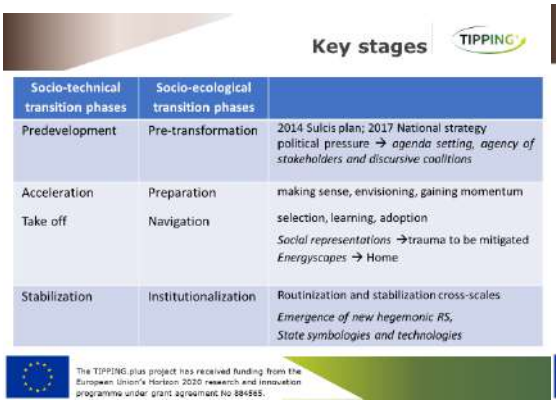
8. ANNEXES

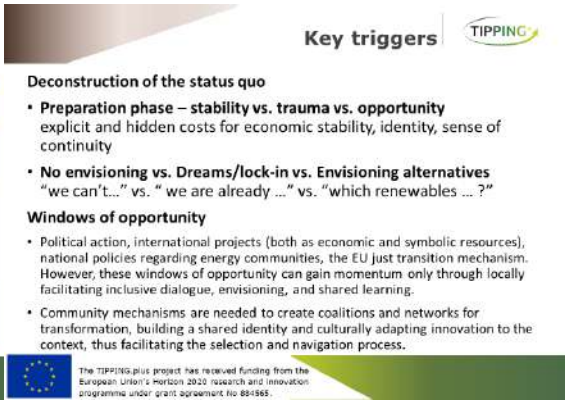
Presentation of WP 1

Presentation of WP 2









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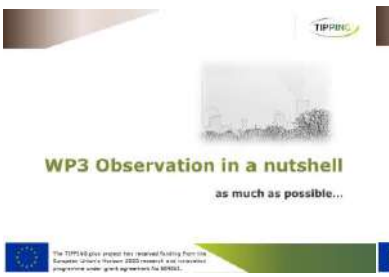
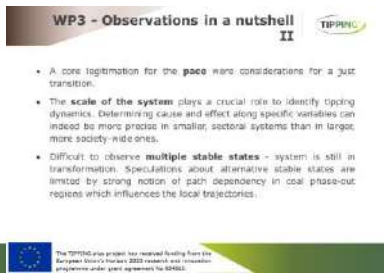
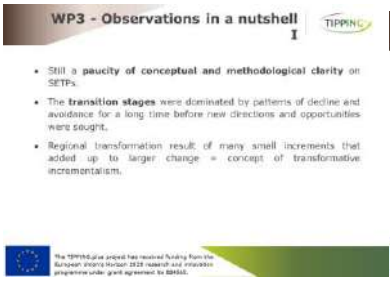
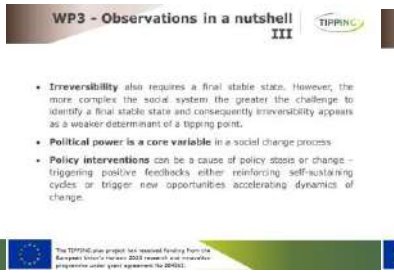
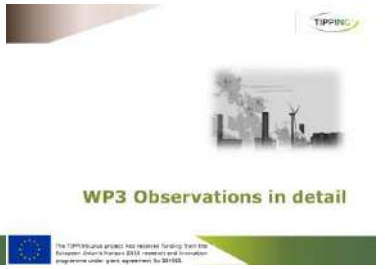
Presentation of WP 3

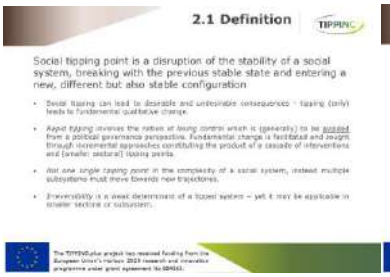


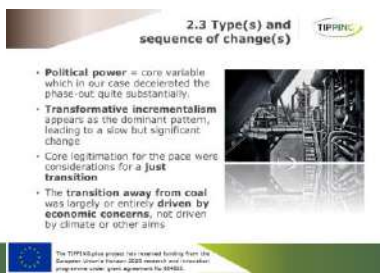


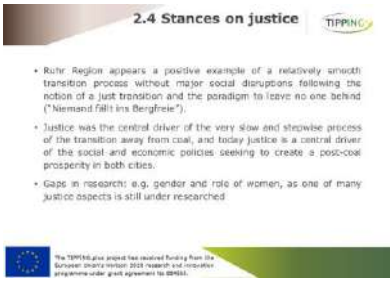












Presentation of WP 4

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WP4 contribution to the integration framework

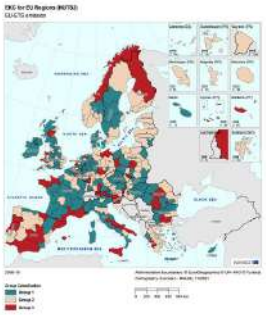
Saptorshee Chakraborty, Jan Frankowski, Raphaela Maier, Antoine Mandel, Joanna Mazurkiewicz, Karl Steininger, Jakub Sokolowski, Andreas Tuerk

- Transition stage: emergence, early adoption, diffusion, stabilisation
- Type(s) and sequence of change(s)
- Stance of justice in the transition
- Shaping of the transitioning region
- Multiple stable states
- (Ir)reversibility
- Feedback loop
- Trigger

- Structural Change
- Technological Change
- Changes in social norms and behaviors

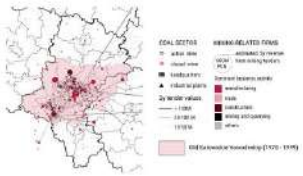
Backward looking perspective on structural change:

- **Regions differ in terms of the structural relationships between emission intensity and economic growth**
- **Emissions increasing with economic growth**
- **Emissions decreasing with economic growth**



Technological change as a driver of structural change

- Change in the relationship between economic activity and the environment
- At the micro-scale: technological changes and changes in the location (geographical embedding) of economic activity
- At the macro-scale (emergent climate mitigaton)



Societal change as a driver of structural change

- Inequality and distributional issues as barries/enablers of the transition
- Changes in the political/cultural boundaries of region
- Different transition phases in the case-studies: power shifts in the economic and political realm

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Tentative Structure for the Deliverable 7.1

D7.1 New social theory on SETPs in CCIRs including the overall project knowledge Integration Framework (Lead: GCF) [M36]

1. **Introduction**

   1.1 Definition(s) and relevance of SETPs in CCIRs

   1.2 Summary of available theories to study Socio-Ecological Tipping Points (SETPs) based on the WP1-4 literature reviews

   1.3 Research (theoretical, conceptual, methodological, and empirical) gaps to study SETPs, identified based on the WP1-4 literature reviews

   1.4 Research questions that the framework and theory on SETPs in CCIRs aim to answer

2. **Integration Framework**

   2.1. How we come up with an IF (methodology): description of applied methods (qualitative and quantitative) to address the research gaps on SETPs (raised in the 1.3 section)

   2.2 How we built on existing work: Connection with the previous projects: IMPRESSIONS, GREEN-WIN, TRANSrisk, ADAM or HARMONICOP.

   2.3. What are our results: Empirical results of the 20 case studies in TIPPING+.

   2.3.1. Identify and select the **key components** explaining the emergence of SETPs in demographic, governance, economic, resource and psychological and cultural systems relevant for understanding clean-energy transitions in CCIRs.

   2.4 The Integration Framework we elaborated brings in key components (demographic, governance, economic, resource and psychological and cultural systems) to better understand SETPs.

3. **Social Theory on SETPs**

   3.1 We explore how the Integration Framework elaborated contributes to furthering social theory in SETPs: how our IF can advance the understanding of the conditions, forces and dynamics which lead to the emergence of positive and negative tipping points.

   3.2. Here we build on D1-4.1: exploring how tipping points are explained across different disciplines and identified gaps.

   3.3. Here we build on D5.3: Building on empirical insights from cases as summarised in Tasks 5.4.

   3.4. Here we show how the Integration Framework fills in current gaps in SETPs: to interpret the cross-cutting forces, conditions and dynamics related to the various regional systems' determinants which lead to key bifurcations in

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regional energy systems trajectories, yielding either positive or negative results (changes to regional welfare, livelihood and adoption or delay of clean energy strategies, among others).

3.4. Here we show how the theory addresses (or not): Just and equitable transitions: challenges in theory and conceptualisation and potential solutions.

3.5 Here we address the limits and shortcomings of the theory: Discussion on the scientific robustness of the social science theory generated within TIPPING+ on SETPs.

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9.6 Annex: List of WOCS/MOCS

Internal online meetings, including 'Weekly Open Communications Spaces' ('WOCS')

We list below the meeting carried between Work Packages and Case Study Members and the Coordinator including all the 'Weekly Open Communication Spaces' all attended by the Coordinator. In addition to these meetings, there were a large of other meetings carried out with international partners and organisations such as the International Science Council and the Transformations Community to organise the Transformations Conference 2021, and with the other sister projects.

	Title	
08 April 2020	WP5 -WP8 meeting	11.00-12.00 CEST
17 April 2020	WP4 -WP8 meeting	10.00-11.00 CEST
21 April 2020	Canada case study	16.00-17.00 CEST
27th April 2020	Bosnian-H. Case studies	11.00-12.00 CEST
29th April 2020	German case studies	15.00-16.00 CEST
29th April 2020	Czech Case studies	11.00.-12.00 CEST
29th April 2020	Romanian case studies	10.00-11.00 CEST
28th April 2020	Polish case studies	11.00-12.00 CEST
28th April 2020	Austrian case studies	16.00-17.00 CEST
13 May 2020	Greenland case studies	11.00-12.00 CEST
25 August 2020	Preliminary discussion of Case Studies	13.00-14.00 CEST
1 September 2020	WP6 discussion issues and Discussion on social scale and TPs	15.00-16.00 CEST
8 September 2020	Initial discussion on the Polish case study and on populism	15.00-16.00 CEST
15 September 2020	Initial presentation and discussion on the Polish Case Study on populism and climate politic	15.00-16.00 CEST
22 September 2020	Initial presentation and discussion on the Indonesian Case Study on Frugal Eco-Innovation for Addressing Climate Change in Emerging Countries	15.00-16.00 CEST
29 September 2020	Presentation and discussion on the Common Framework of Analysis	15.00 - 16.00 CEST
6 October 2020	Addressing the issue of scale relevant for TIPPING SETPs conceptualisation and case study support	15.00 - 16.00 CEST
13 October 2020	First application of the Conceptual framework and of scale discussion on selected cases	15.00 - 16.00 CEST
20 October 2020	Romanian Case Study	15.00 - 16.00 CEST
27 October 2020	WP2 Literature Review findings on the Environmental and Social Psychology and Anthropology on Social-Ecological Tipping Points (SETPs)	15.00 - 16.00 CEST
3 November 2020	WP2 Literature Review findings on the Environmental and Social Psychology and Anthropology on Social-Ecological Tipping Points (SETPs)	15.00 - 16.00 CEST
24 November 2020	Improving TIPPING+ understanding of the relationships between populism and clean energy transitions	15.00 - 16.00 CEST

