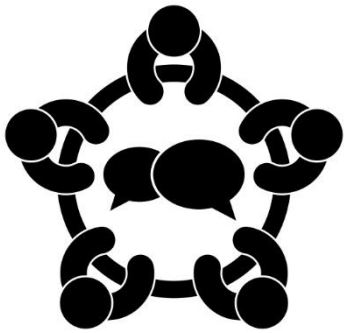
Smart strategies for the transition in coal intensive regions

Project No: 836819

TRACER
TRANSITION IN COAL INTENSIVE REGIONS

Regional stakeholder engagement activity to identify a vision and future-oriented priorities for energy transition



WP 5 – Tasks 5.2 & 5.4 / D 5.3

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TRACER website: www.tracer-h2020.eu

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Abbreviations

ACIVJ	Asociaţia Comitetului de Inițiativă Valea Jiului (Jiu Valley SMEs association), Romania
ADR Vest	West Regional Development Agency, Romania (NUTS2, RO42)
AISVJ	Asociatia Institutul Social Valea Jiului / Social Institute Jiu Valley Association, Romania
ANRM	National Agency for Mineral Resources, Romania
BSERC	Black Sea Energy Research, Bulgaria
CEH	Hunedoara Energy Holding, Romania
CETI	Institut Vugilnych Tnegotechnologiynatsionalnoy Akademii Nauk Ukrainy / National Academy of Sciences of Ukraine
CHPP	Combined Heat and Power Plants
CJH	Hunedoara County Council, Romania
CRES	Centre for Renewable Energy Sources and Saving Foundation, Greece
CRIT	Coal Regions in Transition
CULS	Česká zemědělská univerzita v Praze / Czech University of Life Sciences Prague
D	Deliverable
EDP	Entrepreneurial Discovery Process
ENTEL	Energoprojekt ENTEL, Serbia
ESIA	Environmental and Social Impact Assessment
ESIF	European Structural and Investment Funds
EU	European Union
FIB	Forschungsinstitute für Bergbaufolgelandschaften / Research Institute for Post-Mining Landscapes, Germany
ICT	Information and Communication Technologies
INSEMEX	INCD - INSEMEX Petroșani - National Research and Development Institute for Mining Safety and Explosion Protection, Romania
IPROMIN	Mining and Industrial Engineering Company
ISPE	Institute for Studies and Power Engineering, Romania
JTF	Just Transition Fund
JTTP	Just Territorial Transition Plan

MMC	Mine Methane Capture
NGO	Non-Governmental Organisation
NPS	National Power System
NRRP	National Recovery and Resilience Plan
NUTS	Nomenclature of territorial units for statistics
PV	Photovoltaic
PwC	Pricewaterhouse Coopers
RES	Renewable Energy Sources
S3	Smart Specialisation Strategies
SME	Small & Medium-sized Enterprises
SNIMVJ	National Mine Closure Company Jiu Valley, Romania
SRSP	Structural Reform Support Programme
SRSS	Structural Reform Support Service
START	Secretariat's Technical Assistance to Regions in Transition
STRATH	University of Strathclyde (European Policies Research Centre), Scotland, United Kingdom
T	Task
TETI	Thermal Energy Technology Institute, Ukraine (formerly CETI)
TJTP	Territorial Just Transition Plan
UAK	Uniwersytet Rolniczy im. Hugona Kołłątaja w Krakowie / Agricultural University of Krakow, Poland
UCG	Underground Coal Gasification
UPET	University of Petrosani, Romania
UK	Univerzita Karlova / Charles University, Czech Republic
WG	Welsh Government, Wales, United Kingdom
WP	Work Package

1 Introduction

The TRACER project aims to support nine current and former coal-intensive regions in their transition towards sustainable energy systems. The project has a focus on the regions' research and innovation strategies, as well as on the re- and up-skilling that will be required among regional workforces in the transition process. The target regions are:

- Southeast Region, Bulgaria
- North West Bohemia, Czech Republic
- Lusatia Region, Germany
- Western Macedonia, Greece
- Upper Silesia, Poland
- West Region/Jiu Valley, Romania
- Kolubara Region, Serbia
- Donetsk Region, Ukraine
- Wales, United Kingdom

Work Package 5 of TRACER concerns engagement with relevant stakeholders, through an Entrepreneurial Discovery Process (EDP) in the target regions. The aim is to mobilise a wide range of quadruple helix stakeholders (i.e. business, including chambers and business associations; government and public bodies; research and education institutions; and civil society organisations and non-governmental organisations) in each target region to participate in the process of developing a shared vision and priorities for the transition out of coal, and into new sustainable energy systems. The engagement work provided a basis for the regional stakeholders to develop and take ownership of a strategy for the future (TRACER Work Package 6).

This report (Deliverable 5.3) describes the TRACER activities carried out in the target regions. Section 2 provides a summary overview of the regional activities. Section 3 includes the nine regional reports, which form country chapters. The regional chapters describe the stakeholder engagement processes which have taken place in the nine TRACER target regions. The details of these vary, but each chapter follows a common format. The chapter first describes the methodology used for the interviews and the workshop(s) which have taken place, followed by a discussion of the shared vision and priorities for the region. Each chapter ends with a conclusion section. The regional chapters will also be published in standalone format for dissemination in the regions.

Note that an accompanying report (Deliverable 5.2) was published in July 2022, which comprised an analysis of the outcomes of the mobilisation process in the TRACER target regions.

2 Overview of regional activities

The stakeholder engagement activities carried out under TRACER Work Package 5 (WP5) have varied across the target regions. This was anticipated at the project outset, even prior to the COVID-19 pandemic. Activity under WP5 started in late 2019, when central guidance was produced for the regional teams on undertaking the Entrepreneurial Discovery Process (EDP) in the target regions. Key stakeholder engagement activities within each target region were foreseen to include:

- Interviews with around 10-15 stakeholders (covering all sectors of the quadruple helix);
- A number of workshops, which together aim for quadruple helix participation.

As the TRACER regions were at very different starting points in their transition out of coal, regional partners were encouraged to be flexible to adapt to regional circumstances e.g. by adapting interview questionnaires and meeting formats.

Additional guidance was then developed for the regional teams in March and June 2020, to take into account the COVID-19 crisis. The guidance provided advice on virtual methods for stakeholder engagement activity, as the pandemic required everyone to rethink working practices, particularly the ones that involved group work, travel, and physical presence.

2.1 Stakeholder interviews

Regions were asked as a first step to map their regional stakeholders, including all four sectors of the quadruple helix (i.e. business, including chambers and business associations; government and public bodies; research and education institutions; and civil society organisations and non-governmental organisations), with the intention of interviewing a range of individuals and organisations with different viewpoints. For example, in Greece, CRES experts elaborated a list of stakeholders most relevant to the energy transition topic, with the main criteria being the location of potential interviewees in the region of Western Macedonia, then identifying representatives across the quadruple helix. Interviewees were then selected based on their relevance and prior active involvement with the topic of coal phasing out for the region, either through participation in working groups or committees, or through participation in national and/or European projects addressing the issues of energy transition and the rehabilitation of mining areas.

In order to provide flexibility to TRACER regional partners, it was anticipated that some interviews could be replaced by meetings with small groups of stakeholders, to discuss common concerns and priorities in general, and especially about potential for new activities in energy R&I. This was before the impact of COVID-19 on this type of activity was fully known.

An interview questionnaire/checklist was provided to the target regions (Box 1), and the regional partners were encouraged to adapt the questionnaire to fit regional circumstances and the interests and expertise of interviewees (as well as translate it into native language as appropriate).

Box 1: Interview questionnaire

A. How do you see the region's coal transition?

1. Do you see a need for the region to transition out of coal to other sectors/activities? Why?
2. What is your view of past and present coal transition programmes in the region? What has – and has not - been successful, and why?
3. What do you see as the priorities for the region in relation to socio-economic development or coal transition?
4. Are you interested in contributing to discussions on a new strategy for future-oriented energy R&I in the region?

B. Mapping connections

5. Who do you already work with in the field of coal or energy R&I? (E.g. main customers, suppliers, partners on R&I projects, members, sources of labour…)?
6. How do you work with them?
7. Which other regional stakeholders are active in the field of coal or energy R&I (or have potential to be active)?

C. What works well in the region?

8. Does the region have future-oriented thematic strengths in relation to energy R&I?
9. What do you see as the most important regional resources/capacities for energy R&I? E.g. in terms of the following:
   - Generators of knowledge (universities, research centres, business R&I);
   - Skilled/educated workers and organisations generating skilled educated people (universities, colleges etc.);
   - Innovative businesses translating knowledge into products and services;
   - Connectors between sectors, organisations and themes (e.g. chambers, cluster agencies, innovation centres, development agency etc.)
   - Sources of funding (e.g. private funds, quasi-public funds, and public programmes);
   - Important customers for R&I (public or private);
   - Supportive institutions, regulations, and infrastructure.

D. Vision for the future

10. Looking 10 years into the future, what changes would you like to see in the region:
    - In terms of R&I / sustainable energy transition?
    - In broader terms?
11. What do you see as the challenges facing the region, in terms of energy R&I / sustainable energy transition?
12. What are the possible solutions to these challenges?

Interviews had been foreseen with 10-15 stakeholders in each region. Almost all regions were able to meet the target, but with the onset of COVID-19 this became very challenging in some regions, despite strenuous efforts by the regional teams. A **total of 175 interviews** were carried out in the nine TRACER target regions, covering a broad range of stakeholder groups (see Table 1).

Table 1: Stakeholder interviews in the TRACER target regions

TRACER target region / Type of stakeholder	Government bodies	Other public sector organisations	Business associations, chambers and individual businesses	Universities	Research institutes	Educational institutions	Civil society organisations	Hybrid organisations (e.g. innovation centres or cluster	Others	TOTALS
Southeast Region, Bulgaria	1	2	4	1	0	0	3	0	2	**13**
North West Bohemia, Czech Republic	5	1	6	2	1	1	0	0	0	**16**
Lusatia Region, Germany	1	1	5	2	0	0	3	1	1	**14**
Western Macedonia, Greece	1	1	0	3	2	0	0	1	0	**8**
Upper Silesia, Poland	2	1	2	1	3	0	1	0	1	**11**
West Region/Jiu Valley, Romania	12	0	6	10	0	0	20	0	11	**59**
Kolubara Region, Serbia	3	1	1	2	0	2	3	0	0	**12**
Donetsk Region, Ukraine	1	1	2	2	6	0	0	0	0	**12**
Wales, United Kingdom	7	8	3	3	2	2	4	0	1	**30**
TOTALS	**33**	**16**	**29**	**26**	**14**	**5**	**34**	**2**	**16**	**175**

The **format** for carrying out interviews varied depending on the availability and preference of interviewees, and on the COVID-19 situation prevailing at the time (see Table 2). For example, FIB in Lusatia were able to secure an early start on the interview process in 2019, so were able to carry out more interviews face to face. Interviews were generally lengthy and detailed (e.g. two hours and longer) allowing an in-depth exchange of views. In other regions, a mix of in person, online and telephone interviews were conducted. In addition, where stakeholders were reluctant or unable to participate in an interview, questionnaires were completed and submitted in written format (e.g. in Western Macedonia). In Wales, securing cooperation from stakeholders was facilitated by Welsh Government being a TRACER project partner, and they worked with STRATH to map, mobilise and encourage stakeholder participation, which helped secure a high number of interviews.

Table 2: Stakeholder interactions in interviews

TRACER target region	Interviews
Southeast Region, Bulgaria	In person, by telephone and online
North West Bohemia, Czech Republic	Online
Lusatia Region, Germany	In person and by email
Western Macedonia, Greece	Online and through completed interview questionnaires
Upper Silesia, Poland	Online
West Region/Jiu Valley, Romania	Online
Kolubara Region, Serbia	In person and online
Donetsk Region, Ukraine	By telephone and email
Wales, United Kingdom	Online and telephone

Guided online interviews using google forms in Romanian were used in Jiu Valley. The TRACER activities in Romania-Jiu Valley were made more complex, but also supported, by the fact that there were several related initiatives taking place in parallel, including:

- development of the strategy for the transition from coal of Jiu Valley for the period 2021-2030 (EC–DG Reform, through SRSS, under the Ministry of European Funds coordination);
- EC assistance services accessed by all six of Jiu Valley's Mayors through START;[1]
- the development of Territorial Just Transition Plans;
- cross-overs with other related H2020 projects for coal regions (i.e. Tipping PLUS, CINTRAN and ENTRANCES).[2]

2.2 Stakeholder workshops

Overall, **26 workshops were held, engaging over 900 stakeholders**, again across a broad range of stakeholder groups (see Table 3). In terms of workshops, flexibility was provided in their quantity and structure, to tailor the approach to the needs of the target regions.

Table 3: Stakeholder engagement workshops in the TRACER target regions

TRACER target region / Type of stakeholder	Government bodies and other public bodies	Business associations, chambers and individual businesses	Universities and research institutes	Educational institutions	Civil society organisations	Hybrid organisations (e.g. innovation centres or cluster bodies)	Others	TOTALS	Number of workshops
Southeast Region, Bulgaria[3]	129	110	40	0	71	0	0	**350**	**4**
North West Bohemia, Czech Republic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	**320**	**8**
Lusatia Region, Germany	8	9	28	0	2	1	2	**50**	**1**
Western Macedonia, Greece	n/a	n/a	n/a	n/a	n/a	n/a	n/a	**n/a**	**n/a**
Upper Silesia, Poland	2	1	3	0	1	1	1	**9**	**1**
West Region/Jiu Valley, Romania	46	8	15	0	16	0	0	**85**	**4**
Kolubara Region, Serbia	12	0	8	0	3	5	0	**28**	**3**
Donetsk Region, Ukraine	9	15	40	0	4	0	0	**68**	**4**
Wales, United Kingdom	8	0	6	1	0	2	0	**17**	**1**
TOTALS								**927**	**26**

A range of face to face and online approaches were adopted (see Table 4). For instance, only one workshop was held in Lusatia, as stakeholders expressed a preference for bilateral conversations/interviews. However, in parallel during 2019, FIB supported LEAG, the regional

[1] The Secretariat Technical Assistance to Coal Regions (START) programme supports seven coal regions (including Jiu Valley in Romania) addressing gaps in technical assistance and providing capacity building.
[2] https://tipping-plus.eu/home; https://coaltransitions.org/projects/cintran/; https://entrancesproject.eu/
[3] Approximate figures, joint with DeCarb project.

lignite mining company, with the organisation and conducting of two working group meetings with a wider range of stakeholders.