1 December 2020	Preparatory meeting for the WP7 Integration Workshop	15.00 - 16.00 CEST
8 December 2020	Preparatory meeting for the WP7 Integration Workshop	15.00 - 16.00 CEST
12 January 2021	Presentation of the Czech case studies	15.00 - 16.00 CEST
19 January 2021	Introduction to the Stakeholder Engagement Monitoring Strategy	15.00 - 16.00 CEST
26 January 2021	Case Study and Stakeholder Engagement Guidelines	15.00 - 16.00 CEST
2 February 2021	WP1 literature review presentation	15.00 - 16.00 CEST
9 February 2021	WP3 literature review on Policy and Governance	15.00 - 16.00 CEST
23 February 2021	WP4 literature review	15.00 - 16.00 CEST
2 March 2021	Polish Upper Silesian case study	15.00 - 16.00 CEST
9 March 2021	A regional human geographic perspective to case studies	15.00 - 16.00 CEST
16 March 2021	TRACER project presentation by Rita Mergner	15.00 - 16.00 CEST
23 March 2021	An update on the Romanian Case Study	15.00 - 16.00 CEST
13 April 2021	Preparatory workshop for the integration workshop series	15.00 - 16.00 CEST
4 May 2021	Greenland Case Studies	15.00 - 16.00 CEST
11 May 2021	Presentation of the Italian Case Studies	15.00 - 16.00 CEST
25 May 2021	Migration and Economic Dynamics	15.00 - 16.30 CEST
1 June 2021	Presentation of the Spanish Case Studies	15.00 - 16.30 CEST
8 June 2021	The potential decarbonization of electricity production in the entity Federation of Bosnia and Herzegovina	15.00 - 16.00 CEST
29 June 2021	Greek Case Studies	15.00 - 16.00 CEST
13 July 2021	Stakeholder Workshop Feedbac	15.00 - 16.00 CEST
20 July 2021	Key TIPPING+ Propositions in view of publications, Part 1	15.00 - 16.00 CEST
27 July 2021	Key TIPPING+ Propositions in view of publications, Part 2	15.00 - 16.00 CEST
7 September 2021	Practical and conceptual challenges	15.00 - 16.00 CEST
14 September 2021	Discussion of the next topics of WOCS	15.00 - 16.00 CEST
21 September 2021	Presentation of the deliverable 5.1 Literature Review on Region	15.00 - 16.00 CEST
28 September 2021	Discussion on the Special Issue	15.00 - 16.00 CEST
5 October 2021	Conceptual and Methodological issues (I)	
10 October 2021	Conceptual and Methodological issues (II)	15.00 - 16.00 CEST
12 October 2021	Young career researchers' informal meeting	15.00 - 15.30 CEST
19 October 2021	su-re.co Workshop on Indonesia CS and workshop	15.00 - 16.00 CEST
26 October 2021	Greek Case Studies: Presentation of PESTEL and DEMATEL methodologies	15.00 - 16.00 CEST

9.7 Annex: Proposal for Joint Analytical Framework

Tipping+ will explore the Social-Ecological Tipping Points (SETPs) in carbon intensive regions. 'Tipping' refers to the accumulation of structural forces within a system leading to a point, or moment in time when positive feedback is triggered, causing a cascade of changes resulting in deep, systemic transformations[1] from one system state to another. Such tipping points are analysed in natural science, perhaps most prominently in climate system analysis, and here we seek to further the understanding of tipping points in social systems.

We know that tipping points exist also in social systems. The earliest use of the term "tip point" in social science was in policy literature on social segregation in the 1950s. It described a "critical proportion of non-whites in a neighbourhood, above which the fraction of whites precipitously declines to zero" (Grodzin 1957). Complex socio-technical systems which developed over decades and centuries, passed at some point in time a tipping point into the system state in which they are today. For example we did not always base our transport on cars, but used to travel by foot or by horse, and at some point in time, the transport system tipped from horses to cars. This mobility change contributed to solving the problem with moving horse waste out of urban areas, but also to the long term dependency on fossil fuels, and created knock-on impacts that fundamentally transformed the organisation of our economics and societies. A socio-economic example is the waning of the shipyard industry in the North Sea region in Germany. The industry tipped in the second half of the 19th century in the context of global trade developments and technology advancement (steam ships) with significant socio-economic impacts for the region. As the shipping industry seeks to transform out of carbon fuel dependency, the EU now funds research to bring sailing ships back for international trade.

Analysing tipping points require us to understand how social change happens while also recognizing how the idea of tipping points, thresholds or shocks has been applied in the broader theoretical literature. Smith et al (2020) refer to social movement theory and emphasised that "social transformation is a dynamic process that (often) results in rather than begins with government interventions" (p. 2).

Even though there is a wide body of evidence from a social science perspective that sustainability transitions, the scientific community has yet to systematically and empirically analyse the chain of events driving the emergence of SETPs in the past decades. Our aim is to provide proof of SETPs over the past decade(s) focussing on identifying and analysing the interventions or unexpected events in the system that have led to them. We ask: *which interventions in which contexts succeed in tipping a region from a carbon-intensive state to new, low-carbon but still prosperous state?*

To this purpose, the T+ consortium will conduct a large number of case studies of past and ongoing transitions, both to gain insights into these particular cases but also to generate theory and provide an integrated and coherent interpretation of the processes and complex interrelations leading to tipping

[1] Note that transition and transformation are used almost synonymously in this document – referring to either deliberate or emergent sustainability transitions. Though different notions of the terms exist and are applied in different analytical frameworks e.g. multilevel perspective versus panarchy-model.

points in the transition to a sustainable future. In studying positive tipping interventions, we will also explore why some interventions fail to lead to a positive tipping point.

The starting point for this is to define the analytical framework for the project and especially for the case studies. A central input to this will be the definition of indicators by Work Packages 1-4 comprising of human geographical, cultural, psychological, political and economic perspectives. Each WP will provide a set of key quantitative and qualitative indicators that will feed into the shared analytical framework to help capture the story of each case study. WP5 identifies the case studies and brings together the narratives that evolves in a coal- or carbon-intensive region within a certain *context* (specific demographic, geographical, political and economic setting) where an *intervention* (e.g. policy action from the European, national, regional or municipal level; an economic, social or cultural initiative by some agent) leads to change and ultimately a positive or negative outcome (the intended outcome, or a better or worse one).

Therefore WPs 1-5 will develop a broad set of indicators to be used as a central input to the case studies that derive from four dimensions:

- Firstly describing the **narrative and context of the region and its transformative capacity** addressing some or all of the following aspects: who lives in the carbon-intensive regions (demographics, gender, minorities), doing what (education, jobs), thinking in which way about their place in that region and that region's place in the world (narratives and frames)? How is the region governed, what are envisioned changes (visions) and how do governments, communities and other actors work to achieve these changes (mainstream and emerging narratives); and what are the economic, social and human resources and capacities to transform (individual income, poverty rates, GDP, skills and expertise, social cohesion, NGO fabric existence)?

- Secondly describe the change that happened in the region. What was the **tipping event** (deliberate or unexpected) that triggered the status quo to change, and activities on which the regional economy, identity and/or social structure depends either altered or ceases to exist. This can be because of a political decision (e.g. close a mine; stop subsidies and hence make the mine unprofitable) made locally or in the capital, or it can be the endpoint of a natural process (e.g. foreign competitors outcompete the mine; the ore runs out). In yet other cases, an external shock may affect the political, societal or discursive viability of an activity, forcing it to stop rapidly (e.g. Fukushima disaster forcing European reactors to off grid, although nothing happened to them directly). A central output in this step is to describe the socio-economic activity that changes – close of a coal mine, a steel works, a car factory – and its embeddedness in the social and cultural structure of the region.

- Thirdly describing **the interventions (solutions/ innovations) that led (or may lead)*** to the tipping point particularly to help answer the following questions: what is done, and by whom to achieve structural change, what were the solutions and innovations to enable the change – and what is that structural change to be, and who has decided that? What are the unintended consequences? Are the interventions coming from bottom up or top down initiatives? Are the signals for change coming from government (policy intervention), industry or are they rather local entrepreneurs (cultural, social or economic intervention)? For example the decision of a power company that it would be closing the plant for commercial reasons and the local adjustments

- Fourthly describing the **immediate and long-term outcomes**** (the sum of individual impacts and outputs - what follows after the tipping point) of the tipping point, for example by assessing: how did the region develop after the tipping point in regard to e.g. economic growth and equality, employment, migration etc. The timing of change will be a particularly important aspect captured in qualitative and quantitative data.

WP leads might identify the same or similar indicators which make it necessary to discuss and align in the process of developing the analytical framework.

It is important to note that there are still open questions and potential for fruitful conceptual discussion about the following:

*What is the timeline we are investigating? Do we look back to understand how tipping points work, or do we look forward to predict what will happen if we take measure XX? For example some tipping points are ahead but already known (to some extent) such as the ministerial decision to close down all lignite power plants by 2023 – including those in Megalopolis/ Greece.

**Is an investigation period of 5 to 10 years an appropriate and effective timeframe to analyse tipping points and transformations of large socio/economic systems? Since system transformations happen in extended periods of time, the last 10 years might be too little time to capture societal changes and identify systemic tipping points.

*** Positivism versus constructivism: some case studies will delve deep into a qualitative case study analysis, while others will capture quantitative data to identify tipping events. The different approaches are welcomed and needed. Though we need to find ways to integrate both, which is the actual purpose of this document to finding some common ground (e.g. getting a basic description of the system in regards to geography, population, etc.) to enable cross-case study analysis. Aligning both indicators (Table 1) and research questions (Table 4) is appears as an important step.

**** The ecological component in the social-ecological system is still somewhat neglected in our current debate. We have to become more aware and explicit about the ecological component in the area (energy) we focus on.

Considerations from Siri: Our proposal responds to an observation that in studies of social-ecological tipping points, the social is often neglected. In this research, we have ecosystem health (our human home) as the backdrop for needing to transform the social-economic component of earth systems. That is, the demand for transformation is ecologically driven, but socially located. Natural-human systems is another theoretical framework that has more of a biogeophysical focus, rather than purely ecological. In my view, the need for transformation is couched most firmly in the need to stay within planetary limits, not within social or economic limits. The coupling to the natural system in our project is mostly at the global level at which carbon is distributed through the atmosphere, and in some cases at the local level through the impact of particulate matter on human and ecosystem health – but I think it's important not to lose this focus.

***** Do we capture the narrative/ public discourses only for the local level or do we expand it to the broader context – state/ national and even international level?

****** Is it necessary to align our use of the terms transition and transformation? Is it enough to define the terms in a Glossary or do we have to discuss the terminology again?

******* What is the level of change that a tipping point has to trigger? Societies may undergo very deep social-ecological systemic changes -often unnoticed- but the (policy) regime stays the same. We may have tipping points at different levels -for those who got good jobs and raised families it probably those changes were PTP in their lives, but at system level may not be qualified as such).

We acknowledge that every case study is different and in some cases the comparability might be limited because of data availability or different methodological approaches. So, we believe that the framework should be flexible enough to suit potential individual and context related variations (e.g. qualitative results), but it should be strict enough to enable a cross-case study analysis (to some extent) and a meta-analysis that offers insights for advancing the SETPs theory.

Table 1: Example of a set of indicators

	WP5: Case studies	**WP1: Demographic trends & challenges in gender, migration & youth**	**WP2: Cultural trends & socio-psychological factors**	**WP3: Policy & governance trends & challenges**	**WP4: Economic trends & challenges**
Perspectives	Narratives: 1) Dominant discourse (incumbent actors) 2) Alternative discourse(s) (niche actors) Timeframe: up to 2030?	Demographic trends and challenges in gender, migration and youth	Cultural trends and socio-psychological factors	Policy and governance trends and challenges	Economic trends and challenges
Shared set of preliminary indicators					
Context	Sector covered: 1) U*pstream energy extractive industry* (coal & fossil fuels); and/or *2) Downstream carbon*-intensive sectors & other sectors reliant on energy	▪ Population demographics ▪ Regional/local narrative(s) ▪ Migration trends ▪ Gender dynamics ▪ Education levels	▪ Acceptance of renewable energy ▪ Identification of new sectors beyond energy ▪ Perceived marginalization/poverty, injustice… ▪ Social/community 'energy' or apathy ▪ Voluntary work	▪ Energy/ climate, social-economic & industrial policies ▪ Voting patterns ▪ Political parties in power	▪ Energy and other industry regime ▪ GDP ▪ Income levels ▪ Energy affordability ▪ Poverty rate ▪ Jobs losses and gains ▪ Renewable energy potential (geographic)

Tipping event	Endogenous or exogenous event that triggered the status quo to change, and activities on which the regional economy, identity and/or social structure depends either altered or ceases to exist. (e.g. new regional vision, political decisions e.g. ending subsidies for a sector, economic decisions e.g. close of mine)				
Intervention (s)	▪ Creating shared vision for future SETPs	▪ Political decisions ▪ Market changes ▪ Presence of social movements or coalitions of people and organisations	▪ Behaviour change ▪ Cultural entrepreneurship (regional initiative to "transform the narrative" of the region)	▪ Policy intervention/ response ▪ Amount of public funds ▪ Change agents	▪ International investments e.g. FDI ▪ Local entrepreneurship
Outcome	▪ Indicate if the case study is a **+** or **-** tipping point	Identify changes in the context indicators and measuring the differences, identifying the timing of change – when did the parameters started to accent or decent or showed some significant qualitative changes			

Having considered the core indicators for each WP, we proceed to explore the overarching objectives and research questions from each WP that should be considered in the case studies.