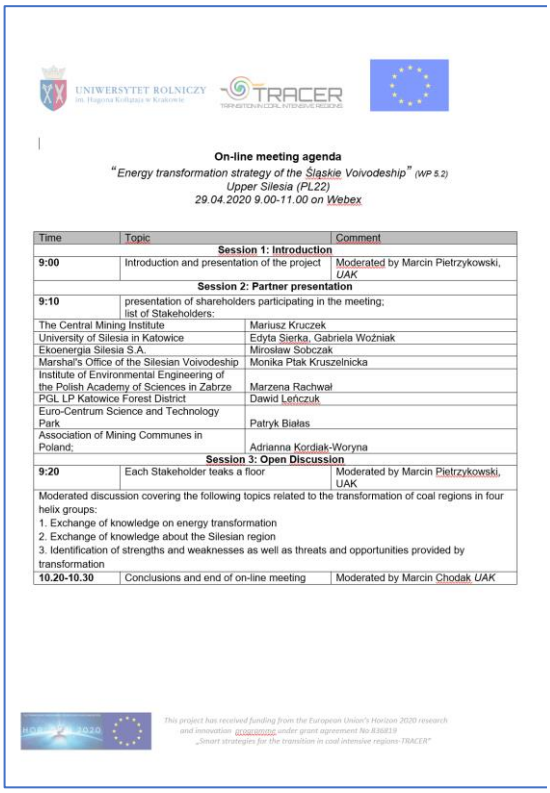
Table 4: Stakeholder interactions in workshops

TRACER target region	Workshops
Southeast Region, Bulgaria	Hybrid (online and in person)
North West Bohemia, Czech Republic	In person
Lusatia Region, Germany	In person
Western Macedonia, Greece	n/a
Upper Silesia, Poland	Online
West Region/Jiu Valley, Romania	Online
Kolubara Region, Serbia	Online, in person and hybrid
Donetsk Region, Ukraine	Online
Wales, United Kingdom	Online

As the project progressed, the need for flexibility increased – due to the pandemic, as stakeholder mobilisation and knowledge exchange activities were having to be cancelled, rescheduled or otherwise altered. In some cases, it was an option to postpone the planned activities to a later date. In other cases, it was preferred to organise online activities. Flexibility was also required to incorporate the need to exploit synergies and minimise duplication, by working collaboratively with other parallel projects and programmes related to coal transition.

For Upper Silesia, UAK were one of the first teams to adapt to the new approach under COVID-19, with an online event using the Cisco Webex platform in April 2020 (postponed from March) (see Figure 1).

Figure 1: Agenda and screenshots from the online workshop, Upper Silesia, April 2020



UNIWERSYTET ROLNICZY im. Hugona Kołłątaja w Krakowie

TRACER TRANSITIONING COAL INTENSIVE REGIONS

On-line meeting agenda

"Energy transformation strategy of the Śląskie Voivodeship" (WP 5.2)
Upper Silesia (PL22)
29.04.2020 9.00-11.00 on Webex

Time	Topic	Comment
	Session 1: Introduction	
9:00	Introduction and presentation of the project	Moderated by Marcin Pietrzykowski, UAK
	Session 2: Partner presentation	
9:10	presentation of shareholders participating in the meeting; list of Stakeholders:	
The Central Mining Institute	Mariusz Kruczek	
University of Silesia in Katowice	Edyta Sierka, Gabriela Woźniak	
Ekoenergia Silesia S.A.	Mirosław Sobczak	
Marshal's Office of the Silesian Voivodeship	Monika Ptak Kruszelnicka	
Institute of Environmental Engineering of the Polish Academy of Sciences in Zabrze	Marzena Rachwał	
PGL LP Katowice Forest District	Dawid Leńczuk	
Euro-Centrum Science and Technology Park	Patryk Białas	
Association of Mining Communes in Poland;	Adrianna Kordiak-Woryna	
	Session 3: Open Discussion	
9:20	Each Stakeholder teaks a floor	Moderated by Marcin Pietrzykowski, UAK
Moderated discussion covering the following topics related to the transformation of coal regions in four helix groups: 1. Exchange of knowledge on energy transformation 2. Exchange of knowledge about the Silesian region 3. Identification of strengths and weaknesses as well as threats and opportunities provided by transformation		
10.20-10.30	Conclusions and end of on-line meeting	Moderated by Marcin Chodak UAK

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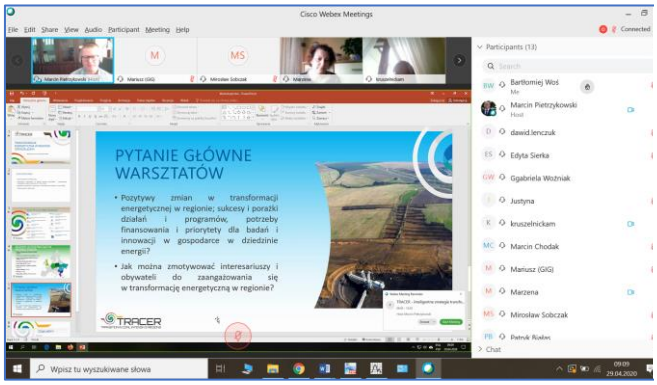
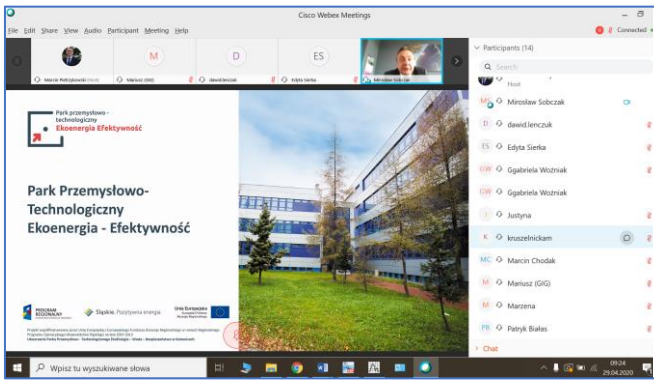
„Smart strategies for the transition in coal intensive regions-TRACER"





Workshops were also managed online by TET for the Donetsk region of Ukraine, where four online conferences/thematic round tables were held. These were organised around technical/scientific topics:

- coal power engineering: ways of reconstruction and development;

- disposal of coal beneficiation waste, solid household and agricultural waste in old industrial mining regions on the basis of a circular economy;
- energy diversification of mines as a direction of smart specialisation of mining regions of Ukraine; and
- investment strategies and mechanisms for financing a fair transition.

The stakeholder mobilization process was very active in Bulgaria Southeast region, in part due to the excellent collaboration between TRACER and the DeCarb project,[4] which resulted in the organisation of six common workshops, which attracted very high number of relevant participants, both physically present and online.

In the Kolubara region of Serbia, three workshops were organised by ENTEL, each targeted to a different stakeholder profile. The workshops focused on: the future operation of the open pit mines in the region; the role of Serbia's electric power industry in energy transformation in Kolubara; and future energy strategy in Serbia. The workshops covered the range of implementation possibilities – face to face, online and hybrid. All formats included a series of presentations and allocated extensive time to discussion sessions.

In the Czech Republic, eight workshops were held in the North West Bohemia region. Each event was focused on a particular aspect of coal transition, targeting most relevant stakeholders' groups, such as mayors and representatives of municipalities, school directors, education authorities, business representatives, research institutions, innovation centres, academics and practitioners, and also students of environmental studies aged 16-19 and university students.

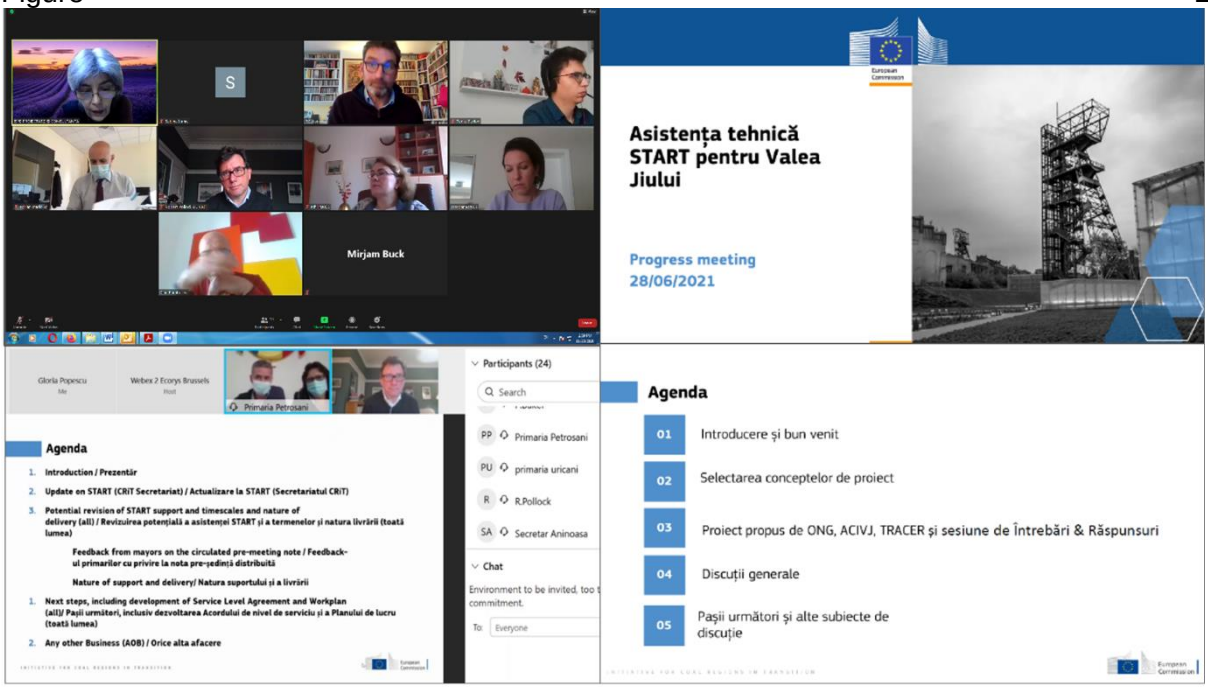
In Jiu Valley, Romania, four half-day workshops were held following the same structure but targeted at different audiences and thus using different vocabulary (more or less technical) (see Figure 2). These were supplemented with separate online meetings (e.g. with SME representatives), and tailored to the needs of stakeholders. For example, the workshop scheduled with the six mayors of the micro-region (Petrosani, Vulcan, Uricani, Petrila and Aninoasa) was made up of two events:

- one generated by the TRACER research team, from the desire to synchronise the European initiatives for the Jiu Valley; and
- one organised by CRIT-START in which the TRACER team were invited to actively participate.

[4] DeCarb is an Interreg Europe project which supports the clean energy transition of nine coal intensive regions across Europe, including the TRACER target region in Bulgaria.

Figure 2: Jiu Valley online workshops 2020-2021

Figure 2



The Romanian TRACER partners ISPE and AISVJ also participated in the consultation with stakeholders in the workshops organised by PwC, within the SRSS assistance programme of the European Commission - DG Reform, which took place in the form of nine online workshops.

The lack of possibility for the implementation of a workshop in the region of Western Macedonia due to the difficulties imposed by the COVID-19 restrictions, exacerbated by the distance of the Greek project partner CRES from the target region, has resulted in the personal interviews with interested regional stakeholders being the main source of data for the gathering of views on the transition out of coal in the region. The impact of this has also been mitigated by extensive interaction and engagement with a wide network of local stakeholders under other TRACER work packages.

The regional chapters which follow describe the stakeholder engagement processes which have taken place in the nine TRACER target regions. The details of these vary widely, as might be expected, but each regional chapter follows a common format. The chapter first describes the methodology used for the interviews and the workshop(s) which have taken place, followed by a discussion of the shared vision and priorities for the region. Each chapter ends with a conclusion section.

3 Southeast region, Bulgaria

3.1 Introduction

This chapter describes the EDP methodology applied in the South-East Region of Bulgaria and presents the shared vision and future-oriented priorities for the energy transition in the region. The South-East region (SER) of Bulgaria is the most coal-intensive region in the country, where Maritsa East complex is located.

The study is based on the involvement of the private sector, researchers, NGOs, labour unions, and government bodies in Entrepreneurial Discovery Process (EDP). All stakeholders contributed to new ideas for the future of the region. Stakeholders' views were collected in relation to:

- The regional situation, especially in relation to energy;
- Regional opportunities and challenges, especially in relation to energy;
- Actions needed to support the transition of the region.

3.2 Methodology

3.2.1 Interview methodology

In April – May 2020, a list of 21 potential interviewees was prepared, aiming to have a balanced representation of priority stakeholders. In total 13 interviews were conducted, of which 11 during the period May – September 2020, and the remaining two, at the end of 2020 and beginning of 2021. Interviews with some of the potential interviewees on the list were cancelled for different reasons: they have presented instead their position during workshops; there was no appropriate occasion to approach some high-level interviewees; the interview invitation was declined; or there was sufficient coverage of a particular stakeholder group.

All interviews were carried out one-to-one. A part of the interviews were in person, another part – by telephone, and some – via an online platform. The average interview duration was 30 minutes. The interview structure was flexible to cover the specific area of interest of the interviewee, based on the questionnaire prepared by STRATH. Table 5 shows the number of interviews undertaken with each type of stakeholders.

Table 5: Number of interviews with different types of stakeholders, Bulgaria South East Region

Type of stakeholder	Number of interviews	Institutions
Government bodies	1	Ministry of Energy
Other public sector organisations	2	Regional economic development agency – Stara Zagora
Business associations and chambers	2	Chamber of Commerce and Industry - Stara Zagora Energy Management Institute
Individual businesses	2	Energoconsult Nucleon Consulting
Universities	1	Technical University - Sofia
Civil society organisations	3	Za Zemiata WWF
Labour Unions	2	Federation of independent labour unions of miners Confederation of Labour Podkrepa
TOTAL	**13**	

The interviews were first transcribed by the interviewee during the interview. Then the transcribed content was analysed and summarized according to the four focus areas of the interview structure (see Box 1).

Next, the interviews were analyses in view of forming the region's vision. The analysis was structured into several main themes and the similarities and conflicts among respondents were identified.

3.2.2 Workshop methodology

Four workshops were (co-)organized by BSERC, specifically to contribute to the development of the vision for the future of the region. The number of representatives of each stakeholder at the workshops is shown in Table 6.

Table 6: Number of participants in each workshop, Bulgaria South East region

Type of stakeholder	Number of stakeholders per workshop			
	Workshop 1	Workshop 2	Workshop 3	Workshop 4
Government bodies	~30	8	1	~20
Other public sector organisations	~30	4	6	~30
Business associations & chambers	~30	3	5	~10
Individual businesses	~30	0	12	~20
Universities	~20	0	0	~20
Civil society organisations	~30	1	0	~20
Labour Unions	~10	0	0	~10
TOTAL	**180**	**16**	**24**	**130**

In addition to the four workshops, the BSERC team organized or participated in other events, aiming to advance the discussion on the vision of the region.

3.2.2.1 Workshop 1 - 28 September 2020

The meeting was hybrid, with 60 on-site and 120 online (Zoom) participants. It involved all stakeholder groups - public authorities (local and national), NGOs, energy industry, business, labour unions, researchers, financial institutions, etc.

The objective was to present and discuss the view of each stakeholder group about the transition of Stara Zagora region and neighbouring regions to low carbon economy. A secondary objective was to enable the audience (including panellists) to develop an adequate position, by providing them with a broad understanding of the transition. The panellists and moderators (more than 30) were recognized representatives of public authorities, businesses, labour unions, and NGOs. Foreign panellists shared the experience of countries more advanced in the energy transition.