Table 2: Main objectives and research questions in WP 1-5

WPs	Core objectives for case studies across WPs	Overarching questions
WP5	1) Indicate if the case study is a potential positive or negative tipping point 2) Identify core narratives for each case study – to be analysed in more detail from WP1-4 perspectives 3) Co-develop future narrative for SETPs	1) What is the current dominant or mainstream narrative? Whose perspective it comes from? 2) What are the alternative or low carbon narratives? Whose perspective they come from?
WP1:	1) Identify how characteristics in gender, age, and migration status for the population have changed over time, and how they have coincided with changes to public narratives on carbon-based industries and fuels	1) Can tipping points be detected in demographic trends? 2) Do changes in the narrative on carbon-intensive industries precede or follow demographic change?
WP2:	1) Identify conflicting visions across levels and among actors' narratives; 2) Identify how psychological dimension (values, beliefs, norms) interact with visions, policies and technologies	1) What psycho-social factors and cultural and anthropological dimensions affect decarbonization trajectories? 2) What is the role of narratives, discourses that mobilize local identity to reconnect/oppose national and EU strategies?
WP3:	1) Identify policy interventions and governance structures in the regions 2) Explore the political context in the regions 3) Map the impacts of political interventions in those regions	1) What was the policy response of different levels of governments to structural change in coal and carbon intensive regions? 2) How did government interventions impact narratives, capacities and the development of local solutions and strategies to promote/trigger a low carbon trajectory in the region? 3) What where the effects of the policy interventions in these regions – what worked well and what didn't?

WPs	Core objectives for case studies across WPs	Overarching questions
WP4	1) Identify characteristics of the socio-economic environment 2) Explore impact of current and future policies	1) How can carbon-intensive regions redefine their role/position in the European/Global economy in: (i) scenarios with continued growth in global trade; and (ii) scenarios with reduced level of global trades?

Table 3: Literature review overview

WPs	Literature review (Months 1-6)	Key word search in Scopus/Web of Science
WP1:	Task 1.1: Literature review from Human Geography and Demography on SETPs in CCIRs	
WP2:	Task 2.1: Literature review from Environmental and Social Psychology and Anthropology on SETPs	
WP3:	Task 3.1: Literature review of SETP from the Public Policy perspective	
WP4	Task 4.1: Literature review from Economics on SETPs	Economic growth, just transition, carbon-intense economy, clean energy growth
WP5	Task 5.1: Literature review on coal and carbon intensive regions as SETPs	Regional innovation, coal region, carbon-intensive region, regional industry

Table 4: Research questions

	WP specific questions	Overall questions to consider in all case studies
	Overall context questions	What are the geographical features of the region? How is the community embedded in the regional ecological system?
WP1:	1) what are useful metrics or indicators for demographic tipping points? 2) what are key responses in demographic trends resulting from interventions targeted at lowering carbon dependency? 3) can agent-based modeling help to quantitatively detect tipping points in demographic patterns? (for the case chosen in WP1)	Who lives in the region (key demographic statistics e.g. gender, youth, minorities)? What are the migratory patterns in the region? What is the mainstream narrative in the region? What are relevant alternative/ niche sustainability narratives? Who are the key actors/ agents in the region?
WP2:	1) What psycho-social factors and cultural and anthropological dimensions affect decarbonization trajectories? 2) What is the role of narratives, discourses that mobilize local identity to reconnect/oppose national and EU strategies?	What constitutes the local identity? What influences/ reinforces/ mobilises the local identity (e.g. public discourse)?
WP3:	What was the policy response of different levels of governments to structural change in coal and carbon intensive regions? How did government interventions impact narratives, capacities and the development of	What were/ are the policy interventions? What where the effects/ impacts of the policy interventions in these regions?

	local solutions and strategies to promote/trigger a low carbon trajectory in the region? What where the effects of the policy interventions in these regions – what worked well and what didn‘t? What governance structures supported or hindered the development in past and current coal regions?	
WP4:	1) How can carbon-intensive regions redefine their role/position in the European/Global economy in: (i) scenarios with continued growth in global trade; and (ii) scenarios with reduced level of global trades?	What are the social and human resources in the region in regard to employment, individual income, poverty rates? What are the key industries in the region? What is the local/ regional growth rate and how does it relate to national level?

9.8 Annex: Guidance for TIPPING+ Coal & Carbon Intensive Region Case Studies: Narrative Development, Stakeholder Engagement and Indicators

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Introduction: Narrative Guidance for Case Studies in Coal and Carbon Intensive Regions (CCIR) in TIPPING+

Explanatory notes for the narrative framework

This guidance helps to define your coal and carbon intensive region and to develop the narratives for each case study considering perspectives from different disciplines across the work packages: **WP1 (geography including demography), WP2 (culture & social psychology), WP3 (policy, politics & governance) and WP4 (economics).**

The objective is to identify the narratives that could potentially lead/have led to a social ecological tipping point.

This is not meant to provide comprehensive analytical guidance to assess the social ecological tipping points, but mainly to:

- **Identify the narratives** through the perspective of different narrators (i.e. stakeholders), which then can be analysed through WP1-4 frameworks or your own analytical frameworks,
- **Identify stakeholders (SH)** contact and engage with SHs, (social economic political) **institutions** and **ideologies.**
- **Describe the characteristics of the region(s) in which the case study is embedded.**
- **Identify important indicators** that either help support the narrative or to feed into the respective WP1 to 4. Further guidance on what to do with the indicators will be provided by WP1-4.

Our point of departure in TIPPING+ is from a sectorial approach for ***Coal and Carbon Intensive Regions*** *(CCIR)*. In our project we define 'sector' as:

- **Upstream energy extractive sector:** this includes the coal & fossil fuels sector; and
- **Downstream carbon-intensive sectors:** sectors reliant on high carbon energy sources such as steel, cement, transport.

Using an economic sector definition as starting point, we break down a case study into its smaller parts such as scale, region, and stakeholders. Then, we refer to these case study basic components to describe narratives and indicators.

Scale helps describe the case studies with its three dimensions (as defined within the Tipping Plus project): size, time, and level.

- **Size** is of quantitative nature and is used to measure an spatial area (e.g. in km2).
- **Time** is used to measure the timeframe of study (e.g. in months, years, etc.) When within a measurement scale there are different measurement concepts (e.g., individual, community, and society) we are referring to levels.
- **Level** is of qualitative and/or quantitative nature and is used to classify phenomena either hierarchically or functionally. Some examples of levels are political systems, multi-level governance, economic systems, socio-cultural systems, resource systems, environmental systems, among others. These scale aspects we use to initially describe a case study: size, time, and level.

Furthermore, there are relations, which are interactions between processes (with different sizes, times, and levels). Relation is expressed both quantitatively and qualitatively. We will look at relation when analyzing the connections across scales and components of narratives.

We also have a special emphasis on ***region*** in each case study. We will define the region through how it's called to formally, then through its function (sector), and finally through how the region is perceived. More specifically:

- **Formal region:** "has definite borders and shares cultural homogeneity (sameness); it is uniform in nature. For example, an area that follows the same laws or speak the same language or follows the same physical features would be a formal region" [1]{examples not limited to political/administrative/governance}
    - e.g., Alberta (province), Canada (country) (historical colonial group and present day settler group), Jiu Valley, Romania (geographical boundary cutting across several administrative areas; valley with a history of 160 years of coal mining) or the Schengen region (free flow of goods and services, no visa needed)
- **Functional region**: is based on horizontal spatial ***social*** and ***ecological*** flows across a geographic area, i.e., functional links or interactions constituted around common interests, needs, goals or strategies, which are represented by flows of persons (commuting to work, for shopping, healthcare, etc.), or of capital, information, goods, resources or other related to stocks and flows of pollution (e.g., GHG) which also ultimate affect the dynamics of the region
    - e.g., the region receiving electricity from a coal fire plant; the region in which workers at a coal mine live and work (across nations); oil sands open pit mining supplying jobs to surrounding area; a region developing green hydrogen technology and infrastructure. Note: a coal-and-carbon-intensive region is one of the functional definitions of a region.
- **Perceptual region:** based on shared perceptions and attitudes of people who live in a given area, linked to a shared cultural *identity* (e.g. character shaping) defined by people's feelings, sense of belonging and attitudes about that area. The following questions (provided by WP2) help describe the characteristics of a perceptual region:
    - Who is attached (individual/group), what they are attached to (social place/physical place), and how they are expressing their attachment (through what behaviours, emotions, reasoning). Is there a place that represents the soul of the community? Is there a local environment (e.g. a river) that constitutes part of regional identity? [Reversed:] Which place, if destroyed, would destroy the soul of the community?
    - Where are the boundaries between "us" and "them"? How these boundaries affect interpersonal and intergroup relationships? Is it impossible/difficult/easy to cross this boundary?

To better understand how we will draw the boundaries of system of reference in terms of the formal, functional and perceptual region, we need to explore their constituent **narratives**. This not only helps us to define the discursive elements that contribute to their current 'baseline' or mainstream configuration but also to identify any indications of deviations or transitions from the mainstream. These deviations may have the potential for a radical transformation (i.e. a complete breakdown) of the current high-carbon mainstream pathway.

[1] Washoe County School District, 2017

Background to the identifying narrative:

Humans have undergone major revolutions since pre-historic time with common underlying aspects: Prior to the transformation there were long period of (slow) change or "evolutionary change" which we call "transition" in our study. As the transition occurred over long periods of time, problems arose requiring society to solve. These "basic problems concerned conflicts between different classes as well as engagement in mutual exchanges and cooperative efforts (Tomasello, 2014; Condemi & Savatier, 2019) aimed at managing new situations created by the evolution of society.

These changes, cooperation and conflicts may be divided into four major processes: **development of technology; class divisions and the economy; ideas and ideologies, and social-political institutions.**
These four processes of society each developed their own momentum and outcome in relation to the other three." (Sherman, 2021, p 166). Moreover, they are pivotal to the activity system that is at the basis of a distributed and cultural approach to human cognition (Cole & Engeström, 1993). Thus, these processes will broadly be used to describe a Social-Ecological Tipping Point (SETP) resulting from changes or events that brings the entire system into another state (e.g., by taking a cleaner development pathway).

These processes are also in line and integrated across our work packages WP1 (geography including demography), WP2 (culture & social psychology), WP3 (policy, politics & governance) and WP4 (economics). Additionally**,** policies can contribute to creating an enabling environment to promote a transition or on the contrary (the lack of) policies may create barriers to a transition.

Considering the above processes, technology**, political and economic institutions and ideology as well as policies**, we will identify multiple "narratives" by capturing the changes in the transition. By **narratives** in our project, we mean the **storylines** describing how the CCIR **pathways** (i.e., pathway broadly is a course of direction) was historically developed until the present and how some promising CCIR pathway can be potentially developed in the future.

Each narrative also has (multiple) **narrators (i.e., story tellers)** and a range of individuals who engage with it in peculiar ways**.** Narrators are essentially stakeholders and we will identify their position (of power) in society, their demographics, institutions they belong to or any other traits that might be relevant to better understanding the stakeholder and their perspective. We will also make explicit the individuals and groups that engage with narratives, that resist, attempt to reinvent or accept them.

Note: we do not assume one stakeholder group has a consensus on a single narrative. Please be as clear and as detailed as possible when indicating which specific (sub)groups the narrative belongs to.

In order to do so, we must make explicit the **current high-carbon mainstream pathway** as well as the range of **co-existing narratives** explaining that pathway and identify who the narrators are (including the institutions they belong to). We also need to make explicit **the transition or transformation pathways**, the narratives explaining that pathway, and identify who the narrators are, who the key characters are, and what spatial and temporal scales they span.

We first do so by identifying the mainstream narratives which include the four processes as well as the policies that has enabled the development of the CCIR.

Defining the mainstream narrative(s)

The ***mainstream narrative(s)*** (refer to Figure 1, page 7) identifies the pathway that represents the mainstream or dominant (mainstream and dominant are used interchangeably) energy/high carbon) sector (e.g. coal power sector).

The mainstream narrative(s) answer(s) the question: how did the CCIR get to where it is now?

This includes an historical description of how the coal and carbon intensive region developed.

We also focus on the *narrators* who are the dominant stakeholders in power and who perpetuate the mainstream narratives. We also identify the enabling *policy environment* that has promoted the **high carbon energy technologies** central to the energy mainstream system. This energy system includes the mainstream energy technology value chain, the workforce, other stakeholders and institutions as well as policies that support the system.