The panels covered all major transition aspects – economic, social, and environmental transition of the region, as well as the change of the energy system. The main topics were:

- The necessity for policy makers to determine and announce a clear pathway for coal sector development;
- The restructuring of the national electricity system and the role of the region in the new energy mix;
- Opportunities for new businesses and the employment that they would create;
- Preparing the region for new opportunities through policies, securing funding, re-qualification, education, and research;
- Environment restoration of the post-mining lands.

3.2.2.2 Workshop 2 - 20 November 2020

The workshop was hybrid. It targeted mostly public authorities (municipalities) in Stara Zagora region. The objective was to discuss the role of Stara Zagora region in the process of Just Transition (JT), in relation to the ongoing preparation of JT plan of the region.

The workshop was structured into presentations and discussions. The presentation part had the following content:

- Opening and objectives of the event;
- Overview of the energy sector development, the need of technical skills and re-qualification, environmental challenges - lessons learned in TRACER and DeCarb (Interreg Europe project of SZ REDA);
- Green Deal and how it is affecting the local authorities and their functions;
- Just Transition territorial plan of Stara Zagora – progress to date and role of stakeholders;
- Plan for integrated municipality development – presentation of the tasks every municipality should undertake, the progress in the process of development of Plan for integrated municipality development;

Each participant shared their view about the region transition to decarbonized economy. The main topics of discussion were:

- Progress of the Integrated Municipal Development Plans
- Regional Territorial Just Transition Plan and possible inputs by municipalities
- Conventional vs renewable energy
- Diversification of the economy of the region
- R&D and education.

A key conclusion was that it is necessary to establish closer cooperation with the Management Authorities of European Structural & Investment Funds Operational Programmes, so that the local and regional organizations can influence the design of the programmes in terms of priorities and available funding, so that they are better adapted to the transition of coal regions.

3.2.2.3 Workshop 3 – 23 November 2020

The hybrid workshop, located in Stara Zagora city, targeted mainly businesses and business associations. Its objective and agenda were similar to the ones of Workshop 2.

In the discussion part, each participant had the opportunity to share their view about the smart specialization of the region, the particular projects necessary to boost the regional attractiveness for investors, and how the policy and administrative frameworks can be improved. The main discussed topics were:

- Regional Territorial Just Transition Plan and possible inputs by businesses and their associations;
- Opportunities for the development of RES, cleaner fossil fuels, energy storage, and non-energy products and services in the region to achieve economy diversification and employment;
- Explore the opportunities for companies and group of companies to optimize their energy consumption, e.g. shift to RES and improve energy efficiency;
- Improvement of the investment environment – administrative procedures, access to capital, business parks;
- Human resources necessary for the transition.

One of the key conclusions was that the main problem for new business initiatives are the human resources. This issue has three aspects: (1) due to State subsidies, the remuneration of employees working in the coal and related sectors is very high, so the other businesses have difficulty to attract qualified workers; (2) the lack of plan coal transition makes it unclear to investors when the coal sector workforce would be available; (3) the low level of education in the region is an obstacle for innovative businesses.

3.2.2.4 Workshop 4 – 29 September 2021

This hybrid workshop gathered over 130 participants in Stara Zagora city and online. The event involved public authorities (local and national), NGOs, energy industry, business, labour unions, researchers, financial institutions, and others. The main objective was to continue the discussion towards setting of priorities for the coal region. The discussion was broadcast to raise the awareness and interest of all citizens and businesses, and to encourage them to become more engaged in the process.

The main topics of the event were as follows:

- Just Transition Territorial Plans (JTTP) of the Bulgarian coal regions – status and next steps;
- Networking of coal municipalities – deepening of the cooperation between 60 mayors from different European coal regions in transition;
- Social dialogue about the future of the coal region – the view of labour unions and youth from the region;
- Research and innovation to support the transition – research needs and opportunities offered by programmes;
- New energy mix in the post-coal era.

After the event, on 30 September in the afternoon, a field trip to Maritsa East coal mines and Maritsa East 2 TPP was carried out for the workshop participants to gain a better understanding of both the situation in the coal enterprises and the perception of the workers at different levels about the future of coal and related challenges.

3.2.2.5 Other workshops

A number of other workshops were also organized which provided an opportunity for stakeholder engagement within the region. Two workshops were co-organized by BSERC and SZ REDA within the TRACER and DeCarb projects – a physical one on **2 July 2020** and a hybrid one on **11 February 2021**. Each gathered 20 – 25 key representatives of the major stakeholders and aimed to exchange their views on the development of the region. Although the events were related to another TRACER Work Package, they also substantially contributed to the EDP process.

Several other events were fully or partly dedicated to the discussion of the challenges and opportunities for the transition out of coal of Stara Zagora region. BSERC team participated in these events, so that additional and updated views of stakeholders are considered in this study.

An online workshop organized by Public Services Ltd, held on **10 November 2020,** was dedicated to the development of the Just Transition territorial plans (JTTP) of the Bulgarian coal regions. The main challenges and possible solutions for the regions were discussed.

A hybrid workshop was organized on **21 January 2021** by PwC (the contractor of DG REFORM for the development of JTTP in Bulgaria). The discussion focused on the JTTP of Stara Zagora. Most participants expressed their position on the priorities of the plan and/or how to ensure that the voice of different stakeholders is considered.

A hybrid workshop was organized by PwC on **23 February 2021** as part of the process of development of the Just Transition territorial plan of Stara Zagora. The workshop gathered all

key stakeholders and aimed to obtain their feedback on the analysis of the region – current situation, strengths, weaknesses, and opportunities.

3.3 Developing a shared vision and priorities

The analysis of the large amount of information collected during the interviews and workshops allowed the similarities and differences of stakeholders' visions to be outlined.

3.3.1 Perceptions of the region's coal transition

In South-East Region (SER), the **coal transition process has just started** despite the fact that at regional or national level an effective plan or strategy on just transition is not yet present. The transition towards a carbon neutral future would **seriously affect regional development**, as coal mining, coal TPPs, and related businesses account for a large share of employment and GDP in SER. For example, the district of Stara Zagora is second to the capital Sofia in GDP, a fact that is mainly due to the Maritsa East Energy Complex.

The **stakeholders are divided** into two groups regarding their view on the transition.

A view shared by one group, consisting mainly of non-coal businesses and their associations, NGOs, most of the researchers, and most independent consultants, is that the **transition out of coal is inevitable**, mainly due to economic and environmental reasons, and should have started much earlier. Thus, it is crucial to urgently start planning of:

- Decarbonisation of the national electricity system, i.e. energy mix, storage, smart grids;
- Energy citizenship, energy cooperation;
- Decentralisation of the electric system, locating the energy production facilities closer to the site of energy consumption;
- Diversification of national energy sources;
- Socio-economic transformation of SER, i.e. re-skilling, education, research, investment environment, etc.
- Land restoration measures;
- Using Maritsa East mines resources for new productions – fertilizers, construction materials, industry symbiosis creation on the territory of the mining complex.

Another stakeholder group, consisting of most public authorities, coal businesses, and labour unions, consider that the **coal sector will be necessary** for the:

- Electricity system (e.g., base load, security of energy supply, indigenous fuel, existing infrastructure, and available workforce) and
- Socio-economic development of the region with a horizon at least until 2040 or 2050.

According to the second group, to ensure improved economic and environmental performance of the coal sector, it must be restructured and its role – gradually - limited.

3.3.2 View on policies addressing the transition out of coal

In relation to EU policy regarding coal and emissions, during the last decade it is clear that the Bulgarian coal sector will increasingly face serious challenges. Moreover, during this period (2011-2021), the sector experienced severe problems – huge financial losses and a 50% decline of coal production and use. Despite the inevitable obstacles to the energy system and the coal regions, the **Bulgarian government has not yet adopted any policies** to mitigate them, because coal phase-out is a politically, economically, and socially sensitive topic.

At policy level, the transition is being addressed only in 2021. The Framework for preparation of the **Territorial Just Transition Plan of Stara Zagora** and neighbouring districts, funded by

DG Structural Reform is currently under elaboration, but no final information is publicly available. The stakeholders included in the process of development of the TJTP are being regularly briefed and informed on the progress and the development of the plan.

The current proposal for the **National Recovery and Resilience Plan** (NRRP)[5] includes a project for construction of **fossil gas infrastructure** to Maritza East complex, so that some of coal capacities can be replaced by combined cycle gas turbines. The surveyed stakeholders have opposing views on such a solution. On one hand, the gas capacities have similar technical characteristics to the coal ones, but have much lower environmental impact (respectively lower GHG-related costs). On the other hand, both the volatile gas price and the expected increase of GHG emission price, makes such an investment too risky in the long term. It also does not address the social topic as far the reduction of the jobs in the Complex will be significant.

Additionally, the NRRP includes a project and the development of a roadmap to accelerate the introduction of the **hydrogen economy**. A special programme is aimed at subsidising the production of hydrogen through electrolysis.

Almost all participants consider that the lack of transition plan and policies is a very serious problem for the development of the energy sector, the coal regions, and the national electricity system. This **lack of political commitment** is very strongly voiced by the local municipalities, most affected by the Just Transition - e.g. Radnevo and Galabovo. The lack of a national framework makes the planning of just transition investments at the local level impossible. A clear coal phase-out date and roadmap would facilitate the planning and realisation of investments in a number of economic sectors in the region (coal, other energy sources, and non-energy businesses who count on an available workforce), as well as in the electricity system.

3.3.3 Challenges in transitioning to a more sustainable energy

3.3.3.1 Technological and policy challenges

It is difficult to determine which is the right energy technology future for the region (SER) because no energy modelling has been applied. Participants mentioned a **lack of publicly accessible models** (which is not the case for models used internally by electricity system operators) as a major barrier for a transparent public debate about the future energy mix in the region and the whole country.

Large scale **solar PV** was the most often mentioned prospective energy alternative for the region. There are, however, two technological challenges: 1) the need to balance the generated (intermittent) electricity, e.g., by storage; 2) the restoration of the post-mining lands into terrains for PV plants would take from several years to a few decades.

The opportunity for the coal plants to switch to **fossil gas** would depend on the construction of expensive gas infrastructure. This transition however has not been publicly discussed, nor environmental impact assessment has been carried out. In addition, the availability of funding for this is still uncertain, as specified in the above section. Most of the local stakeholders state their position as opposing a coal-to-gas switch.

Another barrier is the lack of detailed and transparent studies regarding the feasibility of implementation of possible innovative technologies, such as **carbon capture and storage, small-scale nuclear reactors, and batteries**. The studies are hindered by the low maturity of these technologies and the unclear context for their application, such as no coal phase-out date, unpredictable stimuli, an unclear future role of electricity generation sources, etc.

As mentioned previously, a key challenge for the transition, according to interviewees and workshop participants, is the **lack of a real policy measures**. In Bulgaria, most policy

[5] Version 1.4 from 15th October 2021, submitted to the European Commission for review (as well as previous versions).

instruments defining the energy transition, such as energy strategy and energy plans, allocation of funding, etc., are within the competences of the State Government. This is predetermined by the character and the administration – centralised with a mostly top-down approach to decision and policy making. However, authorities have no clear vision on the topic and, as a result, there are neither adequate targets nor policy or economic measures relating to coal phase-out (respectively replacement by other energy sources) and regional transition in terms of economy, workforce reskilling, social policy, land restoration, education, R&I, etc.

The absence of transition policy targets is the main reason why there is **no targeted financial support** yet for the transition in the coal intensive regions. Although some transition projects are eligible for funding under several national programmes, the programme requirements rarely match the needs of the coal-intensive region (SER).

Moreover, the lack of real policy targets and measures increases the **risk for EU funding availability** for Bulgaria. For some EU-funded projects, e.g. within the National Recovery and Resilience Plan, the Commission requires clear national plans for transition to a low carbon economy, including a coal phase-out roadmap.

3.3.3.2 Organisational, social and cultural challenges

Education, training, and R&I are among the key factors to ensure successful transition to sustainable energy. Some participants, however, are concerned that the moderate level of these, both in the observed region (SER) and in Bulgaria as a whole, is a barrier to making the region hospitable to entrepreneurship and innovative businesses. The specific qualification and skills of coal mining, even though very useful in some industries also are limiting for others.

The **depopulation** of the region and the lack of clarity about the coal sector perspective are other obstacles for attracting new investments in SER.

Many stakeholders pointed out that coal sector **workers and citizens receive too little and biased information** to understand the transition opportunities. As a result, the majority sees only (or mostly) the negative impacts of the transition. When the majority of the population strongly opposes the restructuring of the energy sector and economy in general, it is very hard for policy makers to initiate those changes. Stronger and actual involvement of the local stakeholders in the process is crucial for politicians to plan the respective policy on just transition. The **low level of citizen's involvement** in the process is pointed out by all local stakeholders and also a subject of several additional analyses.

Another worrying factor is that several interviewees shared their **low level of trust** in policy makers. This makes the negotiation process much more difficult. Those who may be adversely affected by the transition often hold an extreme position against it, because they are unsure whether the promises made by the Government will be kept.

According to some stakeholders, coal workers and other citizens believe that their lives and the region in general are inextricably linked to coal. The sector provided jobs to several generations, and many are **not willing to re-skill** or even imagine a different future. This cultural barrier may take many years and dedicated measures to overcome.

Finally, the **traditional view of a centralized electricity sector**, where several large power plants must secure national electricity security, seems to be an obstacle for many to accept a shift to small-scale projects, such as distributed generation (e.g. roof-top solar PV) or energy efficiency measures (e.g. improvement of the energy performance and efficiency of buildings). Similarly, community energy projects face strong cultural barriers, such as unwillingness of citizens to cooperate.

Although TRACER and other initiatives involved a wide range of stakeholders in the discussion about the future of the region, an important stakeholder – the citizens – were not included. Future actions, therefore, needs to fill this gap, in order to better identify the social and cultural challenges and impact of the envisaged energy transition.

3.3.4 Views on regional strengths

There is consensus among all stakeholders that the main asset of the region is its people. The coal complex employs a large number of **experienced engineers and other technicians**, who can, after re-skilling, apply their knowledge and skills in post-mining land reclamation and restoration, and new energy and industrial projects. The two largest cities in the region - Stara Zagora and Burgas – are very dynamic, with high culture and standard of living, and good education options.

Several interviewees pointed out that the region has a relatively **diversified economy**, compared to other coal regions. This could facilitate and support the transition in many ways.

There are many **public funding opportunities** that could potentially be available to the region, such as the Just Transition Territorial Plans, National Recovery and Resilience Plan, European Structural and Cohesion Funds and many others. If policy makers soon set regional transition targets and policy measures, the region could rely on unprecedented levels of financing to overcome expected negative impacts and start reshaping its industry.

Many stakeholders also mentioned the **well-developed electricity infrastructure** in the Maritsa East complex. The grids can be used for all kind of future large-scale generation projects, e.g. gas-fired TPPs, solar PV, wind, etc.