The starting point for developing narratives begins at the **regional level** in your case study. Once you have defined the **boundaries** for the regional level, you can bring in additional scales or governance levels (e.g., national or supranational (EU) that impact your specific region. By documenting the mainstream narrative as well as the narrators (i.e., stakeholders and their institutions in power), you are making explicit how we got to where we are (i.e., the high carbon development trajectory) within the region.

Within the mainstream narratives we explore the following areas:

I. Technologies

We start drafting the mainstream through identifying the 'technologies' that enabled the development of the coal and other high carbon sectors.

II. Stakeholders III. institutions and IV. ideologies

We then explore the other three processes through the lens of stakeholders, (their corresponding) social-political and economic institutions in power and their ideologies that have enabled the development of the current mainstream pathway.

V. Policies

Along with the four processes, we explore how policies, or a policy mix has been influencing the development or the decline of the CCIRs.

VI. Contextual factor and events

Other contextual factors that might influence an CCIR can be the geography or events that might change the course of direct.

Alternative narratives: on-stream and off-stream narratives

After drafting the mainstream narratives, we search for narratives that deviated from the mainstream by applying the same three core components of technologies, stakeholders, ideologies and institutions as well as policies.

The alternative narrative(s) answer(s) the questions: where do stakeholders want the region to go from here?

These alternative narratives can provide us indications of changes or transitions that can potentially lead to a transformation.

The ***on-stream*** pathway can promote new low carbon technologies but **under the 'same' system**. They exist only in a special space within the mainstream pathway but do not challenge the current norms or the rules of the game. This might include carbon capture and storage technologies that support negative emissions but does not challenge the fossil fuel norms as they are add on technologies that could help fossil fuel companies continue to exist. Renewable energy technologies might so receive some subsidies but continue to operate within the existing energy system norms (e.g., with fossil fuel subsidies and within the centralised energy systems).

Policies and support mechanisms in the on-stream pathway can promote equal treatment (i.e., equal opportunity policies) of different technologies or gender perspectives. While the largely mainstream perspectives continue to be accepted, alternative technologies or gender perspectives are viewed as equally valid. However, the dominant pathway is not fundamentally questioned, and the underrepresented perspective only exists in special spaces **without challenging the underlying power dynamics** that keep the mainstream energy system in place.

The ***off-stream*** pathway refers to alternative perspectives that **depart from** the mainstream perspective and **challenges** the mainstream pathway. The narrators are often those stakeholders or institutions who are on the fringes of power in society, the economy and politics. Their narratives can challenge the very power dynamics of the mainstream narratives and narrators. Policies within the off-stream pathway promote **low-carbon innovations in a dedicated space** that is separate from mainstream technologies. Policies help to create protective spaces for low-carbon technologies, which exist outside the mainstream energy system. For instance, low carbon technologies may require new infrastructure to be built outside the existing infrastructure. These technologies may be supported through special incentives, programmes, and subsidies. In the off-stream pathway off-stream stakeholders may bring in new values and norms that challenge the mainstream power dynamics and (social) norms. The off-stream perspectives are viewed as distinct perspectives that do not reinforce the mainstream pathway. On the contrary, synergies of low carbon technologies supporting alternative narratives may emerge in an equality (gender) sensitive, off-stream energy transition.

Within the alternative narratives we explore the same four areas as the mainstream narrative of **technologies, ideologies, social-political and economic institutions, policies and other contextual factors and events.**

Transformative-stream narratives

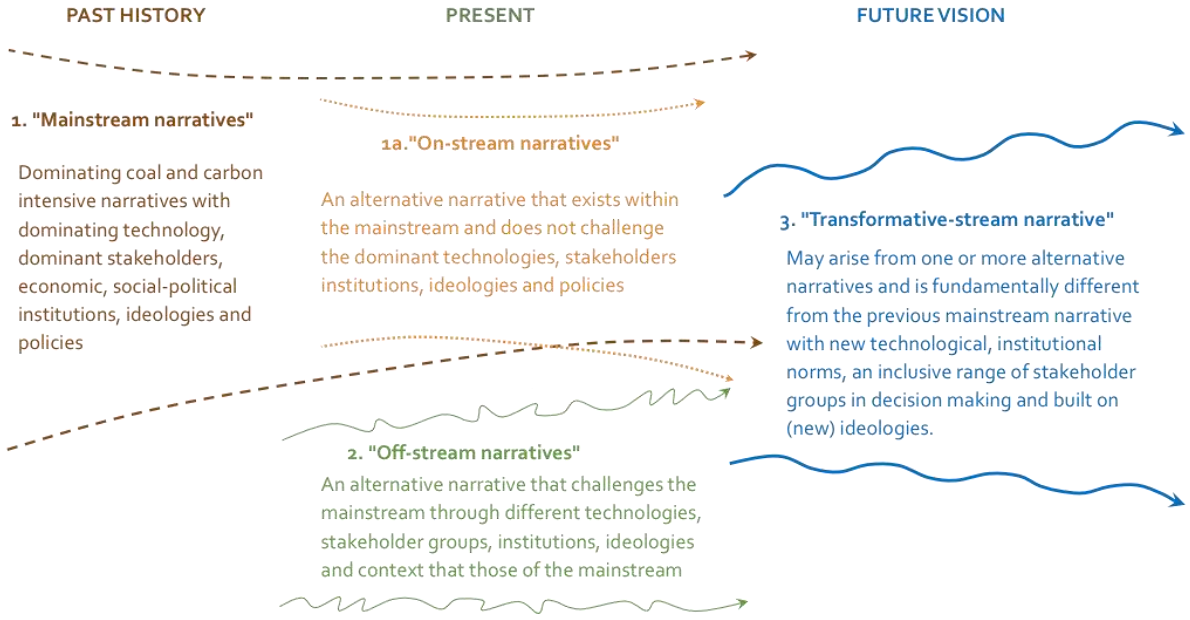
Based on the alternative narratives, we identify those that have potential for transformative changes.

Transformative pathways involve a radical technological, social and/or policy change, on how individuals interact with their biophysical systems and the representation of diverse stakeholders and their perspectives that challenges the CCIRs mainstream pathways, its power dynamics and becomes the new norm. This new mainstream pathway no longer resembles the previous dominant pathway. A transformation may occur as a result of on- and/or off-stream pathways leading to a future where different stakeholders are part of the decision making processes. Transformation pathways are supported by a mix of stakeholder groups, policies and/or technologies that lead to a **radically changed energy system** dominated by low-carbon energy. The transformation process changes the power dynamics of the previous mainstream pathway and includes

groups previously marginalized. However, we also need to be mindful of how stakeholders can be further marginalised through a transition (see Sovacool et al, 2021). Transformative pathways also consider broadening the discussion of equality and gender beyond women by including gender with other intersecting social identities.

The following figure summarises the different narratives that will be discussed above: ***mainstream CCIR narrative*** *and* ***alternative narratives*** *that depart from the mainstream, consisting of on-stream and off-stream narratives that potentially could lead to a* ***transformation*** *pathway.*

Figure 1: Mainstream and Alternative Narrative Framework



There are several streams of literature that have contributed to this framing: social ecological tipping points (Tàabara et al., 2018, p 120);iInnovation literature techno-economic paradigm shifts (Freeman and Perez, 1986); social technological transition through policy perspective (Kemp, 1994; Grin et al., 2010; Kern and Smith, 2008;) and agency (Smith and Sterling, 2005); gender in Political Theory (Squires, 1999) and gender mainstreaming Walby (2005); political and economic evolutions: Sherman (2021).

Chapter 1: Guiding questions for writing up narratives

The aim of this chapter is to describe how the CCIR have developed over time and how the regions can potentially achieve development through narratives, the use of indicators and with the help from stakeholders. The narratives have broad components: **i) technology ii) stakeholders, ii) their institutions, iv) ideologies and v) policies and vi) other contextual factors or events** (e.g. Fukushima, global economic crisis etc.) that might have impacted your CCIR.

You can choose to tell your narratives using perspective and indicators you find most relevant. We have compiled a generic list of indicators in Appendix 1 that you may wish to consider but you can include indicators not listed in Appendix 1. You can use the indicators to describe or explain changes in your CCIR from the stakeholder perspective (see Chapter 2 on stakeholders) that might have impacted the development of your CCIR. Alternatively, your starting point might be through policies and you may spin your narrative around how policies have influenced coal production etc.

Figure 2 below shows how a combination of policies, events have impacted coal production and employment in the UK coal power sector over a period of 55 years. The indicators used are changes in coal production and employees.

One of the stakeholder perspectives taken can be those from coal power producers and those employed by coal power plants. Other stakeholder perspectives can also be considered, such as political parties that initiated the policies.

Figure 2: UK Coal Power Development over time

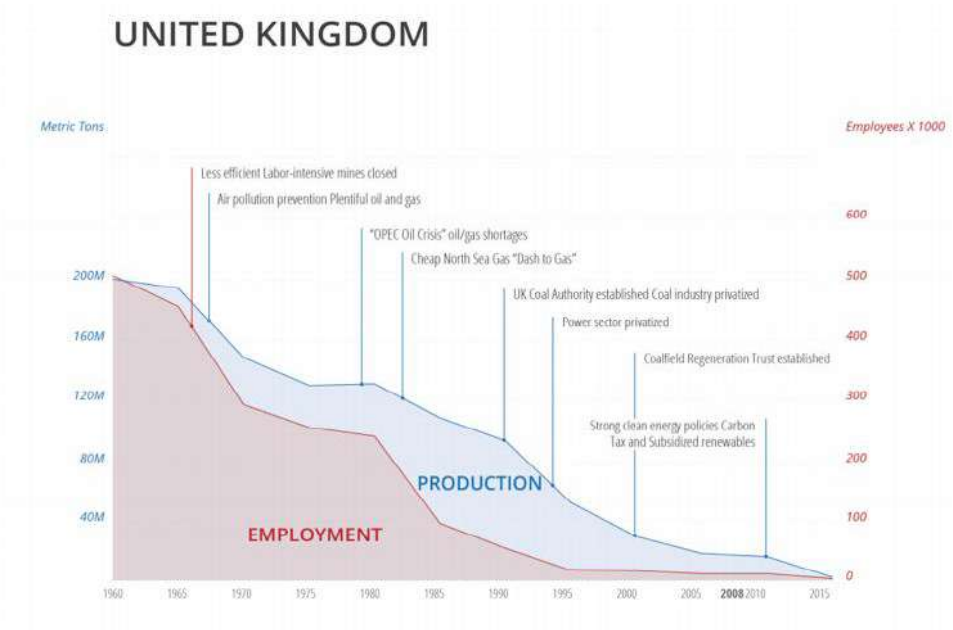


Figure 2: United Kingdom: coal production and employment 1960–2015

Source: Authors' own, based on data compiled from Coal Transition in the United Kingdom, Steve Fothergill (Paris: IDDRI and Climate Strategies, 2017).

Source: World Bank, 2018

1. Step 1: The mainstream narratives

The mainstream broadly answers the question 'how did the CCIR get to where it is now' over a period of time? Please consider the broad categories below when developing your narrative. These are some of the minimum components (technology, stakeholders, ideologies and institutions, policies other contextual factors and events) but feel free to include any other factors not considered below.

I. Technological sector(s): (WP4)

1.1. What is/has been the dominant sector (e.g., coal mining, oil sands open pit mining, steel sector etc.)
1.2. Is the CCIR dependent in upstream energy-extractive and/or in downstream carbon- and energy-intensive industry(ies)?
1.3. Time scale: what period are you studying in your CCIR? (WP 1)

II. Stakeholders

1.4. **Who are the mainstream stakeholders** currently in power and their corresponding institutions (WP6) (e.g., key decisions makers, those in powerful positions) in your CCIR? (WP6). *Note: you do not need to identify the names of individual stakeholders but broadly indicate the type of stakeholder they are: e.g. government organisation, local community leaders etc.*

1.4.1. **Stakeholder's demographics and traits**: identify the demographics and traits that influences the CCIR (WP 1, 2) including their gender, ethnicity/ethnic majority, age, political affiliation….

III. Institutions

1.5. **What institution**(s) do the stakeholder (groups) belongs to?: social (e.g. education), political (e.g. political party), economic (e.g. industry association, bank) (WP6)
1.6. **Multi-level governance**: what is the current governance system that has enabled the development of the technology? Specify the institutions and administrative level or levels (e.g., locality, municipality, national, etc.) are covered by your CCIR. (WP 1, 3)
1.7. **Economic system(s)t**: what is the CCIR's (i.e. the sector you're studying) economic contribution to the region (e.g. jobs, skills, competitiveness, added value etc.) (WP4)
1.8. **What resources** do the mainstream stakeholders and their institutions have access to? (e.g. natural resources, finance, political power) (WP6)

IV. Ideologies

1.9. **What is the guiding ideology** of the institutions or stakeholders that have allowed the mainstream technology to persist? The ideology may be a social (consumerism), political (see Appendix 2 for table of political ideologies), economic (neoclassical). Ideologies can also be broadly conceived as an organised set of representations that provide a shared interpretative framework, a shared meaning for action, and a common language to a group (e.g., resistance against invaders) (WP2):
1.10. **Role of culture and identity:** describe the significance of culture in the institutions and/or the development of the CCIR (WP1, 2) (e.g., sense of place, signification systems at individual and community levels, ideologies etc.)

1.11. **Future development vision:** what is the mainstream stakeholders' perspective about their future regional energy development? (WP2, 5):

V. Policies:

1.12. What **policy instruments, strategies and programmes** have been supporting the mainstream? Keep in mind policies outside the energy sector, such as those affecting economic development, as well as social, health and broader environmental policies. (WP3):

1.12.1. Are these national, regional policies or EU level?

VI. Other contextual factors and events

1.13 **Physical geography:** what are the key aspects of the physical environment (e.g. resource rich, climate zone, forest coverage, biodiversity hotspot etc.) that impact the CCIR's development? (e.g. tropical climate zone and long coastal lines ideal for tourism) (WP 1)

1.14 Are there **any other factors and events** not included above that contributed to the development of your CCIR mainstream pathway?

Table 1: Summary of the traits and respective indicators in your case study region and perspectives for your mainstream narratives

Components of the mainstream narrative	Identify key traits and key indicators for each component noting the *size (where?), time (when?), and level (what meaning?) scale* where relevant
I. Technology	Description & indicators:
	Level. What types of technological sectors have been dominant in the region? Size. Where have the technological sectors been located? Time. How long have these sectors been dominant? (e.g. oil sands open pit mining across the Alberta province throughout the last 50 years)
II. Stakeholders	Description & indicators:
	Level. What types of stakeholders (including stakeholders' groups) have been the dominant voice(s) in the region? Size. Where have the roles of these stakeholders been located? Time. How long have these stakeholders been dominant?

III. Institutions	Description & indicators:
	Level. What types of institutions have been supporting the dominant voice(s) in the region? Size. Where have these institutions been located? Time. How long have these institutions been supporting the dominant voice(s)?
IV. Ideologies	Description & indicators:
	Level. What types of ideologies (see e.g. Annex in political ideologies) do the dominant voice(s) in the region have? Size. Where have been these ideologies spread? Time. How long have the dominant voice(s) been identified with these ideologies?
V. Policies	Description & indicators:
	Level. What types of policies have been supporting the dominant voice(s) in the region? Size. Where have these policies been implemented? Time. How long have these policies been supporting the dominant voice(s)?
VI. Other contextual factors	Description & indicators:
	Level. What types of [contextual factors] have been supporting the dominant voice(s) in the region? Size. Where have these [contextual factors] been located? Time. How long have these [contextual factors] been supporting the dominant voice(s)?

Note: There may be more than one mainstream narrative. The narratives' perspective come from the stakeholders, so it is important to clearly identify the stakeholders and the time and scale in which they operate in or represent. For instance, the coal power region at the sub-national scale – from the perspective of coal miners and local government and have developed over the past 40 years. While a

mainstream national scale narrative which represents the national government's perspective which has expressed a desire to transition away from coal over the past 10 years.

VII. Key Relations identified from Table 2 to analyse

1.15 What are the key relations, connections, and networks between the components (technology, stakeholders, institutions, etc.) of the narratives that you would like to focus your analysis on?

1. Step 2: Defining the boundaries of a region (WP 1&2)

Consider how your region can be defined. In what ways might these three dimensions be expressed? Which of these three will be most effective for narrating the transition pathways in your case study?

1.1. **Formal:** physical, social, or political boundary. e.g., Alberta, Canada; settler (i.e. colonial group) contested Indigenous lands and the Indigenous community of Fort McKay

1.2. **Functional:** horizontal spatial flows (of people, capital, information, other) and ecological flows in a geographic area: e.g., the region in which oil sands are mined in the boreal forest, the region across which workers commute to work at a mine located, the region across which electricity is transported, the region across which activist groups are sharing information and resources

1.3. **Perceptual:** culture of region e.g., Cowboy wild west taming the frontier land, Northern Norway

Table 2: Summary of traits when defining your CCIR

	Formal region characteristics	Functional region characteristics	Perceptual region characteristics
Case study name			

2. Step 3: Alternative narratives

I. Technological sector of the alternative pathways:

2.1. What is/has been the dominant energy/industrial/service sector (e.g., renewable energy, tourism, etc.)?

2.2. Does the pathway represent an on-stream or off-stream narrative?

2.3. Time scale: what period does the alternative pathway cover?

II. Stakeholders:

2.4. Who are the **alternative stakeholders** and their corresponding institutions?

2.5. **Stakeholder's demographics and aspects:** identify the demographics and aspects of stakeholders in the alternative pathway (WP 1, 2) including their gender, ethnicity/ethnic majority, age, political affiliation….

III. Institutions:

2.6. **What institution(s) do the stakeholder (groups) belongs to?:** social (e.g. education), political (e.g. political party), economic (e.g. industry association, bank)

2.7. **Multi-governance scale:** does the alternative pathway include different levels of governance not included in the mainstream?

2.8. **Economic/market:** what is the alternative pathway's potential economic contribution to the region (e.g. jobs, skills, competitiveness, added value etc.)

2.9. **What resources do the alternative stakeholders, and their institutions have access to**? (e.g., natural resources, finance, political power)

IV. Ideologies:

2.10. **What is the guiding ideology of the institutions or stakeholders in the alternative pathway**? The ideology may be a social (environmentalism), political (centralist), economic (ecological economics)

2.11. **Role of culture identity:** describe the significance of culture in the institutions and/or the development in the alternative pathway (e.g. sense of place, signification systems at individual and community levels, ideologies etc.)

2.12. **Future development vision:** what is the alternative stakeholders' perspective about their future regional energy development?

V. Policies:

2.13. **What policy instruments, strategies and programmes** have been supporting the alternative technology sector? Keep in mind policies outside the energy sector, such as those affecting economic development, as well as social, health and broader environmental policies. (WP3)

2.13.1. Are these national, regional policies or EU level? WP3)

2.14. **What potential new policy or policy mix** should be considered to support the alternative pathway(s)? WP3)

VI. Other factors and events:

1.1. **Physical geography:** what there any aspects of the physical environmental not discussed in the mainstream that is important to the alternative pathway (WP1)

1.2. Are there **any other factors and events** not included above that contributed to the development of your CCIR alternative pathway?

Table 3. Summary of traits of your case study region and perspectives for your alternative pathway narratives

Components of the alternative narrative	**Identify key traits and key indicators for each component noting the *size (where?), time (when?), and level (what meaning?) scale* where relevant**
1. **Technology**	Description & indicators:
	Level. What types of technological sectors promote alternative pathways in the region? Size. Where have these technological sectors been located? Time. How long have these sectors been present or when are they expected to emerge?
II. Stakeholders	Description & indicators:
	Level. What types of stakeholders (including stakeholders' groups) have been the alternative voice(s) in the region? Size. Where have the roles of these stakeholders been located? Time. How long have these stakeholders been present?
III. Institutions	Description & indicators:
	Level. What types of institutions have been supporting the alternative voice(s) in the region? Size. Where have these institutions been located? Time. How long have these institutions been supporting the alternative voice(s)?

IV. Ideologies	Description & indicators:
	Level. What types of ideologies do the alternative voice(s) in the region have? Size. Where have been these ideologies spread? Time. How long have the alternative voice(s) been identified with these ideologies?
V. Policies	Description & indicators:
	Level. What types of policies have been supporting the alternative voice(s) in the region? Size. Where have these policies been implemented? Time. How long have these policies been supporting the alternative voice(s)?
VI. Other contextual factors	Description & indicators:
	Level. What types of [contextual factor] have been supporting the alternative voice(s) in the region? Size. Where have these [contextual factor] been located? Time. How long have these [contextual factor] been supporting the alternative voice(s)?

3. Step 4: Re-defining the boundaries of a region (WP 1&2)

Can the regions be redefined?Now, we can think whether the region(s) should be redefined to align them to their envisioned development pathways. In what ways might the three dimensions of a regions be expressed? Which of these three will be most effective for narrating the transition pathways in your case study?

1.3. **Formal:** physical, social, or political boundary

1.4. **Functional:** horizontal ***social*** flows across a geographic area spatial flows (of people, capital, information, other) and ***ecological*** flows across a geographic area:

1.5. Perceptual: culture of region, social-psychology

Table 4: Summary of traits when defining the alternative pathways of your CCIR regions

	Formal region characteristics	Functional region characteristics	Perceptual region characteristics
Case study name			

4. Step 5: Transformation-stream narratives

Transformative stream narratives for potential tipping points:

1.6. Can one or more of the above alternative narratives potentially lead to a transformation? Why or why not?

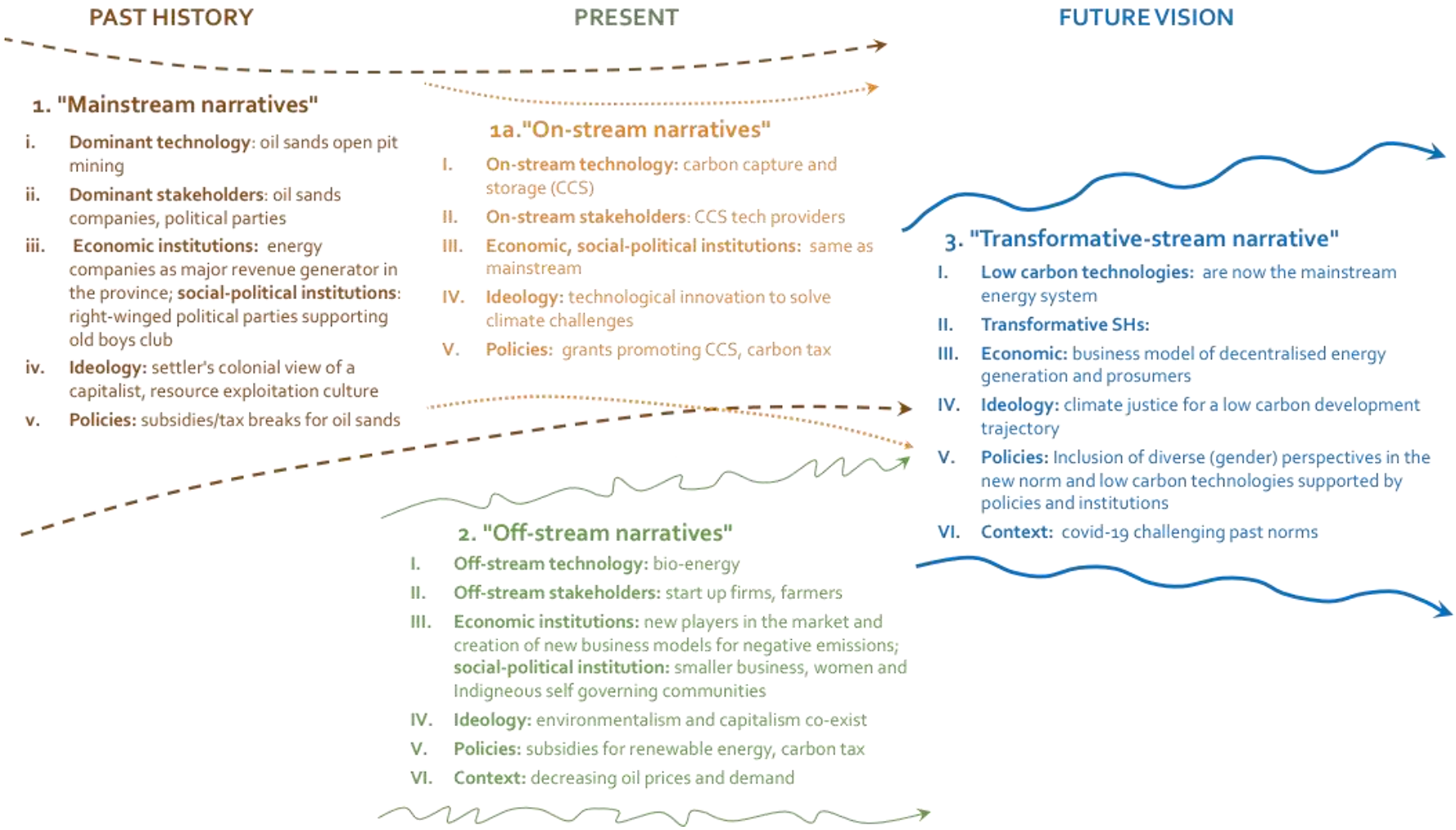
1.7. How would you describe the (potential) transformative capacities (e.g., economic, social, and human resources) of this region to transform into the desired vision(s)? You may refer to: individual income, poverty rates, GDP, skills and expertise, social cohesion, NGO fabric existence, etc.