Almost all respondents claim that advantage need to be taken of the excellent **solar PV potential** of the region. A large share of the region, including the area of Maritsa East coal complex, is within the best areas in the country, in terms of solar irradiation. For large-scale solar PV parks, there is sufficient land available, e.g. the post-mine lands. Small-scale installations located at industrial, service, or residential premises are also becoming increasingly attractive.

The area of the Maritsa East Energy Complex is seen by some stakeholders as very suitable for large carbon neutral and innovative **industrial zones,** based on the industrial symbioses and circular economy.

R&I capacity mustered within **Trakia University** and the adjacent **Institute for Sustainable Development and Transition** would significantly facilitate the just transition process, if used properly.

Stara Zagora Regional Economic Development Agency, whose members include ten out of the eleven municipalities in Stara Zagora district, Trakia University, the Chamber of Industry and Commerce, and the Bulgarian-German Training Centre, is very knowledgeable in the field of just transition and constantly supports local stakeholders with know-how and good practices.

3.3.5 Vision for the future

A number of policy makers, businesses, labour unions, researchers, NGOs and others shared their vision about the transition of South-East region (SER) to low-carbon energy. They reached consensus that the region needs to continue playing a **key role in the national energy sector**. There are many reasons for this, such as: available workforce; available energy and other supporting infrastructure; people's mind-set related to the traditional energy specialization of the region; high solar PV potential; hydrogen potential etc.

The main disagreement refers to the pace at which the transition should be carried out. One group of stakeholders believe that coal need to be **phased-out quickly - by 2026-2030**, in order to minimize the huge financial losses and the environmental impact of the sector, as well as to take advantage of the current and coming public funding opportunities to support the transition.

Another group considers that the **coal sector must exist until at least 2040**. Their main arguments are that: 1) it would take years for other technologies (e.g. RES combined with storage) to mature and play such a role in the national electricity system; 2) no other (energy) sector could secure a comparable level of employment and provide as high benefits to workers. The supporters of this idea offer different possibilities to make coal more acceptable in the long

term: carbon capture and storage; coal gasification and use of the gas in chemical industry; or operation of coal TPPs only in case of electricity deficit and a high electricity price.

All agree that the transition is a process should be **gradual and well planned** jointly by all stakeholders. The planning should be accelerated, both regarding the national electricity system and the development of SER, so that the transition can actually be prepared. The planning should include at least: 1) energy studies, based on long-term energy scenario modelling; 2) adoption of a national energy strategy and concrete plans, including coal phase-out roadmap and development of other energy sources; 3) elaboration of regional transition plans (e.g. the territorial JT plan) and related policies and financing opportunities at national and local level.

There is consensus about the promising role of **solar PV and green hydrogen**, in relation to the high solar irradiation in the region. Most of the respondents pointed out the construction of large-scale solar PV parks in post-mining lands and hydrogen hubs. Due to the intermittency of solar PV generation, it is thought that such large projects need to be combined either with electricity storage or production of hydrogen from the excess electricity. These two additional options, however, are still not economically viable and their implementation is envisaged to happen in the next decade.

Some stakeholders support the idea to **turn one of the coal-fired TPPs into a gas-fired one**, by using combined cycle gas turbines. They believe that natural gas can play the role of a transition fuel in the next 12-15 years, until RES-based systems combined with storage become economically viable. Such a project, however, has been criticised due to volatile gas prices and the increasing carbon dioxide emission costs associated with fossil fuels.

In parallel to the large-scale energy projects, many interviewees recommend development of small-scale ones, such as **individual or community-based distributed generation** (e.g. based on solar or biomass energy), or **energy efficiency in buildings**. In addition to the economic benefits, such projects would absorb many more workers compared to the large ones and would increase the energy and environmental awareness of citizens.

Finally, while specialisation offers many advantages, it is good to consider development of a **wide range of energy and non-energy opportunities**, so that region is no longer dependent on a single sector. The State could make the business environment more friendly, e.g. by supporting infrastructure projects and the development of industrial zones.

3.4 Next steps and outcomes

The research on which this chapter is based focused on the vision for the future development of the Bulgarian coal region surrounding Maritza East complex. While it identifies general directions for the (energy) development of the region and challenges that need to be addressed, it does not specify in detail what particular actions need to be taken to advance the transition. The research is seen as an important basis for elaboration (within the next steps of TRACER project) of more specific documents, including:

- A regional R&I strategy
- A regional R&I roadmap
- A report on the needs for workforce retraining
- A roadmap on workforce re-skilling.

These documents will require further stakeholder consultations, scheduled for the period October 2021 – April 2022.

3.5 Conclusion

The visions and future-oriented priorities in South-East Region (SER) in Bulgaria (summarised in Table 7) were identified in the period May 2020 – September 2021 through a number of

interviews and workshops, involving hundreds of relevant stakeholders. Unlike in other TRACER target regions, in SER the coal transition has just started and, except for a couple of topics, there is no consensus about its direction and pace.

Table 7: Summary of vision and priorities for South East Region, Bulgaria

Perceptions of the region's coal transition	**Coal transition has just started and would seriously affect the region.** **According to one group: the transition is inevitable and coal must be phased out quickly.** **According to another group: the sector must remain in the long term.**
View on policies addressing the transition out of coal	The Bulgarian government has not yet adopted any policies. Lack of political commitment.
Challenges in transitioning to a more sustainable energy system	Lack of serious studies about the transition of the energy system and the feasibility of individual technologies. Lack of policies and targeted financial support for the transition. Little information about the transition, low level of citizen involvement, perception that the region is inextricably linked to coal, traditional view of a centralised electricity sector.
Views on regional strengths	Available experienced engineers and other technicians. Potentially available public funding for transition projects. Well-developed electricity infrastructure. High solar PV potential. Existing and potential for new industrial zones. Strong research and regional development organisations.
Vision for the Future	The region shall continue its key role in the energy sector. The change must be gradual and well planned by all stakeholders. Most promising decarbonisation projects: solar PV, green hydrogen, fossil gas electricity capacities, distributed generation, and energy efficiency in buildings.

The stakeholder mobilization process was very successful mainly due to the excellent **collaboration between TRACER and DeCarb**, expressed in the organization of six common workshops. DeCarb is an Interreg Europe project, which supports the clean energy transition of nine coal intensive regions across Europe, including the Bulgarian pilot region of TRACER. The collaboration took advantage of the complementarity of the Bulgarian partners in these projects, such as: national (BSERC) and regional/local (SZ REDA) knowledge and contacts; expertise in energy (BSERC) and regional development (SZ REDA). Additionally, the higher total budget allowed organization of more and better prepared events, which attracted very high number of relevant participants, both physically present and online.

The high number of co-organized events helped to provide comprehensive information about the EU and national developments, best practices from other countries, results of various studies, decarbonisation opportunities for the region, and views (concerns, needs, etc.) of each stakeholder affected by the transition.

4 North West Bohemia, Czech Republic

4.1 Introduction

To develop a broad vision and find future-oriented priorities in the TRACER region of North West Bohemia, Czech Republic (Karlovarský and Ústecký districts), the research focuses on a broad range of stakeholders, experts, and decision-makers to collect a varied set of views on the transition out of coal in the region, and on the reclamation of post-mining land. This chapter describes the methodology and the results of the implementation of the Entrepreneurial Discovery Process in the North West Bohemia region.

4.2 Methodology

In order to collect stakeholders' views on the transition out of coal and the reclamation of post-mining sites in Karlovarský and Ústecký districts in North Bohemia, a series of workshops and conferences were held along with a series of interviews and an extensive online survey.

4.2.1 Interview methodology

The list of questions provided for the interviews was based on the questionnaire provided by STRATH (See Box 1).

A total of **16 interviews** were conducted since around 2020. Interviewees included university researchers, representatives of regional and national government, representatives of energy companies and mining companies, an innovation centre, representatives of restoration and tourism/culture projects, and a representative of the national RE:START programme for coal regions in the Czech Republic.

Interviews were conducted face-to-face, but later also by telephone by prior arrangement, and some additional information was added after an e-mail inquiry. Some respondents became members of a regional working group, which now has seven members.

The number of interviewed participants and distribution in areas of activity is given in The interview questionnaire provided by STRATH for all TRACER regions was used. It focuses on a) coal transition and b) energy R&I (in line with TRACER's focus). Depending on the specific living conditions and professional background situation of the interviewees, FIB adapted the given questionnaire and the order of the issues to fit to the interviewee's real lives. FIB always asked all the standard questions but, for example, in case the stakeholder had a focus on social/employment issues, then the interview had a focus on these issues rather than energy R&I. A total of 14 interviews were carried out, all conducted in the German language. The interviews were undertaken during September and November 2019.

- FIB contacted local stakeholders during events or called them to fix a date for the interview. The duration of an interview was scheduled to be two hours. Mostly, the time frame was sufficient, but in some cases, it took longer, depending on the need for communication.
- The location for the interview depended on the needs of the stakeholder. Usually, one or two persons from FIB went to the office of the stakeholder. The place for the interview was mostly a separated area or room.
- FIB briefly presented the TRACER project and started then the questions following the interview questionnaire.

When FIB was represented by two persons, one person was mainly leading the conversation and one was writing notes for the minutes afterwards. This interview technique makes sense because it offers the chance for a deeper, more open bilateral conversation. In addition, stakeholder priorities and visions for the future can also be discussed in more detail than in a workshop, where there are more participants. In case a personal meeting was difficult to

realise, the interviews were carried out via email. However, the lively discussion was missing and additional questions coming from the situation were not possible.

Every interviewee received its minutes of the interview in German or English to check whether the notes had been correct and truly reflected the opinion of the interviewee. .

Table 8: Number of interviews conducted with different types of stakeholders

Stakeholder type	Number of interviews
Government bodies	4
Other public sector organisations	3
Business associations and chambers	-*
Individual businesses	6
Universities	2
Research institutes	1
TOTAL	**16**

** although no interviews were conducted with business associations, the research team cooperated with the business (economic) and social chamber of Ústecký region to co-organise workshops. In addition, the chairman completed the online questionnaire (see below).*

4.2.2 Workshop methodology

A total of **eight workshops and conferences were organised** between February 2020 and June 2021. These addressed a variety of stakeholders and attracted more than 320 participants. The events were organised with specific themes and focused on selected issues related to coal transition process (see Table 9).

Table 9: Workshops and conferences

Date	Name	Key words	Number of participants	Main type of stakeholder
11/02/2020	Subsidy opportunities for cities and municipalities	Actual needs and opportunities for municipalities	61	Mayors and representatives of municipalities
11-12/3/2020	Post-mining landscape	Conference, debate and field trip to post-mining landscape	70	All types of stakeholders
27/05/2020	Education and trade platform of Ústecký district	Debate about reskilling needs in changing work trade	15	School directors, education authorities
11/06/2020	Business platform	Evaluation of restructuring of Ústecký district, new vision	N/A	Business representatives
21/10/2020	Research and innovation platform	Hydrogen projects, effect of Covid-19 on workforce, results of government strategy RE:START	17	Research institution, innovation centre, university
23/10/2020	Restoration and transformation of our region	Post-mining landscape restoration, energy transition	35	16-19 years old students of environmental studies
13/05/2021	Where is our region going?	Lectures about the complex transition of Ustecky district and debate with young persons	57	Young people and university students
3-6/6/2021	International "Forest and Landscape Restoration of post-mining sites"	Conference about mine sites restoration	65	Academics and practitioners

The main findings emerging from the workshops were as follows:

- There is a high interest in financial support.
- More craftsmen and workforce for the construction industry is needed.
- Hydrogen energy and brownfields re-use is a priority.
- More cooperation between research and practice is needed.
- The best outcome for post-mining landscape restoration is a combination of land reclamation, sites with spontaneous succession, new small industry and recreation.
- Education, participation and support of start-ups is needed.
- Research education and extension of reskilling are necessary.

An additional event will be held on 26-27 September 2022 in Ústí nad Labem. It will be an international hybrid conference featuring a debate on the hydrogen future of the region.

4.2.3 Online stakeholder's opinion survey methodology

Alongside the interviews and workshops, an internet survey was conducted throughout the research process. The survey was publicly available on the internet but was mostly completed by stakeholders encouraged to do so during their interactions with the research team. The final pool consisted of 140 respondents, 50% of respondents were men and 50% women between the ages of 18 - 89 years (mean and median ages were both 37 years).

In terms of occupation, 47% of respondents label themselves as citizens, 35% work in research and education, 10% in various positions in local government, 2% in the coal and energy industry and 6% represent other enterprises. Most of the respondents were contacted during the research team's meetings with stakeholders, which implies they have some relationship with the mining region, however only 54% of respondents live in the North Bohemia region (i.e., Karlovarský and Ústecký district) and 46% of respondents live outside this region.

The online survey complemented other activities with views on coal transition based on in-depth questions (Box 2).

Box 2: Information collected through the online survey in Czechia.

1. What is the relationship between respondents (living in / outside Karlovy Vary and Ústí nad Labem) toward coal mining and coal-based energy production?
2. What is respondents' opinion about the cessation of mining earlier than after extraction of coal reserves?
3. What are the reasons why mining should be stopped before extraction of coal reserves?
4. What are the barriers/problems/factors slowing down or preventing the development of coal regions?
5. How much support does business in the region needs?
6. How intensive help the energy sector needs?
7. How much investment in the general post-mining region needs?
8. How intensive help in the development of research and education post-mining region needs?
9. How much help post-mining region needs in reskilling and social stabilization?
10. How much need in improving the environment post-mining region needs?
11. How intensive help in public administration and infrastructure in mining regions' needs?
12. What should be repurposing of the coal mining region if coal mining stops in the near future?
13. What are potential of various other energy sources to replace coal in energy production?
14. How European and other social funds contribute to destructuralization of the coal mining region?
15. How successful is the reclamation of post-mining landscape?
16. How reclaimed areas help to transform the coal mining region?
17. What should be the focus of the use of reclaimed post-mining sites?
18. What can be the value of using non-reclaimed (self-evolving) sites in post-mining land?

19. What is awareness about the government program RESTART that supports coal mining region transformation?

Respondents come from various social and professional groups living inside or outside the mining region, but considering how they were recruited, they have some interest in the mining region. Chart 1 and Chart 2 show the relationship between respondents toward coal mining and coal-based energy production. Not surprisingly, people living outside the mining region are more opposed to mining and the coal industry in general (about three-quarters of respondents are opponents of the coal industry, while in the mining region this is only half). In the mining region, there are also more people who are supportive of the coal industry (in total about 18% of respondents) Even here, however, support for mining is not strong.

Chart 1: The relationship of people living outside the *Karlovy Vary* and *Ústí nad Labem* region to the coal industry.

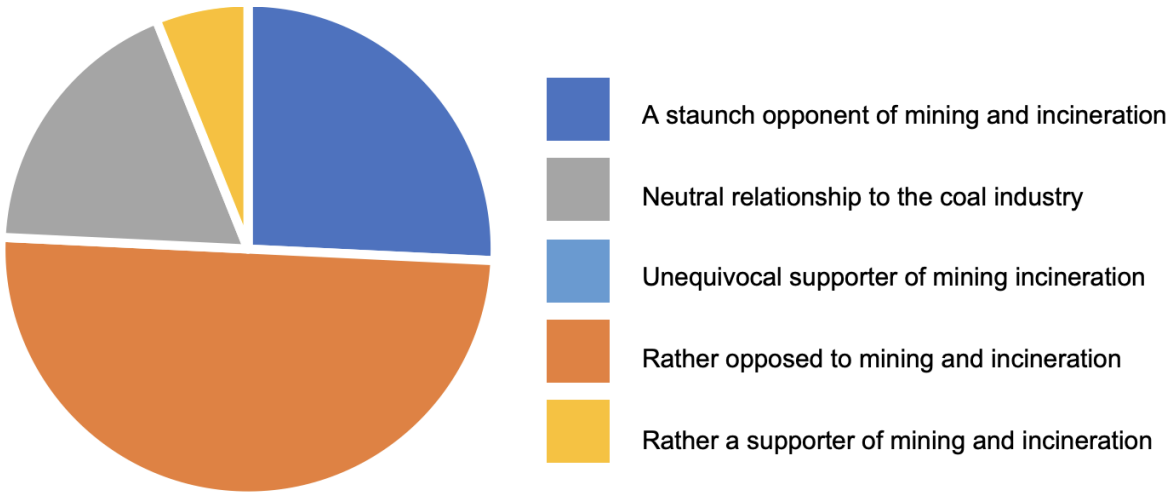
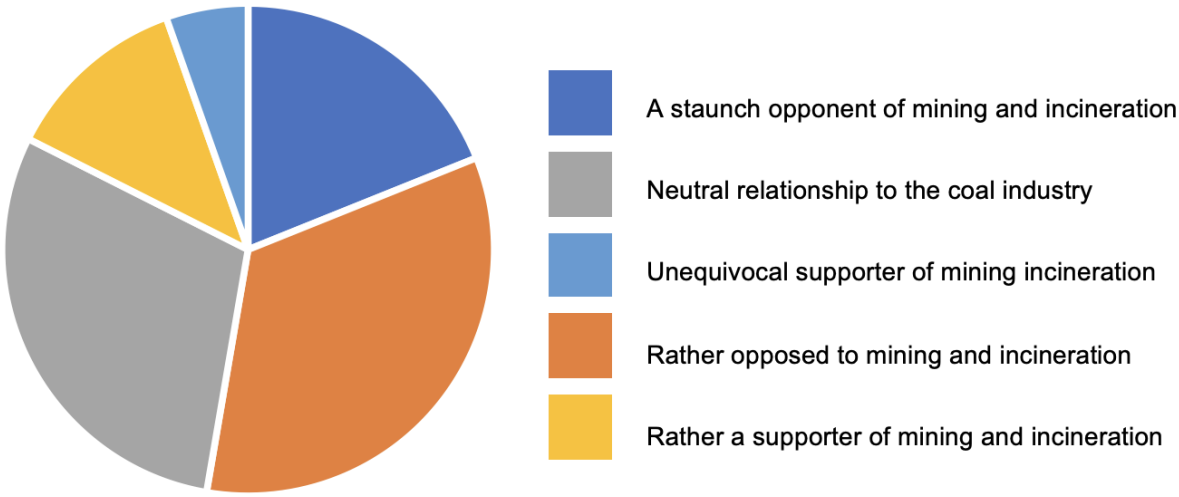


Chart 2: The relationship of people living in the *Karlovy Vary* and *Ústí nad Labem* region to the coal industry.



The cessation of mining before coal mining reserves are mined out is a sensitive issue in the Czech Republic. Chart 3 (A, B and C) shows the surprising respondents' opinions about major factors that prevent the cessation of coal mining before the complete extraction of mineable reserves. People living inside as well as outside the mining region agree on the major reasons, which are the large economic benefits that coal mining brings to the local economy and the fact that there is now no other available source of energy that can replace coal, and that available alternatives are currently very costly. Another often mentioned reason is a negative impact on employment and the general legal framework.

This is followed by a question about why coal mining should be terminated as soon as possible (before extraction of coal reserves). Respondents' answers to this question are shown in Chart 4 (A, B and C). Most respondents highlight as a major reason the negative impact of mining and the coal-based economy on the environment and living conditions of the people in the region, either locally or globally (via the negative effect on greenhouse gas emission and global warming). Less frequently mentioned are opinions that the cessation of mining will open new possibilities for future development of the region or industry sector. Finally, quite a few respondents also believe that the cessation of coal mining before coal reserve extraction is premature.

Chart 3: Opinion of respondents on the cessation of mining earlier than after the extraction of coal reserves based on their place of residence.

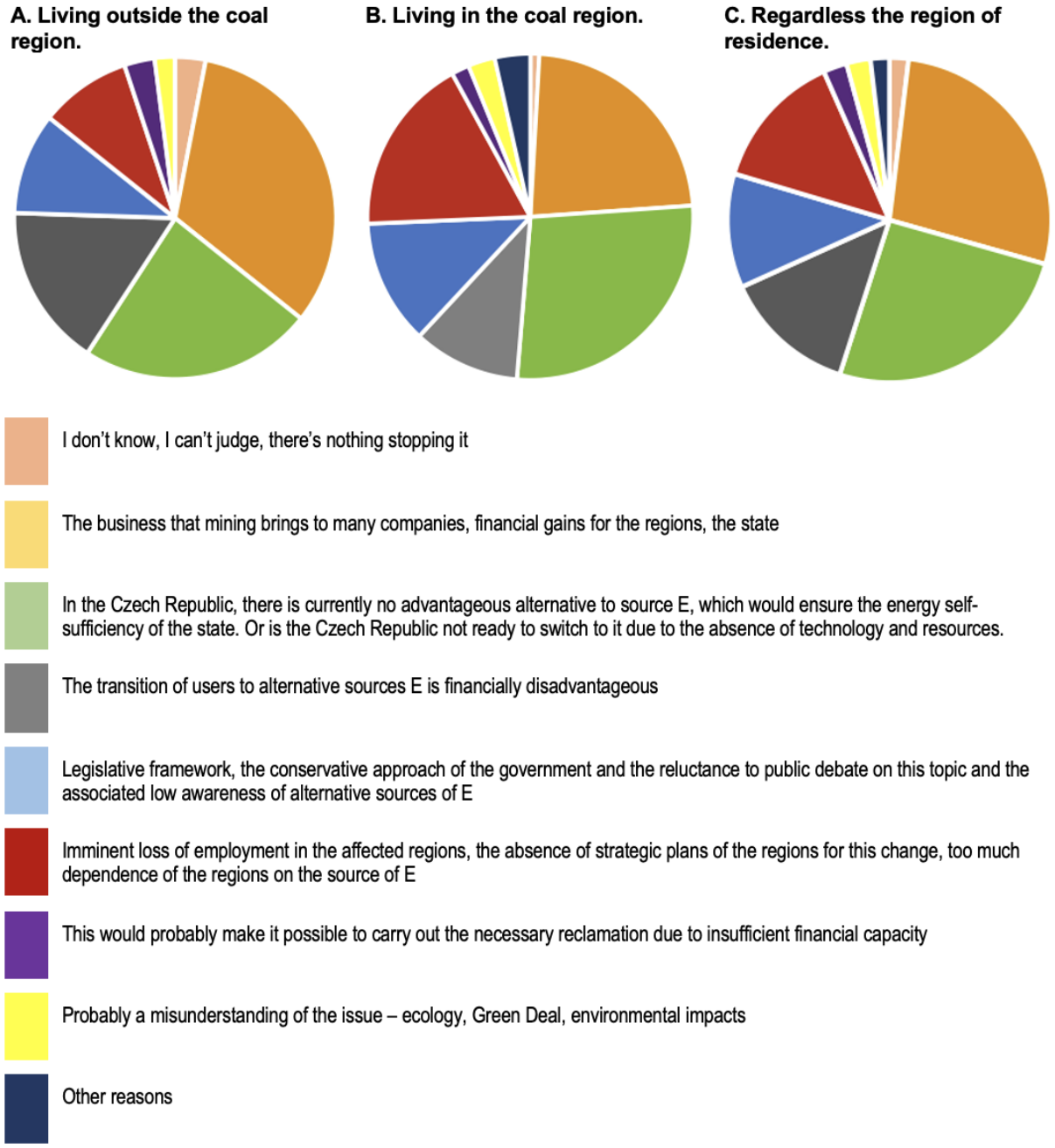


Chart 4: Why should mining be stopped before the extraction of coal reserves? According to residents based on their place of residence.

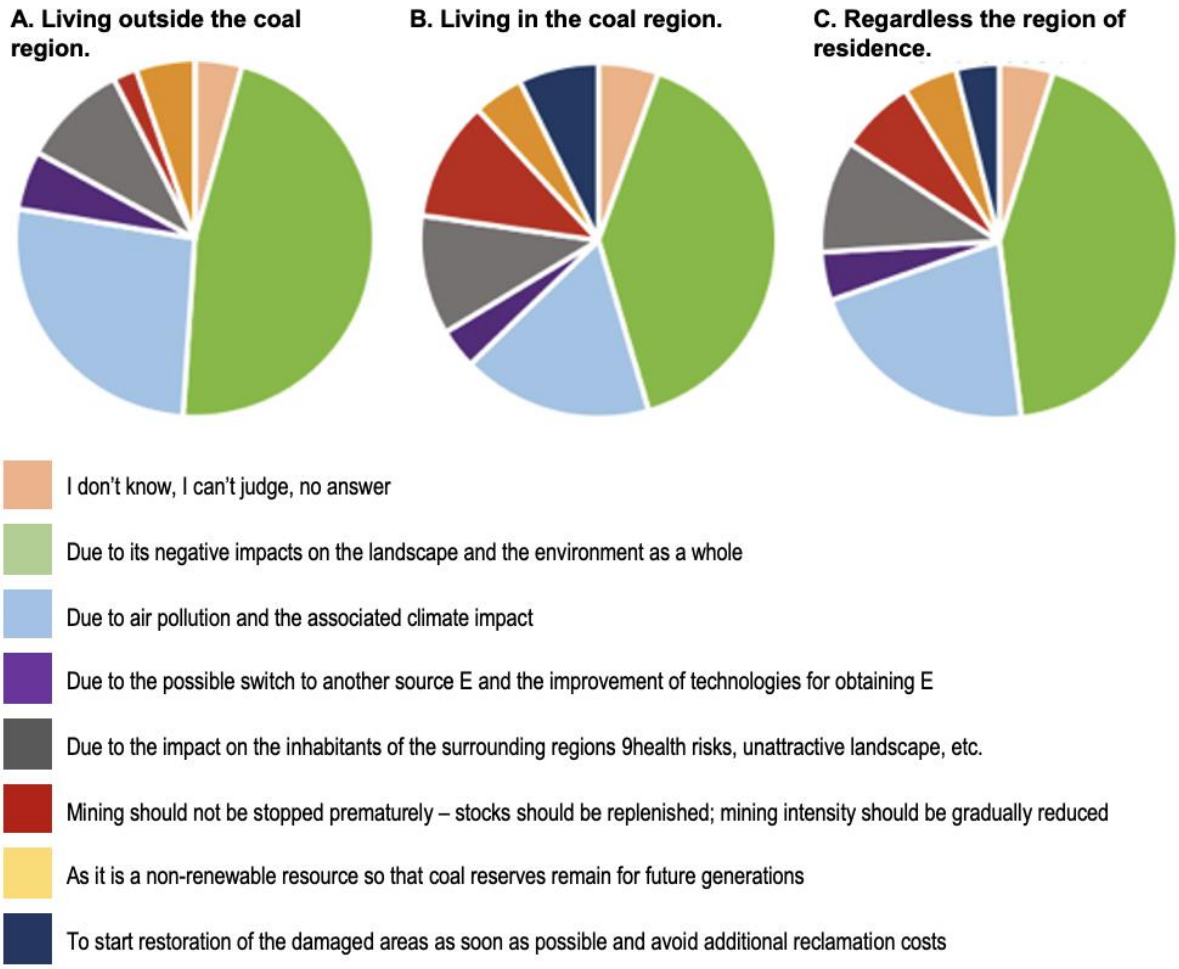


Table 10 answers the question "What are the barriers/problems/factors slowing down or preventing the development of coal regions?" From a total of 206 responses, 106 were from outside the mining regions and 100 from inside the mining regions. Quite a few people do not feel that they have an answer to this question - more outside the regions than inside mining regions - which may indicate that this question is more urgent in the mining region than in the rest of the country. In both areas, the small diversity of jobs, lack of qualified employees as well as low education, and associated social problems were argued as being major factors that slow development. This was followed by the low financial support of the region, which perhaps a bit surprisingly was assumed to be a major problem by people outside rather than inside the mining area. Low environmental quality was assumed to be the next most important problem. Bad political decisions and bad communication were cited next in terms of importance. However, this was assumed to be far more important for people inside the mining region than in the rest of the country. For people inside the mining region this factor is considered even more important than environmental problems and lack of financial support.

Table 10: What are the barriers/problems/factors slowing down or preventing the development of coal regions?

Groups of problems	total	outside	inside
small diversity of the job offers in the region, lack of qualified employees and employees in other fields	47	23	24
low financial support of the region from the loss, lack of investment, low support for reclamation	32	19	13
low education, the impossibility of retraining, the social structure of the population	27	14	13
the impact of mining on the landscape, nature, air, climate and the whole environment and human health	22	10	12
I don't know, I can't answer the question	19	12	7
bad decision-making of previous regional management, political decisions, bad communication between administrative bodies, absence of comprehensive plans for the development of the region, excessive dependence of the region on mining	18	4	14
the overall unattractiveness of the region (nature, urban infrastructure) the associated outflow of population, and small tourism	17	10	7
lack of urban infrastructures, services, insufficient construction in the surrounding municipalities, insufficient road structure and associated low attractiveness of the region	10	7	3
activists, demonstrators, objections from municipalities, and conflicts of interest from groups with conflicting views	6	4	2
too high a price of emission allowances	4	0	4

Charts 5 – 12 (A, B and C variants) summarize the opinions of respondents about help needed in various fields. The largest need for help seen by respondents is in improving the environment, which is consistent with the opinion mentioned earlier that environmental damage is one of the major reasons for the cessation of coal mining. Other fields that require substantial help according to respondent opinion are: research and education, reskilling and social stability in the region which require investment in general. Rather surprisingly, respondents express a lower preference for support for local government and infrastructure.

Chart 5 summarizes the answer to the question of how much support is needed by business in the region. Most of the respondents agreed that more help should be available (various warm colors) rather than less (blue color). This opinion is stronger inside than outside the mining region. Chart 6 summarizes respondents' opinions of the energy sector, which also requires quite high levels of support. There is high general support for investment (Chart 7). According to respondents' opinions, extremely high support is needed in research education, this can be partly biased by a quite high number of respondents from this field, but it may also be connected with the fact that this field is really underdeveloped in the target region in comparison with the rest of the country (Chart 8 and Chart 9). Also, the need for reskilling and social issues needs quite high support, as well as the environment (Chart 10 and Chart 11). This is also consistent with the opinion that low qualifications, low diversity of jobs and environmental issues are the major problems of post-mining region recovery. In contrast, support for investment in local government and infrastructure is not so high (Chart 12), this opinion is quite consistent inside and outside the mining region. This is despite bad political decisions, organization, and communication issues having been an important source of problems in post-mining regions in the past.