1.8. Who are the (potential) stakeholders and their institutions involved in the potential transformative narrative?

1.9. What actions are being implemented as enablers or barriers to achieve the visions and by whom?

Figure 3: Case study narratives examples over time

If you wish you can also summarise your narratives components in the diagram below:



Chapter 2: Stakeholder Engagement Guidance for Case Studies

The timeline below provides guidance on the case study and stakeholder engagement trajectory until the third year of the project.

Table 4: Approximate guiding timeline for case study work, deliverable deadlines & stakeholder engagement

Case study work	Stakeholder Engagement
Framing the problem: March 2021- September 2021	
• March-May: Draft mainstream narratives (Steps 1- 3) • April- August: Draft alternative narratives (Steps 3-4) • March- September: Initial scoping of indicators (WP1-5) • August September: Identify tipping event and analyse narratives with help from WP1-4 frameworks (Step 5)	• Stakeholders analysis and mapping • First contact with stakeholders • 1st workshop design & invitation • 1st workshop *Deadline May 2021: Fill in Stakeholders Engagement Monitoring Dashboard (SEMD) • Workshop follow-up & regular interactions
Analysing the problem: August 2021-September 2022	
• August -December 2021; Revise mainstream and alternative narratives with stakeholders • September - December 2021: Analyse potential for transformation • *December 2021: Interim deliverable: submit initial list of indicators for each study • January-July 2022: finalise narratives and indicators. Submit in July for D5.2 • January- September 2022: Clustering regional case studies (D5.3) • *Due September 2022: case study key findings for Deliverable 5.2	• Integration and co-development of narratives • Evaluation of first engagement activities • Complementary engagement activities design & implementation • Share with Stakeholders preliminary results • Possibly co-design with them the 2nd workshop • Update Stakeholders Engagement Monitoring Dashboard (MSED)
Exploring Impact: January 2022- May 2023	
• January-September 2022: Co-develop future transformation narratives (D5.4) • May - December 2022: Co-develop regional strategies with stakeholders. Submit in Dec. for D5.3	• 2nd workshop *Deadline May 2022 • Complementary engagement activities design & implementation • Share and revise with Stakeholders new results

● *Due February 2023 co-developed regional strategies for Deliverable 5.3: Case Study Regional Strategies Booklets	• Invite stakeholders to the final conference • Update the Monitoring Stakeholders Engagement Dashboard (MSED)

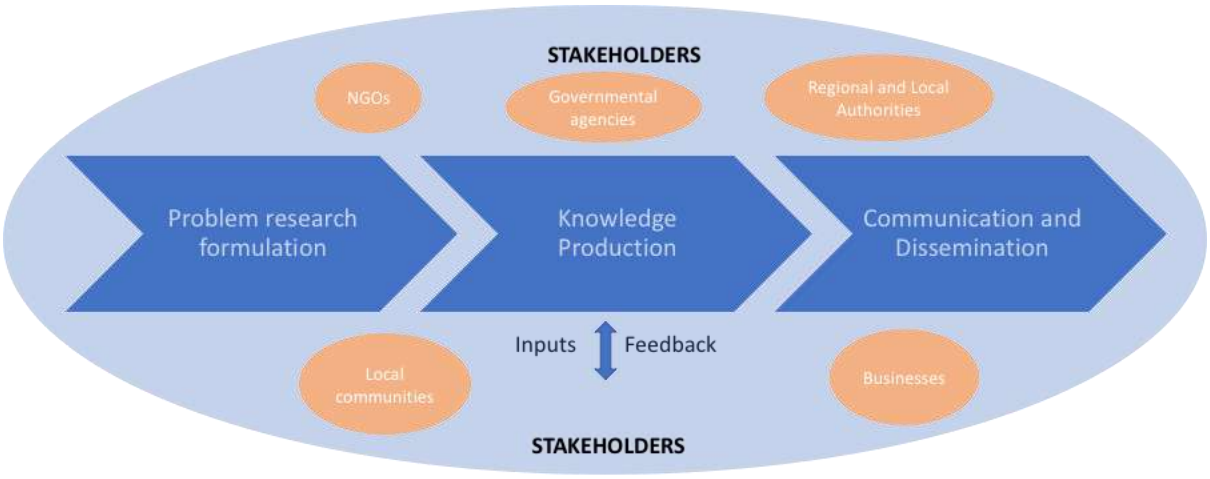
The active participation of diverse stakeholder groups in the research project is of paramount importance for the in-depth development of the case studies and the assessment of tipping points in CCIRs. The adequate mapping and involvement of relevant stakeholders contribute to identifying Narratives and co-create research knowledge.

Involving Stakeholders

Many of the guiding questions presented in section II, might be able to be answered by Case Study leaders using literature sources (e.g., scientific studies, local press, etc.). However, these sources might not be impartial when it comes to highlighting the needs of all stakeholder groups in a Coal or Carbon Intensive Region in transition. Active engagement with stakeholders (after a desk research has been performed to answer as many of the guiding questions as possible) will aim to verify the information/data collected, or capture arguing voices whose perspective on the region's positive transformation varies from the mainstream transformation narrative(s).

By having already answered guiding questions, CS leaders will have the opportunity to drive the discussion, avoiding vague dialogue over broad questions. For the questions that cannot be answered using literature sources, direct stakeholders' input would be needed. In this case, probably a stakeholder category (e.g., coal mine worker) might be more suitable to provide an answer instead of another (e.g., politician), and it is up to the case study leader to engage initially with this stakeholder category before engaging with other stakeholders to discuss the acquired input.

Figure 4: Interaction model between research process and co-development of knowledge with stakeholders (Adapted from Slunge et al., 2017)



Previous to the engagement with stakeholders, a **mapping exercise** needs to be conducted on the earlier stages of the research process. Besides, the engagement efforts need to be monitored to ensure an inclusive, constructive and long-standing relationship with field actors. Thus, **three key steps** need to be considered when developing the CS:

1. Mapping the relevant stakeholders related to the Case Study
2. Developing active engagement activities with those stakeholders
3. Monitoring the relationship with them

1. Mapping of stakeholders

1.1 Identification of stakeholders

As stated in Deliverable 6.1 "Plan of Dissemination and Outreach (PDOR)", stakeholders in TIPPING+ are defined as entities that are affected by, or can influence, the emergence of Social-Ecological Tipping Points (SETPs), both positive and negative, in Coal and Carbon Intensive Regions (CCIRs) (Michas et al., 2020). The first stage is then to identify those stakeholders in the Case Study scope. Different approaches can be undertaken such as those five steps:

1. **Write out the well-known or recognized stakeholders** ("usual suspects") based on pre-existent knowledge of the region, CS or thematic issue.
2. **Organize a brainstorming session** among the project researchers to identify additional stakeholders based on local and regional projects related to the CS.
3. **Explore different thematic or sectorial networks** connected to the CS, analysing if they are relevant as a whole or if there may be potential stakeholders as their members.
4. **Undertake a literature review,** searching for similar case studies, research projects or relevant initiatives, including papers, conferences, reports or workshops.
5. **Discuss with previously identified stakeholders** to collect their suggestions on any additional actors to be included.

The final selection of stakeholders should follow clear criteria of **Relevance and Representativeness.** A **checklist**[2] addressing specific questions regarding issues of gender, age, ethnicity, etc., is detailed in Tipping+ Deliverable 6.2 to identify potential gaps and foster the development of an inclusive and representative stakeholder group. This group should not be considered static as it can potentially evolve during the lifetime of the project, while relationships, interests and interactions with stakeholders change.

1.2 Analysis of stakeholders

Once the relevant stakeholders have been identified, their relations and relevance to the CS has to be assessed. In particular their **Capacity, Motivations, Needs, Interests and Willingness** to interact should be analyzed to know how they have to be considered, prioritized or integrated into the consultation and

[2] L. Segura, J. Fosse, and L. Meltz, Plan of Stakeholders Engagement (PLAS) - TIPPING+, 2020. Available at: https://tipping-plus.eu/deliverables [Accessed: 22-February-2021]

engagement process, ensuring a fruitful, interactive and balanced interaction with interest groups during the whole life of the project.

Different methods can be applied to define the stakeholder's "stake" in the project, such as the **Power/Interest Grid** or **Influence/Salience Matrix**[3], mainly used in the Management field. This basic assessment allows us to quickly cluster and prioritize stakeholders considering their role or potential impact in the project. Complementary variables can also be considered to develop a more accurate analysis: Legitimacy, Level of expertise, Commitment (willingness to engage), Urgency or Value (necessity of involvement)[4]. These variables contribute to a deeper understanding of Stakeholders motivations and availability, which helps to define a more effective strategy for engagement.

Figure 5 Stakeholders categorization through power/ interest grid

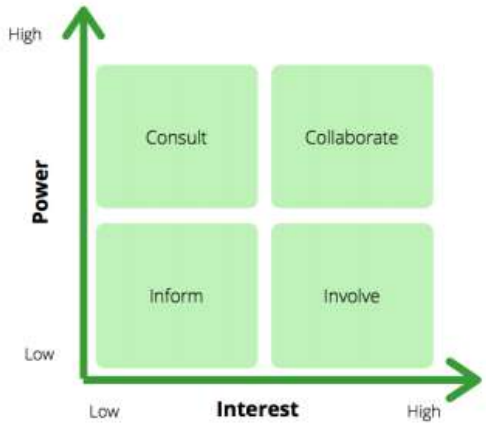
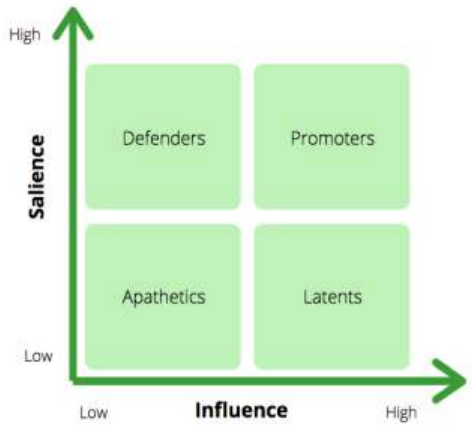


Figure 6 Stakeholders categorization through salience/ influence grid

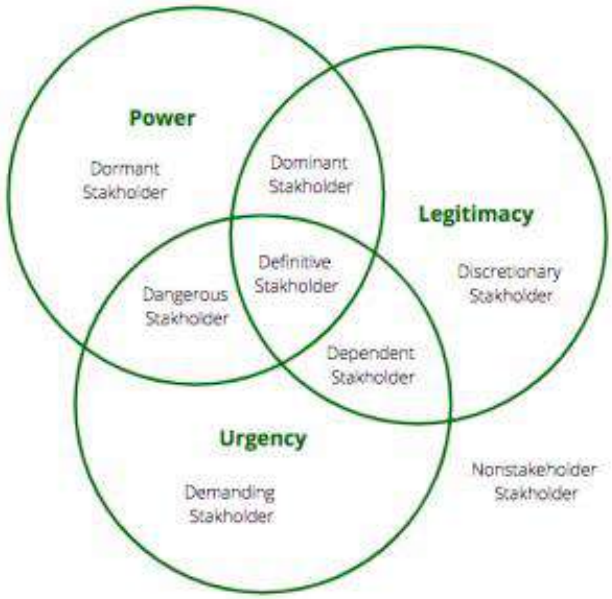
[3] Stakeholder Analysis using the Power Interest Grid, 2017. [Online]. Available at: https://www.projectmanagement.com/wikis/368897/Stakeholder-Analysis--using-the-Power-Interest-Grid [Accessed: 23-Jul-2020].