Chart 5: How much support does business in the region need? Based on place of residence.

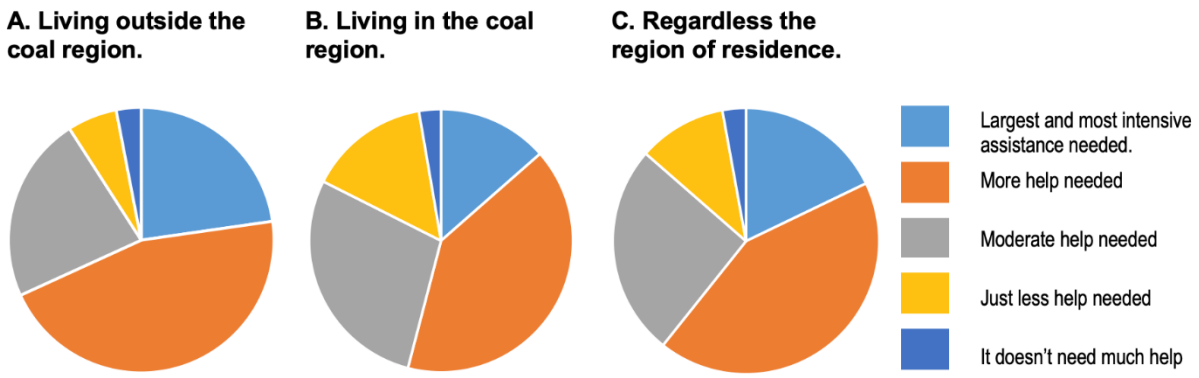


Chart 6: How intensive help does the energy sector need? Based on place of residence.

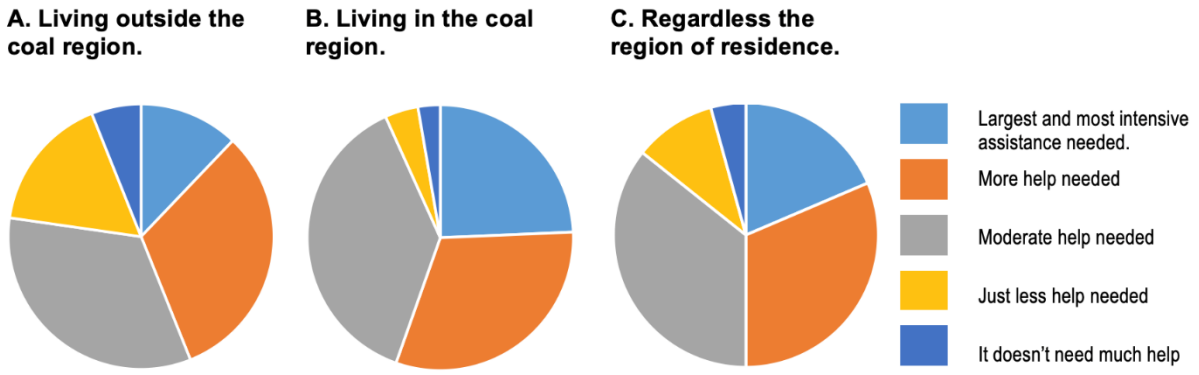


Chart 7: How much investment does the post-mining region need in general? Based on place of residence.

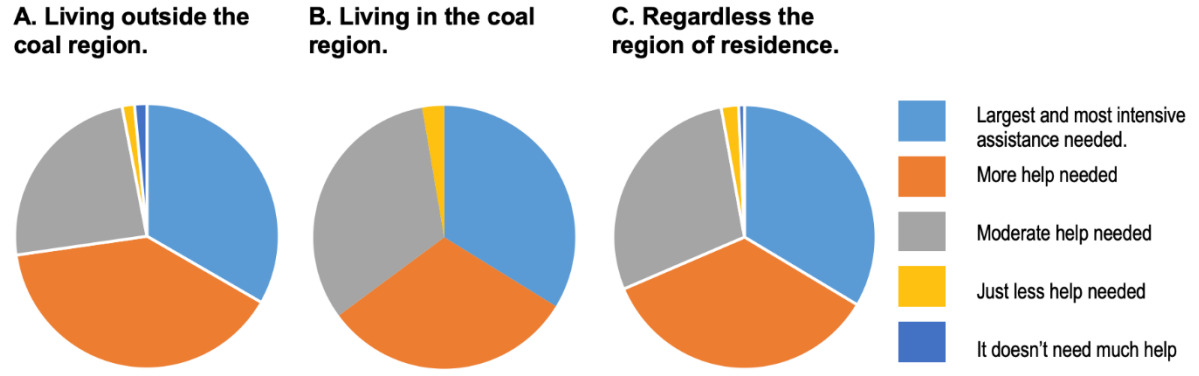


Chart 8: How intensive help in the development of research and education does the post-mining region need? Based on place of residence.

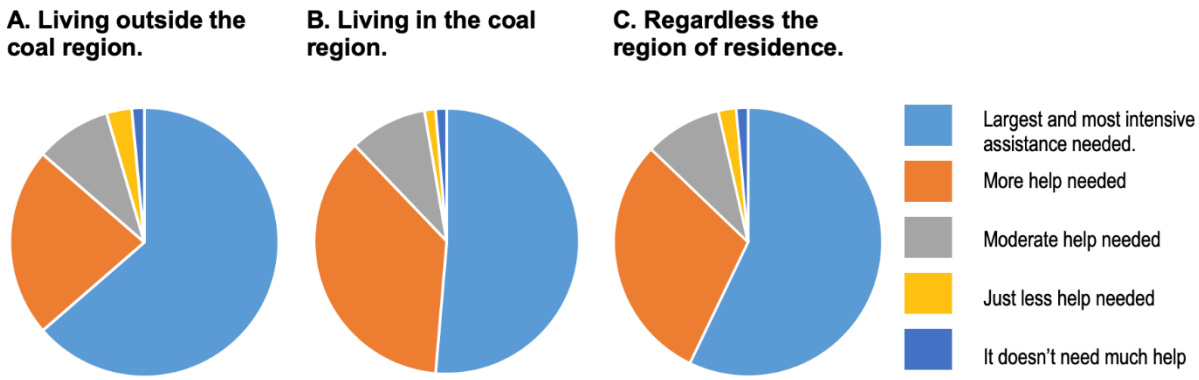


Chart 9: How much help does the post-mining region need in reskilling? Based on place of residence.

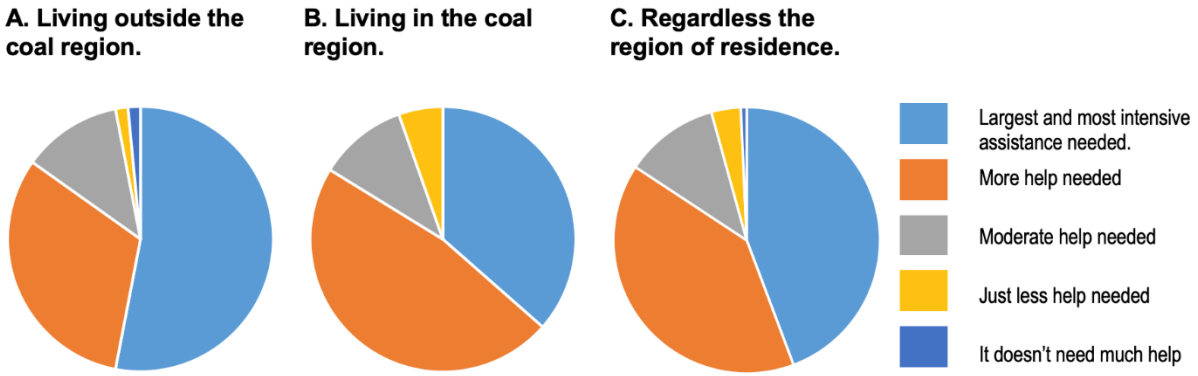


Chart 10: How much help does the post-mining region need in social stabilization? Based on place of residence.

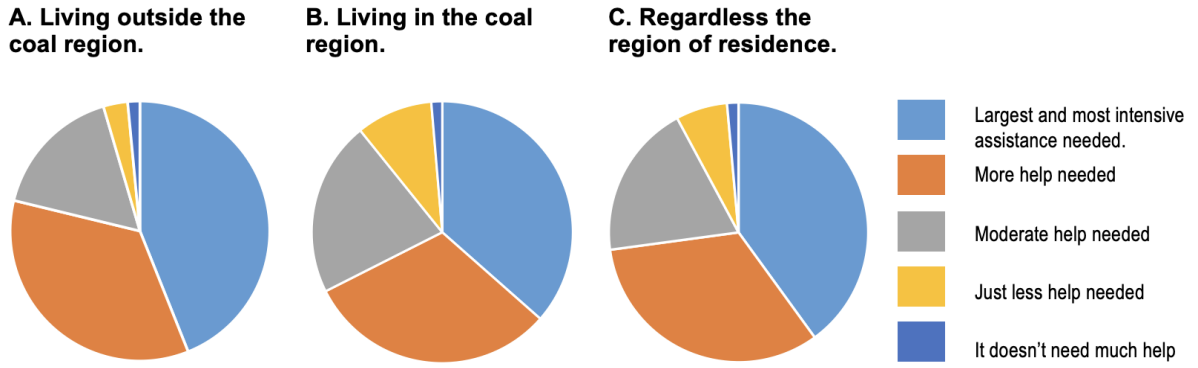


Chart 11: How much help in improving the environment does the post-mining region need? Based on place of residence.

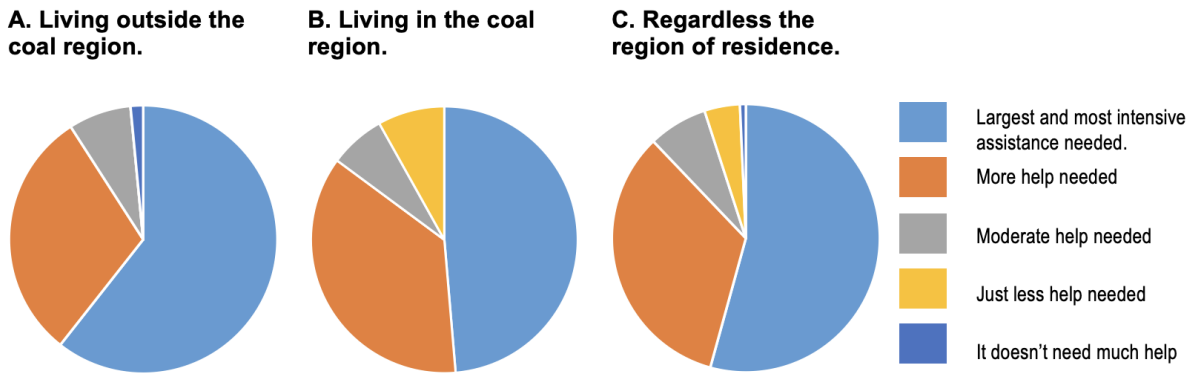


Chart 12: How intensive help in public administration and infrastructure does the post-mining region need? Based on place of residence.

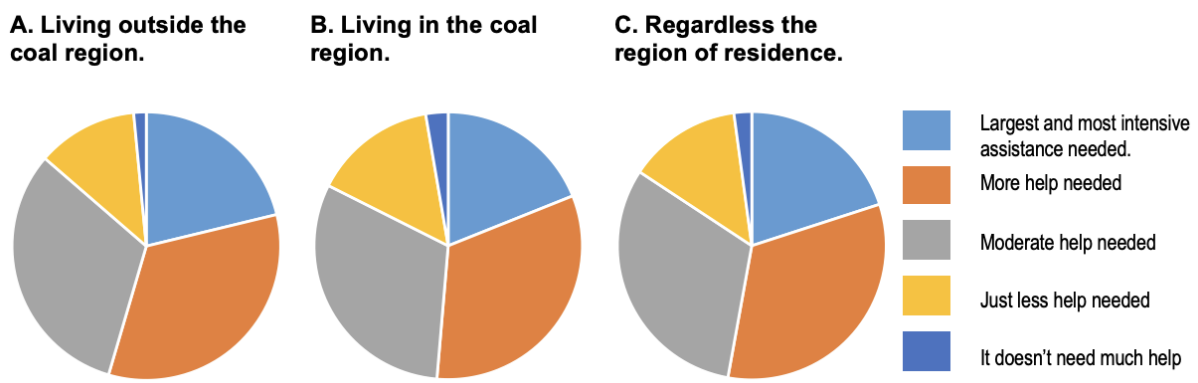


Chart 13 summarizes opinions about the potential repurposing of the coal mining region. Again, opinion is quite similar for respondents coming from inside and outside of the mining region. Most of the respondents believe that the best way forward is to use the experience of the region in the energy industry for repurposing the region into a producer of more green energy. This is followed by tourism and nature protection. This is interesting, as some previous questions highlighted the environmental problems of the region and even proposed environmental issues as a major reason for the cessation of mining. Despite the high focus on green energy production, most respondents do not believe that these green sources can replace more than half of the energy which is now provided by coal (Chart 14).

Chart 13: What should be the repurposing of the coal mining region if coal mining stops in the nearby? Based on place of residence.

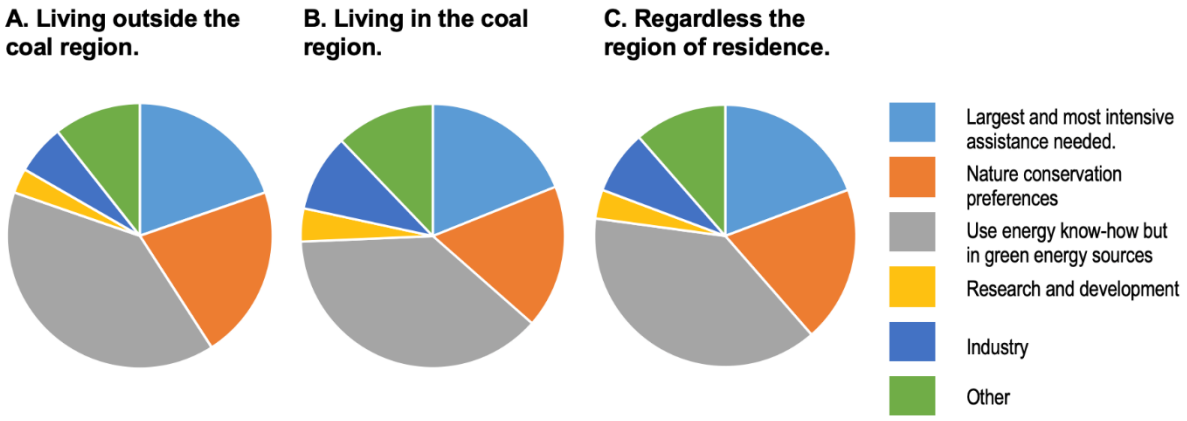


Chart 14: What is the potential of various other energy sources to replace coal in energy production? Based on place of residence.