[4] A. Corovessi, and E. Kanellou, iBRoad stakeholders as real driver of positive change. Step 1: Identification process across Europe, 2017.



Going beyond a two-axis chart, the **Power, Legitimacy and Urgency** framework[5] provides deeper hints on stakeholder's assessment while presenting a more comprehensive way of visualizing the mapping.

Figure 7: Power, Legitimacy and Urgency Mapping

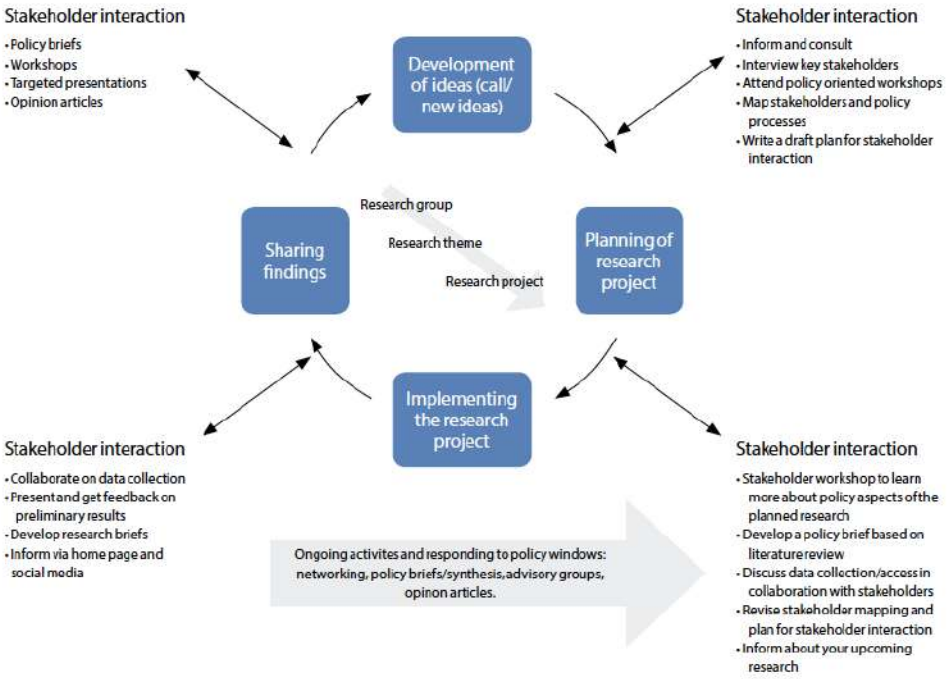


2. Active stakeholder engagement

TIPPING+ research approach requires the active involvement of stakeholders through participatory processes to **co-produce knowledge.**

[5] R. K. Mitchell, B. R. Agle and D. J. Wood, Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts, 1997. The Academy of Management Review, 22 (4), pp. 853-886. [Online]. Available at: https://www.jstor.org/stable/259247?seq=1#metadata_info_tab_contents [Accessed 15-Oct-2020].

Figure 8: Stakeholder interaction across research project[6]



The following **principles** are a basis for ensuring a long-standing fruitful relationship with stakeholders[7]:

- Recognize the **interdependency** with and between stakeholders
- Ensure **balanced, understandable and respectful interactions** with stakeholders
- Build **trust and** maintain **openness** with and among stakeholders
- Co-develop a **shared perception** of the issue (Case Study) and potential solution(s)
- **Give-and-take:** Joint decision-making based on reciprocity and collective commitment

However, not all the identified stakeholders should be approached the same way. **Tailored interactions** are to be developed, engaging with stakeholders via different communication methods and on different frequencies.

[6] Slunge D., Drakenberg O., Ekbom A., Göthberg M., Knaggård Å. and Sahlin U. 2017. Stakeholder Interaction in Research Processes – a Guide for Researchers and Research Groups. University of Gothenburg. http://dx.doi.org/10.13140/RG.2.2.28518.22080

[7] Adapted from Cernesson & Al., Learning together to manage together. Improving participation in water management, 2005. [Online]. Available at: https://www.researchgate.net/publication/323768425_Learning_together_to_manage_together_Improving_participation_in_water_management [Accessed: 28-Oct-2020]

Table 5: Stakeholder (SH) mapping

Type of SH	Relevance	Frequency of communication	Methods of engagement	Digital engagement Tools
Primary stakeholders To engage and commit	Critical to achieving the project's objective. To interact intensively with during the whole project.	High on ad-hoc and regular basis	Individual channels: Phone calls, Individual interviews, Personal email Regular updates: Policy briefs, Working documents and Scientific paper Direct intervention: Workshops, Field visits, Survey, Focus group	Individual channels: social media (FB, instagram, twitter, Whatsapp...), e-mailing Direct intervention: video-conference (Zoom, Jitsi, G-Meet...) Feedback/ information gathering: e-survey or quizz (Google forms, Kahoot...), Participatory platforms (Canvas, VTaiwan, Citizen OS…), whiteboards (Miro, Jamboard…)
Primary Stakeholders To involve	Directly affected by the project. Inputs to be systematically integrated.	Medium-High on ad-hoc and/or regular basis	Individual channels: phone, video calls, personal emails Direct intervention: focus groups and workshops	Individual channels: social media, e-mailing Direct intervention: Webinar or video-conference Feedback/ information gathering: e-survey or quizz, Participatory platforms, Mindmaps or whiteboards
Secondary Stakeholders To consult	Have certain power or specific interest for the project. Inputs to be collected.	Low-Medium Sporadic or when required	Individual channels: personal calls and interviews. Direct intervention: consultation groups and workshops	Feedback/ information gathering: e-survey or quizz (Google forms, Kahoot...), Participatory platforms (VTaiwan, Citizen OS…)
Secondary Stakeholders To inform	Somehow involved in the project activities, partially or indirectly.	Low Regularly or when needed	Mass communication: public presentations, social networks, videos, newsletters,	Social Media: Twitter, Facebook, linkedin, etc. Digital channels: Posts or Articles in corporate/project/thematic websites or platforms, Ads...

			press-release, and infographics	

3. Monitoring stakeholder engagement

During the whole lifetime of the Case Studies, Partners shall monitor and report on their engagement activities as a **learning by doing** process, especially challenging in covid-time. Involvement of stakeholders can be improved through field practices and cross learnings between CS and among Partners. A **contact point** for each CS and T+ partner is therefore needed to ensure fluent communication with the **Stakeholders Engagement Team** (SET) led by WP6 (eco-union and UNIPI).

To centralise this process, a **Stakeholders Engagement Monitoring Dashboard (MSED)** is available through a **shared google spreadsheet** accessible here.

Table 6: Monitoring Stakeholders Engagement Dashboard (MSED)

Methodology			Outcomes	
Used Tools / Particpatory schemes	**N° of participants**	**Duration**	**Results**	**Stakeholder's feedback**

Distribution of consultated stakeholders (%)				
NGOs	**Local / regional / national authorities**	**Businesses**	**Academia / Science**	**Female**

Methodology			Outcomes	
Used Tools / Particpatory schemes	**N° of participants**	**Duration**	**Results**	**Stakeholder's feedback**

The template gathers different information on the engagement activities, methodologies, processes, stakeholder participants and outcomes for each CS.

Partners should also inform in advance on the **date, methodology and target of their Stakeholders Workshops** due in Month 12 and 24**,** to facilitate participation and learning among T+ and sister projects partners. Approximately every three months WP6 (eco-union) will send corresponding reminders to all partners to update the MSED introducing the information regarding engagement activities.

4. Stakeholder Engagement Timeline

Case Study research and stakeholder engagement strategy need to be developed parallelly and consistently. Following the T+ **Transformative Framework**, stakeholder engagement should be undertaken within the three different stages of the research process.

4.1 Framing the issue

- **Stakeholders mapping and analysis**: Primary stakeholders have to be identified and assessed while framing the research question and designing the research strategy, to better define the scope and objective of the CS.
- **Initial contact with key stakeholders:** Primary stakeholders should be contacted to discuss, refine and validate the research question.
- **Workshop design & invitation:** The workshop should ensure balanced participation of identified stakeholders. Their response to the invitation gives valuable insights of future engagement dynamics.

4.2 Analysing the issue

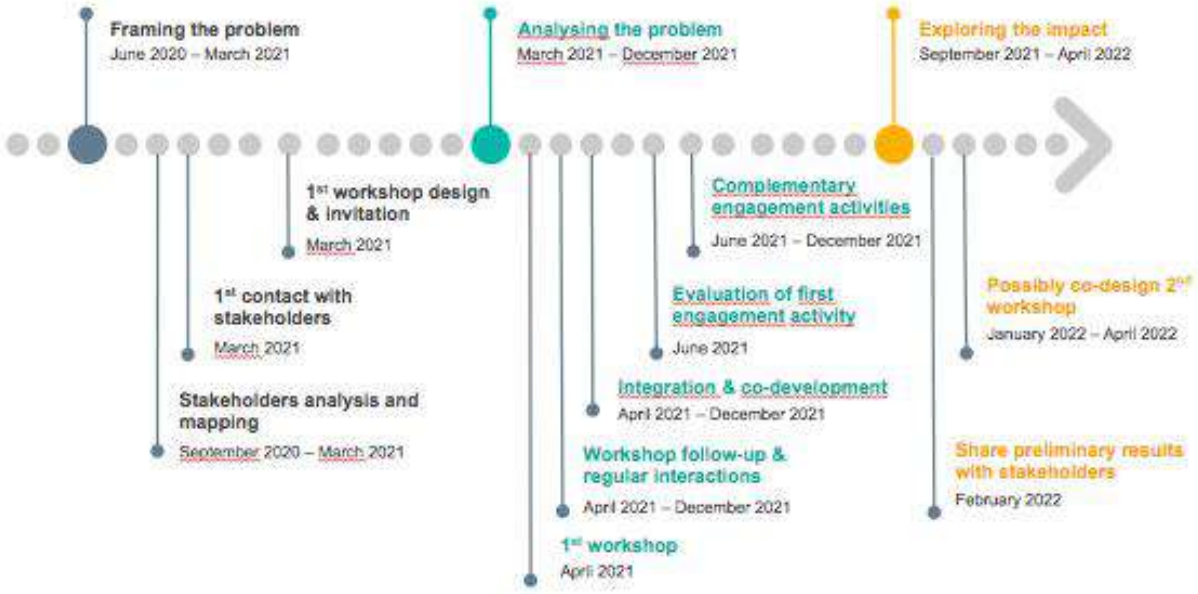
- **Production of workshop:** the inputs from participants provide valuable insights on the CS and contribute to the co-creation of actionable knowledge about key challenges, processes, driving forces and critical conditions related to tipping points.
- **Workshop follow-up & regular interactions:** Primary stakeholders need to be contacted for collecting feedback and regularly engaged in order to keep them committed to the project.
- **Research integration and co-development:** the knowledge produced through the continuous interaction among all stakeholders needs to be documented and integrated in the project outcomes.
- **Evaluation of stakeholder engagement:** the monitoring of the stakeholder interactions contributes to assess the strategy and improve the research results.
- **Complementary engagement activities**: Additional stakeholder activities might be developed if there are insufficient inputs or lack of interaction from CS actors.

4.3 Exploring Impact(s)

- **Share preliminary results:** First outcomes of the research should be shared with the stakeholders to keep them informed and engaged.
- **Co-design with stakeholder the following workshops**: Based on lessons learned from the first event, the second workshop can be co-developed with primary stakeholders to draw further insights and promote ownership.

A potential **timeline for stakeholder engagement within the Transformative Framework** is provided below. The specific months detailed are orientative and can vary among CS according to field constraints.

Figure 9: Example of case study timeline



To ensure partners are on track with project milestones and deliverables, a checklist with major project deadlines is provided below.