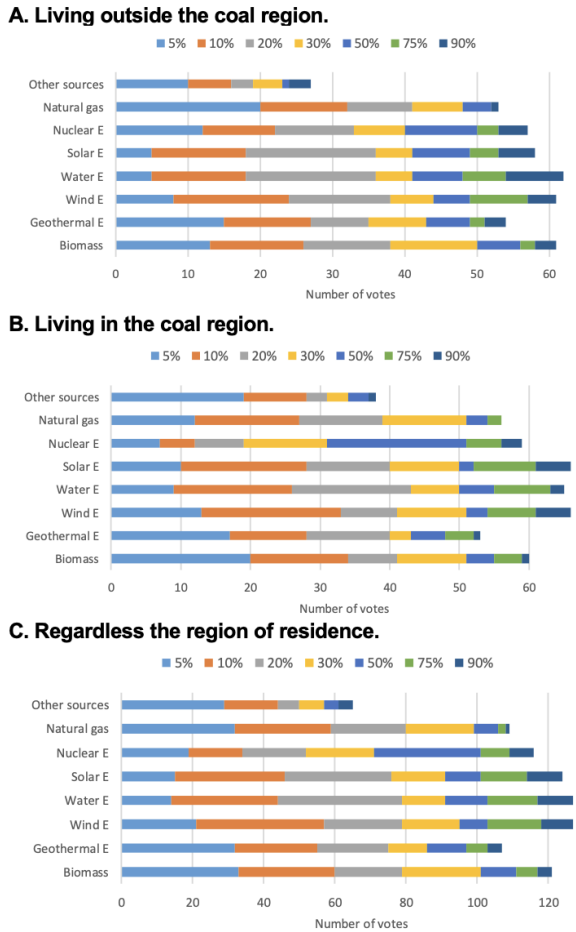


Chart 15 depicts answers to the question of how beneficial EU funds and other social funds are viewed in restructuring the coal-mining region. Generally, most of the respondents believe that there is some benefit of these funds, however respondents in the coal mining region are the most critical, and almost half of respondents believe these funds are of little use.

Chart 16 depicts the opinion of respondents about the reclamation success of post-mining land. Generally, this is assumed to be successful to various extents and this opinion does not vary between respondents from inside and outside the mining region. Most of the respondents believe that reclaimed areas support the potential for tourism and other recreational activities. The creation of new jobs and improvements to the environment are also assumed as benefits. However, these three categories may partly overlap (Chart 17).

Chart 15: How European and other social funds contribute to restructuring of the coal mining region? Based on place of residence.

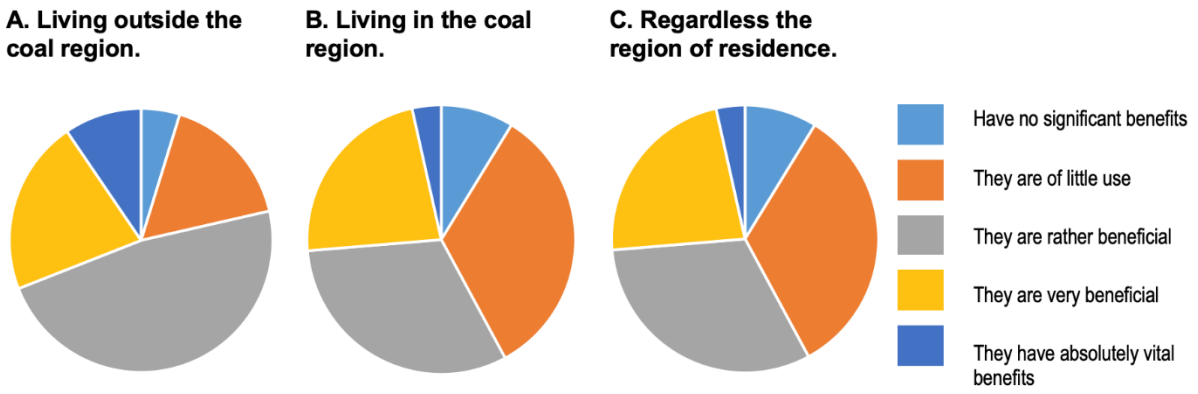


Chart 16: How successful is the reclamation of the post-mining landscape? Based on place of residence.

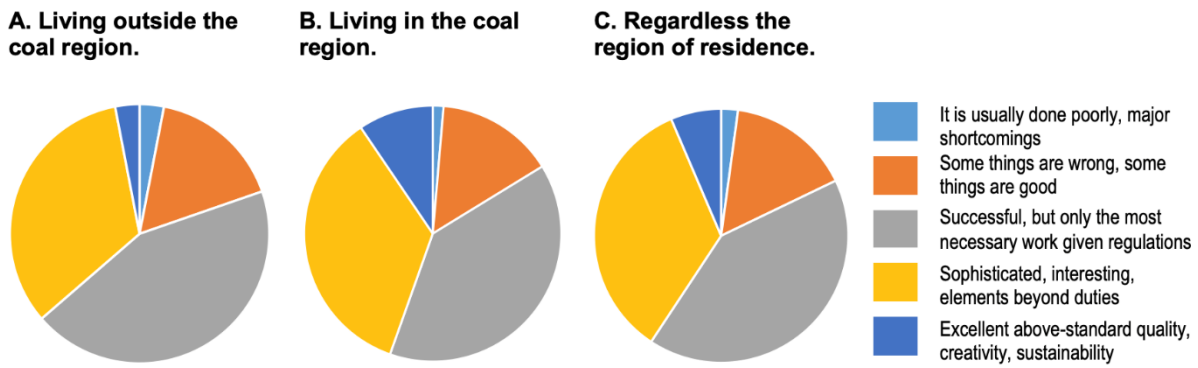
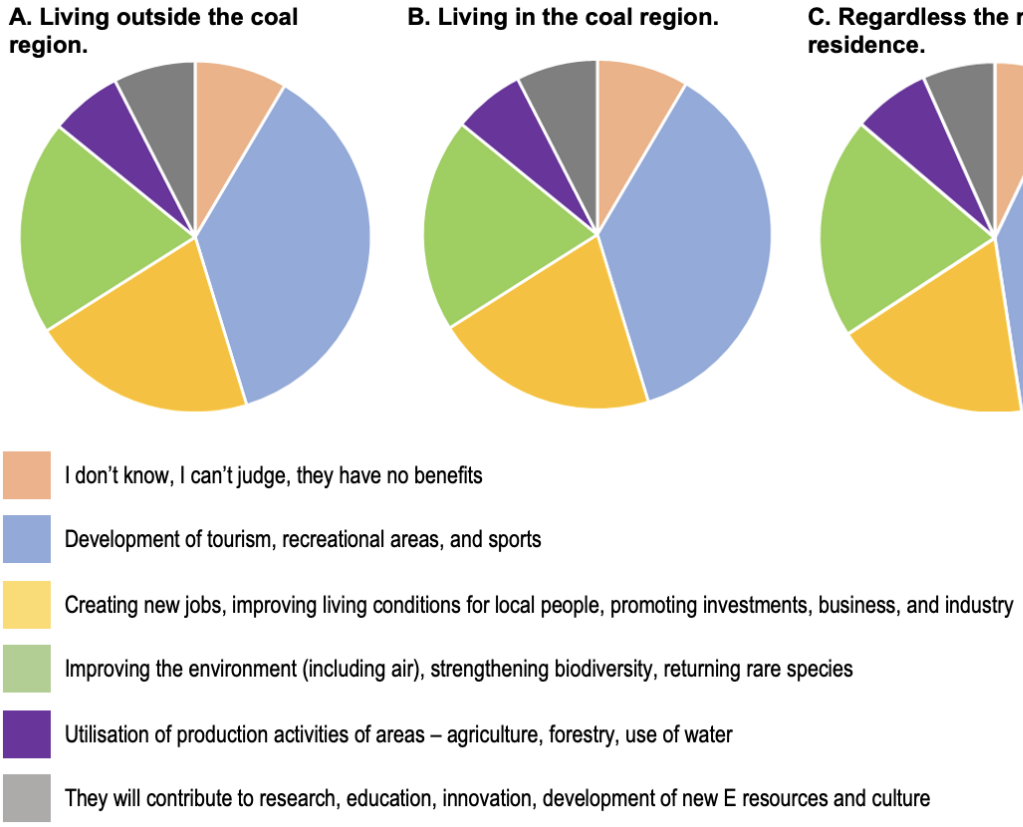


Chart 17: How reclaimed areas help to transform the coal mining region? Based on place of residence.



The opinions about what should be the focus of reclaimed sites are very diverse and do not differ substantially between respondents from inside and outside the mining regions. The dominant responses are recreational uses for both locals and visitors, followed by forestry, agriculture and nature protection. Relatively fewer preferences were expressed to use for energy and other industries, even though the future specialization of the region on green energy was assumed as a major target for most respondents (Chart 18). In terms of using a self-developing area in the post-mining landscape, most of the respondents see the benefits in various aspects of nature conservation (Chart 19).

Chart 20 depicts awareness about the government RE:START programme which is intended to help the post-mining region. Most respondents know about the existence of the programme but do not know any further details.

Chart 18: What should be the focus of the use of the reclaimed post-mining sites? Based on place of residence.

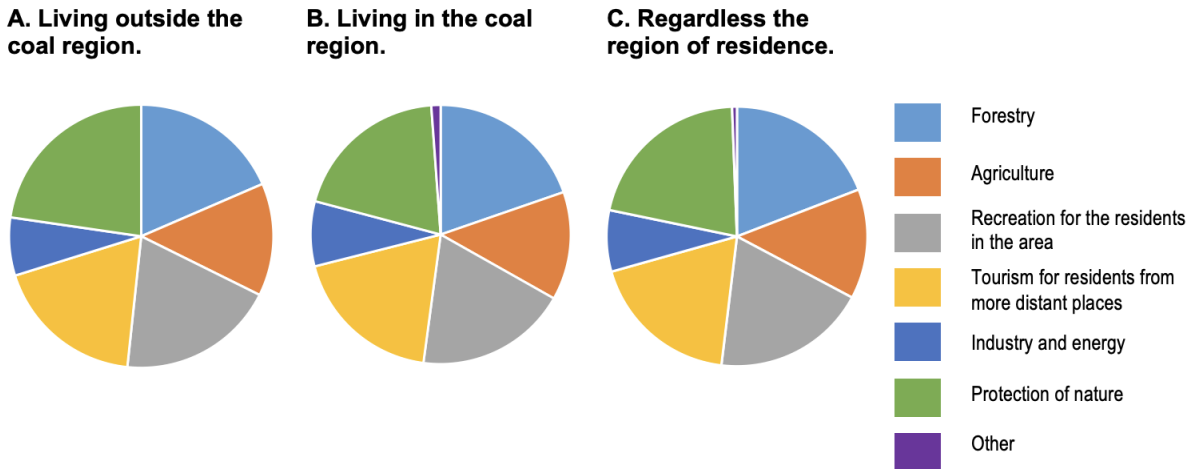


Chart 19: What can be the value of using non-reclaimed (self-evolving) sites in post-mining land? Based on place of residence.

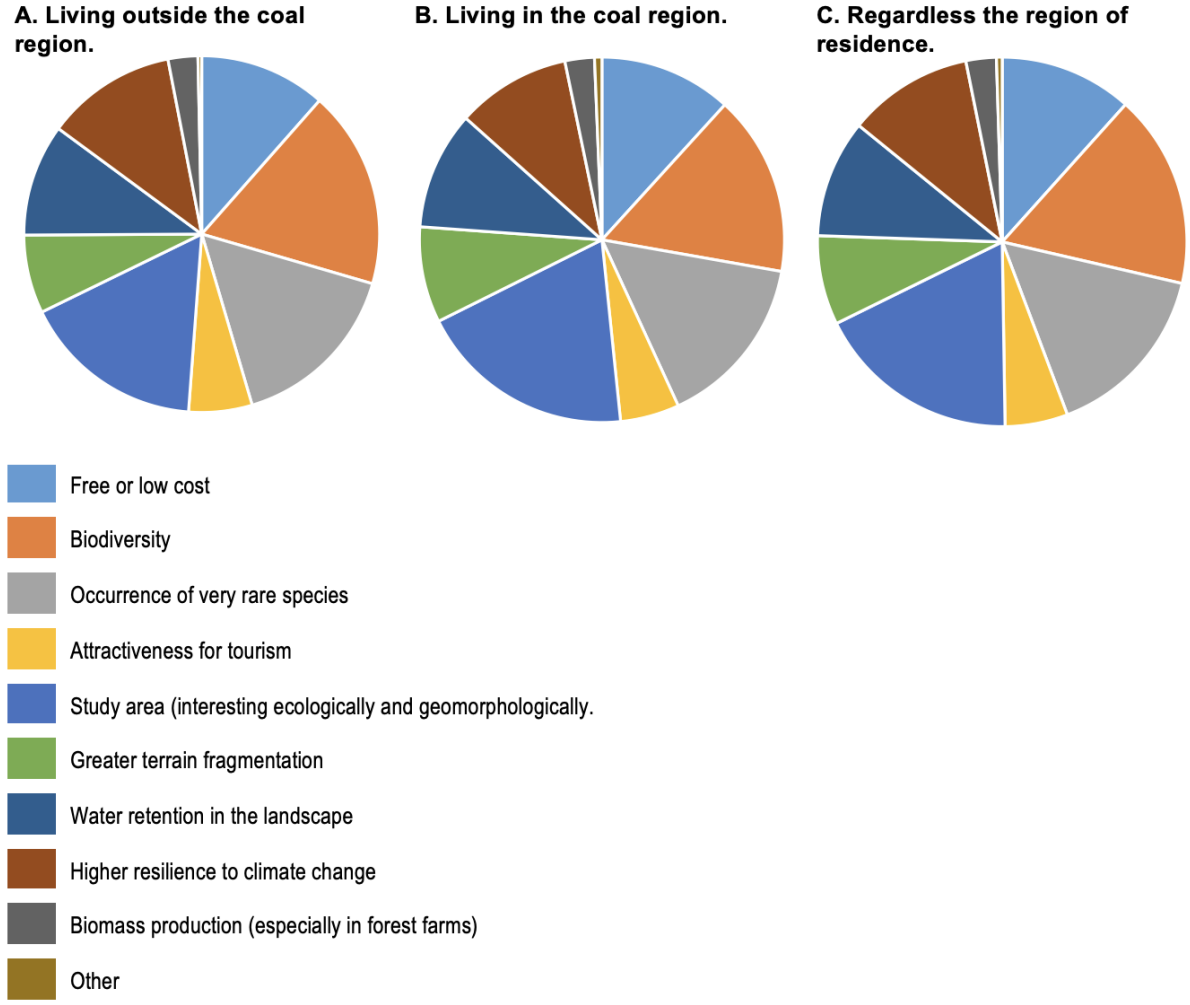
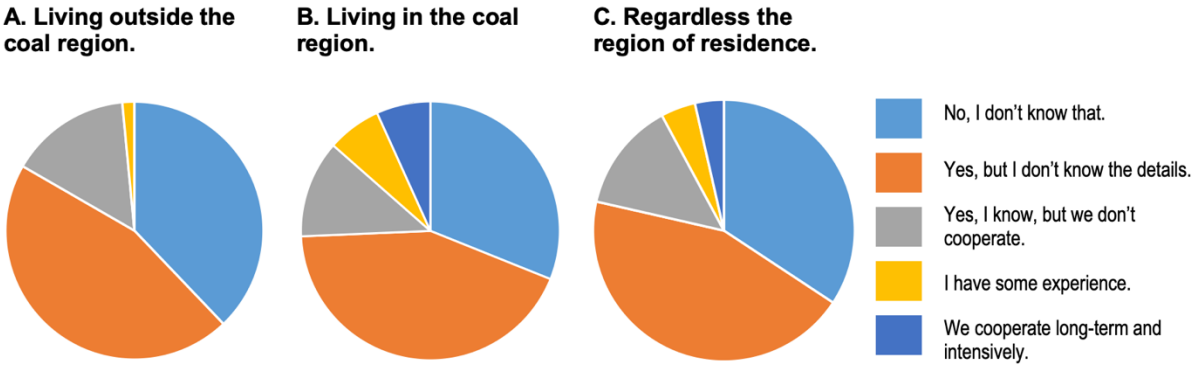


Chart 20: What is the awareness about the government program RE:START that supports coal mining region transformation? Based on place of residence.