Table 7 Stakeholder Checklist

Month	Action	Status
By month 10	Have you identified your stakeholders?	☐
	Have you analysed and mapped your stakeholders?	☐
	Have you started the consultation process with your stakeholders?	☐
	Have you invited the stakeholders to your first stakeholder's workshop?	☐
By month 12	Have you held the first stakeholder workshop?	☐
	Have you integrated their feedback?	☐
	Have you contacted stakeholders to thank them for their inputs and share first results?	☐
By month 24	Have you integrated stakeholders' inputs to your case study analysis?	☐
	Have you communicated the preliminary results of the research to your stakeholders?	☐
	Have you evaluated the interaction process?	☐
	Have you considered the lessons learned from the first workshop to design the second one?	☐
	Have you invited stakeholders to participate in the second workshop?	☐

	Have you contacted stakeholders to thank them for their inputs and share first results?	☐
By month 36	Have you communicated the project results to your stakeholders?	☐
	Have you invited your stakeholders to the final conference?	☐

Appendix 1: Indicators to consider in the case study

The following potential indicators for context including geography, business, politics and society are initial indications and not meant to be comprehensive. Indicators will differ from case study to study and need to be verify. If the indicators you're using are not present in the table, please add it to the table and inform WP5 leads.

1. Potential indicators for context including geography, business, politics & society

Variable type	Variable examples	Key Questions
General context		
Demographics	Population Composition of gender Education levels Age pyramid Migration patterns Life expectancy *(only relevant over longer time frame)*	Who lives in the carbon-intensive regions (demographics, gender, minorities)? What are they doing in terms of jobs and education? What (if any) migration patterns can be observed? What are the ongoing trends?
Socio-economic trends and changes	GDP Household income levels Poverty rate Energy poverty rate Employment and unemployment levels (by gender and age, if possible) Productivity level	What are the economic, social and human resources and capacities available to transform the region?
Business/industry context		
Importance of incumbent dominant industry (e.g. coal, steel)	Number of employees / share of local employment Contribution to local GDP Subsidies / subsidies relative to turnover, value-added Production output (e.g. MW, tonnes of coal)	What is/has been the dominant sector (WP4)? what is the CCIR's economic contribution to the region Is the CCIR dependent in upstream energy-extractive and/or in downstream carbon- and energy-intensive industry? Who are the incumbents and dominant industry actors? How important are they for the local economy and employment market? What is the local economic contribution and value of the incumbent industry? How much public subsidies in relation to value added do they receive?

Presence and importance of other sectors	Number of companies employing 10%, 20%, 25% of the workforce Share of public vs. private sector in Regional GDP Employment Number of employees / share of local employment Contribution to local GDP Number/ % of SMES	What resources do the mainstream stakeholders and their institutions have access to? (e.g. natural resources, finance, political power) (WP6)
Presence and importance of low carbon sectors	Number of employees / share of local employment Number of companies active in the regions Contribution to local GDP Subsidies / subsidies relative to turnover, value-added Skills needed for expansion	Are new "green" companies present? Can they step up and grow into the niche left by the carbon-intensive business? How important are they for the local economy and employment market? What is the local economic contribution and value of the green industry? How much public subsidies in relation to value added do
Investments (e.g., public private, foreign direct investment)	Expand existing operations	Expand local value creation, new jobs
	Found new operations	Expand local value creation, new jobs
	Relocate from another region	
Entrepreneur initiatives	Start-ups and technology and business innovation	Establish a flexible and supportive business environment for start-ups and other entrepreneurial innovations
Political context		
Political composition of government	EU parliament National government State government Local government	Who are the mainstream stakeholders currently in power and their corresponding institutions (WP6) Stakeholder's demographics and traits: identify the demographics and traits that influences the CCIR (WP 1, 2) including their gender, ethnicity/ethnic majority, age, political affiliation (WP3)…. Who are the governing actors and who is in opposition? What is their position on COAL or carbon intensive industries? What role does COAL or carbon intensive industries play in legitimising their power?

Public opinion on national, regional and local level	Acceptance of climate science Acceptance of renewable energy deployment Support of government Trust in government Civil engagement and own participation in public consultations Corruption perception	What is the current governance system that has enabled the development of the technology? Future development vision: what is the mainstream stakeholders' perspective about their future regional energy development? What sentiments do local and regional community members convey about questions of climate change, acceptance of renewable energy, trust in government bodies and their own participation in transformation processes?
Public budgets	Funding for different levels/ ministries, branches of government (total or spending per capita) • Climate protection • Energy funding/ subsidies • Labour (retraining and upskilling measures) • Social welfare • Research and Education • Innovation Public spending/investments relative to GDP • Local/municipal • Regional • National	What policy instruments, strategies and programmes have been supporting the mainstream? Are public investments or public investment support programmes possible? Do public investments or public investment support programmes already exist, and can the region tap into them? Are the public budgets balanced? Is there room for additional spending? Are existing investments or other structural change programmes available? Public debt relative to GDP
Media discourse	Media or political coverage of COAL/CARBON (intensity) • Number of newspaper articles • Number of public service TV (news) reports • Number of online newspaper articles or social media (Facebook, Instagram) • Media coverage of COAL (direction) • Number of positive (pro-closing, pro-transition) and negative (anti-closing, anti-transition) newspaper articles • Number of positive/negative public service TV (news) reports • Number of positive/negative online newspaper articles or social media (Facebook, Instagram)	How often does the COAL (or carbon intensive industries) appear in the local news (newspapers, online news, social media)?

Other variables?	Other examples?	Other questions? What are the key aspects of the physical environment (e.g. resource rich, climate zone, forest coverage, biodiversity hotspot etc.) that impact the CCIR's development?

2. Potential indicators for social psychology and social anthropology

Key indicators should be examined from a systemic point of view as emerging variations in each of the following indicators, in the behaviours and in the meaning-making process. These variations can be observed and inferred from the outside (i.e., I see that behaviours have changed), and/or recognised by people themselves (i.e., emic; Locals acknowledge that they changed their behaviours). The external and internal views could coincide (I see change / they acknowledge) or not (I see change / they don't; I don't see changes / they do). Variations could be assessed qualitatively or quantitatively (preferably with validated scales).

Variable type	**Variable examples**	**Possible questions**
Consciousness (individual and shared)	Knowledge, Experience, Awareness, Concerns, Values, Social capital	What do they know? Do they refer any direct or mediated experience? Are they aware of the risk? What are they concerned about? Do they express any emotion? Positive negative? Which values guide their understanding and action?
Event Appraisal	Positive / Negative, Relevant / Irrelevant, Close / Distant, Attitude	How is the event evaluated? Is it perceived as relevant or not? Is it perceived as related to self/community? Do they display a positive or negative attitude towards the object?
Cognitive barriers	Bias, Heuristics, Forms of denial, Learned helplessness, Discredence	Do they systematically perceive a distorted reality? Do they show wishful thinking? Do they have positive/negative views of self and others that are not realistic? Do they deny the gravity of reality? Or deny their role in it? Do they feel helpless?
Individual and intragroup determinants (psychosocial + anthropological)	Drivers (e.g. need for power, need for closure) Norms & Social comparison	What is their inner motivation to do so or to keep a specific position? Are they just conforming to social norms (prescriptive or descriptive)? What are the costs of doing or saying something different? What is the event's role in the community's identity building processes? is it useful in order to assimilate and/or differentiate actors?

Societal and intergroup determinants (psychosocial + anthropological)	Identity, Social representations, Ideologies, Perceptions of injustice / grievance / deprivation, Temporalities, Local conflicts, Activation of exchange circuits, Creation or enhancing of networks' cohesion	Has individual identity changed? How does he/she narrate his/her life, the story of his/her family and community? Has social identity and belonging changed? How are 'the others' perceived? Do representations about technologies, policies or the environment influence particular actions? How is the issue at stake represented? Is it a hegemonic representation? How are novelties represented? How are memories and history 'used' to understand novelties? How does the past affect the vision of the future? What is the event's role in the community's identity building processes? is it useful in order to assimilate and/or differentiate actors? Do shared meanings lead to the development of alliances?
Coping appraisal and responses	Perception of individual and shared resources, Coping behaviours	Are symbolic and material resources (perceived as) available within the community and effective? Is there any (perceived)difficulty to acceded to the economic resources? Is there low/high social capital? What is the perceived level of agency?

3. Potential indicators for policy & other interventions

Intervention indicators	Intervention example	Intended effect
Policy interventions		
Public investments	Build new infrastructure (rail, road)	Improve transport of goods and people to/from the region; allow longer commuting
Investment support	Public-private partnerships	Subsidies for private actors investing in the region to trigger investments in new economic activity, jobs creation
	Soft loans	Low-interest loans for regional investments to trigger investments in new economic activity, jobs creation

Subsidies	Subsidies or tax exemptions for companies present	Keep companies in the region, maintain employment
	Subsidies or tax exemptions for companies expanding in or to the region	Attract further companies to the region, create further jobs in already existing businesses
Education R&D	Fund university, fund new university program	Attract young, qualified students to the region; create the skills needed for the envisioned transition
	Found or move R&D institute	
Deliberation processes	Local engagement process	Build new vision for region
Population management	Support for families moving away	Reduce unemployment in affected region, create new opportunities for citizens and other regions
	Lower property tax, soft loans for buying property in regions	Keep population in the region by supporting house ownership
Local interventions	Fund local initiatives and associations	Support local social capital
Societal interventions		
Education & Training	Re-train existing employees	Enhance skills, direct skills towards what is needed in future (keep existing employees employed)
	Train new employees	Teach new employees necessary skills for future operations, scope of company
	Work with government to design new education programs, university foci	Teach new employees necessary skills for future operations, scope of company and the governmental vision for the region
Societal interventions		

Citizen initiatives	Network support for businesses and other stakeholders	Create movement of orchestrated policy, business and civil society actions to achieve new vision for the region
	Bottom-up visionary discussion processes	Build new vision for region, build social trust and associational networks
Education	Information campaigns about environmental awareness and health	Create awareness, educate and build local social capacity
Social networks	Collective action	Support local initiatives and NGOs in order to create or maintain social capital

Appendix 2: Political Ideologies

<table>
<tr><th colspan="2">POPULISM</th></tr>
<tr><td colspan="2">POPULISTS typically challenge the legitimacy of established political institutions and emphasizes that the will of the people (or “the nation”) should prevail. It strongly applies the rhetoric “the people” (morally good force) vs. “the elite” (corrupt and self-centred), as well as have strong anti-elite discourse. The “people” is used as a proxy which can be filled with any meaning depending on the situation/ public discourse and, hence, can develop pretty strong appeal. Although populists claim that they do everything “for the people”, they do not necessarily seek empowerment of the people.

Populism is a very shallow ideology or mere a discourse/political rhetoric, which is filled with more substance from full ideologies such as liberalism, socialism, conservatism etc. and, hence, can take many different varieties depending on the national/ regional or even local context.

Examples of varieties of populists:
• right wing populists (often anti-immigrants, anti-Roma and other ethnic minorities, anti-LGTB rights, anti-feminists etc.);
• left wing populists (anti-globalization, economic left-wing (socialists));
• illiberal (right wing) populists (often attacking civic liberties, human rights and the rule of law).</td></tr>
<tr><th colspan="2">SOCIAL CONSERVATISM VS SOCIAL LIBERALISM</th></tr>
<tr><td>Those with CONSERVATIVE values reject these ideas in favour of order, tradition and stability, believing that government should be a firm moral authority on social and cultural issues.</td><td>Those with LIBERAL values favour expanded personal freedoms, for example, on abortion rights, same-sex marriage, and democratic participation.</td></tr>
<tr><th colspan="2">ECONOMIC RIGHT VS ECONOMIC LEFT</th></tr>
<tr><td>Those on the economic RIGHT favour a reduced role for government in such ECONOMIC ISSUES as privatization, taxes, regulation, government spending, and the welfare state.</td><td>Those on the economic LEFT want government to play an active role in the ECONOMIC ISSUES as mentioned before.</td></tr>
<tr><th colspan="2">ENVIRONMENTAL SCEPTICISM VS ENVIRONMENTAL AWARENESS</th></tr>
</table>

General policies against protecting the ENVIRONMENT, fighting CLIMATE CHANGE, and other "green" policies such as general preservation of natural resources, preservation of countryside, forests, etc., protection of national parks and animal rights.	General policies in favour of protecting the ENVIRONMENT, fighting CLIMATE CHANGE, and other "green" policies as mentioned before.
PRO DEMOCRACY VS AGAINST DEMOCRACY	
Favourable mentions of democracy as the "only game in town". General support for the country's democracy. Support for: (i) democracy as method or goal in national, international or other organisations; (ii) the need for the involvement of all citizens in political decision-making; (iii) support for parts of democratic regimes (rule of law, division of powers, independence of courts etc.).	Statements against the idea of democracy, in general or in the manifesto country. Calls for reducing or withholding democratic rights from all or certain groups of people. Calls for the introduction or maintaining of a non-democratic regime, e.g. monarchy or rule of the military.

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