4.3 Developing a shared vision and priorities

The cessation of mining before the complete extraction of mineable reserves is a sensitive issue in the Czech Republic. The major reason agreed with by regional stakeholders for the cessation of coal mining before the extraction of mineable reserves are environmental concerns – i.e. the negative impact of mining and the coal-based economy on the environment and living conditions of the people in the region, either local or global (via the negative effect on greenhouse gas emissions and global warming). Major problems of post-mining region recovery in the region are identified as low qualifications, low diversity of jobs and

environmental issues. There is some consensus among stakeholders in the target region that investment in the environment, research and education, green energy reskilling, and social issues should be prioritised. Transformation in green energy tourism and other industries are seen as the major potential for coal mining region transformation.

4.4 Conclusion

The activities engaging stakeholders under the banner of the TRACER projects allowed a number of focus points for energy transition to be defined:

- **Cooperation of regional and national authorities** is beneficial; as the involvement of innovation centres and business representative bodies, which support the involvement of people and businesses in the region in transition.
- **The Territorial Just Transition Plan will be an important source of funding** for transition, with 20 strategic projects being proposed for the North West Bohemia region. This should be combined with other financial sources.
- **Progress with transition will involve a combination of energetic** (photovoltaic, geothermal, H2, batteries), **environmental** and **socio-economic projects** (labour market, transition centre) – a combination of 'hard' and 'soft' projects. A good example is the 'Green Mine', a complex project for a coal mine which will be closed in 2024.

Planned next steps should be focused on establishing a new working group which would mobilise stakeholders, improving communication on the parallel strategies underway in the region. The group would consist of seven members representing the Economic and Social Council of the Ústí Region, government strategy RE:START, social, research and innovation platforms and industry (mining company). In the meantime, good cooperation has been established with the regional authority, which has newly appointed a councillor with responsibilities for transition.

5 Lusatia Region, Brandenburg and Dresden, Germany

5.1 Introduction

To develop a broad vision and find future-oriented priorities in the TRACER region of Lusatia, FIB contacted different types of stakeholders, to capture the opinions of decision makers as well as of civil society in the region. This chapter describes the methodology and the results of the implementation of the Entrepreneurial Discovery Process (EDP) / stakeholder engagement in Lusatia.

5.2 Methodology

The activities carried out in the region consisted of:

- **TRACER kick-off meeting and first EDP workshop**: FIB combined the project start in the Lusatian target region with an EDP workshop, held as a joint stakeholder workshop together with STRATH at the "IBA-Terrassen" in Großräschen in May 2019. This interactive meeting was joined by official stakeholders such as governmental bodies, business associations and chambers, universities, and research institutes. FIB contacted local stakeholders afterwards for feedback. Mostly they preferred the personal conversation and the bilateral exchange, because the conversation was more individual and concentrated more on topics that were important to the interviewee.
- **Stakeholder interviews**: Thus, for the further project work, FIB decided to contact interested stakeholders directly and to focus on personal bilateral interviews. The addressed stakeholders were mainly representatives of individual businesses and civil society organisations, which were underrepresented at the workshop but also in the transformation process as a whole. Performing interviews in the office of the stakeholder with one or two representatives of FIB took lots of time, but it generated a familiar and trustful atmosphere for a valuable conversation. The guaranteed anonymity through the interview gave the interviewees the option of free expression, regardless of a group view during a workshop.
- **Working group**: In 2019 FIB started already to support a working group on energy and special crops on reclaimed land. Out of this capacity-building engagement, a very specific cooperation consisting of the new TRACER working group established in 2020 a small field trial to test their ideas concerning special agricultural crops.

5.2.1 Interview methodology

The interview questionnaire provided by STRATH for all TRACER regions was used. It focuses on a) coal transition and b) energy R&I (in line with TRACER's focus). Depending on the specific living conditions and professional background situation of the interviewees, FIB adapted the given questionnaire and the order of the issues to fit to the interviewee's real lives. FIB always asked all the standard questions but, for example, in case the stakeholder had a focus on social/employment issues, then the interview had a focus on these issues rather than energy R&I. A total of 14 interviews were carried out, all conducted in the German language. The interviews were undertaken during September and November 2019.

- FIB contacted local stakeholders during events or called them to fix a date for the interview. The duration of an interview was scheduled to be two hours. Mostly, the time frame was sufficient, but in some cases, it took longer, depending on the need for communication.
- The location for the interview depended on the needs of the stakeholder. Usually, one or two persons from FIB went to the office of the stakeholder. The place for the interview was mostly a separated area or room.

- FIB briefly presented the TRACER project and started then the questions following the interview questionnaire.

When FIB was represented by two persons, one person was mainly leading the conversation and one was writing notes for the minutes afterwards. This interview technique makes sense because it offers the chance for a deeper, more open bilateral conversation. In addition, stakeholder priorities and visions for the future can also be discussed in more detail than in a workshop, where there are more participants. In case a personal meeting was difficult to realise, the interviews were carried out via email. However, the lively discussion was missing and additional questions coming from the situation were not possible.

Every interviewee received its minutes of the interview in German or English to check whether the notes had been correct and truly reflected the opinion of the interviewee.

Table 11: Number of interviews undertaken with different types of stakeholders, Lusatia Region, Germany

Type of stakeholder	Number of interviews
Government bodies	1
Other public sector organisations	1
Business associations and chambers	1
Individual businesses	4
Universities	2
Civil society organisations	3
Hybrid organisations (e.g. innovation centres or cluster bodies)	1
Others	1
TOTAL	**14**

5.2.2 Workshop methodology

The expert workshop was held by FIB on 15 May 2019. It was linked to TRACER's kick-off meeting. FIB and STRATH held a joint stakeholder workshop at the "IBA-Terrassen" in Großräschen. The location of the "IBA-Terrassen" (Headquarters of the former International Building Exhibition IBA Fürst-Pückler-Land) was chosen because it is located very close to the mining lake "Großräschener See" which originates from the former opencast-mine "Meuro", closed in 1998. The view from the terrace shows a typical excerpt from a reclaimed post-mining landscape in the heart of the Lusatian Lignite District. At the same time the location is a best-practice example for transition in former coal-mining regions.

FIB decided to structure the workshop as a full-day event, with a series of presentations in the morning and a workshop in the afternoon. The presentations were:

- Michael Haubold-Rosar (FIB): Greetings
- Rainer Janssen (WIP): Welcome & Introduction to the TRACER Project
- Alexandra Tomczak (EU Commission, DG ENER, Policy Coordinator – Coal): EU Coal Regions in Transition Platform: Main Activities and Cooperation Opportunities
- Kai Stryczynski (EU Commission, DG REGIO): Transition and Regional Development: What EU Cohesion Policy can contribute
- Jörg Schlenstedt (LMBV): Rehabilitation of former State-owned Lignite Mining in Eastern Germany – Results and Tasks
- Stefan Zundel (BTU Cottbus-Senftenberg): Decarbonisation in Flyover Country? Transition Management in Lusatia
- Karsten Feucht (IBA-Studierhaus): The Challenges of the Regional Development of Post-Mining Regions
- Sara Davies (STRATH): Knowledge exchange about the region.

FIB invited different participants such as representatives from the Ministries of Economy from Brandenburg and Saxony, Lusatian Commissioners of the Provincial Government, representatives from the Chamber of Commerce and Industry, local and regional politicians from the affected municipalities and districts, committed entrepreneurs from the region and representatives from non-profit organisations. The people were invited by email from FIB.

The aims of the workshop were to:

- launch the process of stakeholder consultation in the Lusatian target region,
- build, consolidate and deepen connections with and between stakeholders, and
- generate awareness, interest in and engagement with TRACER in the region.

In fact, the regional stakeholders were highly interested in the TRACER project and the transformation process. FIB were surprised about the good registration rates for the kick-off meeting, especially because the whole day was in English, which is not the common language for the area. FIB therefore offered simultaneous translation. A total of 49 people registered for the workshop, and a total of 50 attended (partially people who had not registered before, while others were missing) while 37 remained for the full event (including the afternoon). These numbers include 27 participants from among the TRACER project partners and two interpreters.

The presentations of the morning session were finished at about 1.15 pm. Quite a few people left the kick-off meeting after the lunch break before the EDP workshop and discussion started at 2 pm. However, the coffee and lunch break had already been used by all participants for a lively exchange. There was no separate participation list for the EDP workshop, but it can be worked out that mainly regional stakeholders left. Reasons included different appointments in the afternoon and that their normal jobs needed to be done. Most regretted that they were unable to spend more time at the event.

At the time the TRACER project was carried out, many stakeholder participation activities were underway in Lusatia, addressing mostly similar stakeholders. FIB contacted almost all relevant and important stakeholders (policy makers, municipal representatives, chamber of commerce, regional business and structural development agency, non-governmental interest groups, mining industry, reclamation science, etc.). Thus, all of them were informed about the TRACER project. Unfortunately, these stakeholders do not have the time to go to every upcoming event. So FIB were very happy that they had such a quantity of regional stakeholders at the kick-off meeting.

The participants for the “knowledge exchange” session were divided into groups of six people, around a table with a poster. Two groups were held in German, with regional stakeholders and some German-speaking TRACER project partners. The other groups were held in English and were made up of TRACER project partners. STRATH guided participants through a series of structured questions:

- What assets, resources, strengths & capacities already exist in the region?
- What would you like to happen? What creative ideas can you think of?
- What problems are there? What practical solutions?

STRATH asked participants to think about their answers before writing their ideas on colour-coded post-it notes (colours coded to correspond to a particular question).

Participants then discussed their ideas with the other people at their table, before placing the post-it notes on a poster on the table, which had been pre-prepared with six categories (Business & Economy, Education & Skills, Family & Communities, Identity & Culture, Built & Natural Environment and Other).

After the three questions, participants were asked to write on a card their answer to ‘What idea/action will I take away from today?’ This card was intended for their own use.

The results of the EDP-Workshop are summarised in the report D 5.2 “Mobilising stakeholders in target regions: Report on the stakeholder discussion in Großräschen, Lusatia”.

This first workshop was the only EDP workshop. The contacted stakeholders indicated that a bilateral conversation was more interesting to them than taking part in a workshop. The stakeholders are already heavily consulted by others and have only limited time. Therefore, it is rather difficult to arise interest in new projects, but they prefer the more in-depth conversation, which is possible in interview settings. In addition, there is a good opportunity to discuss problems and more personal opinions and be rather open-minded because of a protected atmosphere. Some of the interviewees would not appear and speak at a workshop, because their impression and opinion of the structural change and the coal phase-out are not consistent with the policy, so the guaranteed anonymity through the interview gave them freedom of expression.

Table 12: Number of participants in the workshop, Lusatia Region, Germany

Type of stakeholder	Number of participants
Government bodies	6
Other public sector organisations	2
Business associations and chambers	3
Individual businesses	6
Universities	8
Research institutes	20
Civil society organisations	2
Hybrid organisations (e.g. innovation centres or cluster bodies)	1
Others	2
TOTAL	**50**

5.3 Vision and priorities in Lusatia

First of all, within the workshop there was a consensus that the coal phase-out is politically set. However, the green energy supply without coal will be challenging. The opinions about the organisation and management of the coal phase-out vary depending on people’s position, age and experience.

The essence of the workshop was that there are many interesting ideas for developing Lusatia beyond coal. Mentioned were potentials in the fields of industry, energy, chemical industry, agriculture and tourism. In particular, the post-mining landscapes have a great potential for tourism, but also for nature development and protection. Up to now, important employers in Lusatia are mining, generation, and reclamation companies. The loss of jobs directly connected to lignite mining and generation is ensured and will be a big concern relating to the transition from coal. There is a need to create new perspectives for employment and careers. A key point is that there are many well skilled people in Lusatia - most of them in the established energy sector and associated industries, notably metal and the chemical branch. But compared to other regions in Germany the age structure of the people in the region will be a challenge. As it was already during the last 30 years, young skilled people are missing. The emigration and brain-drain of young professionals hinders socio-economic development and transition. Immigration of a skilled and creative work force could be an answer - quite similar as at the beginning of industrial mining in the region about 150 years ago. To attract immigrants there have to be improvements in the infrastructure concerning traffic, digitisation, health care, childcare and so on. These aspects are more or less well known. But it must be mentioned that, due to a diffuse fear of loss, first of all socially disadvantaged people are very sceptical and sometimes xenophobic.

Thus, FIB decided to address interested regional stakeholders and private individuals directly and focus on personal bilateral interviews to get more detailed information and contacts.

Depending on the interest of the interviewee the discussion varied. From the perspective of the people addressed, the main and repeatedly named challenges for the next years will be:

- establishment of a new steady energy structure
- fostering energy storage technologies to balance the electricity system
- socially compatible expansion of renewable energies
- hedging of the energy supply
- insufficient availability of skilled workers/professional in many sectors, especially heath care, education, technical tasks
- perspectives for the youth in smaller cities and villages
- obvious cultural and social deficits making the region less attractive for open-minded people
- creating an innovative mind-set and creative atmosphere
- self-empowerment of the region
- implementation of the sorbs - a regional ethnic minority
- a noticeable political sullenness and scepticism towards top-down initiatives thus endangering social cohesion
- R&I activities need a high level of practical relevance
- sustainability in shopping behaviour to strengthen regional production and value chains (less online, more local)
- lack of opportunities and old-age poverty are already and will be an increasing problem.

In parallel during 2019, FIB supported the LEAG, the regional lignite mining company, with the organisation and conducting of two working group meetings with a wider range of stakeholders. The crucial topics were, how to find new business ideas and cases for regional farmers, biomass processing facilities and the lignite mining company as a major landowner of reclaimed land. Therefore, FIB are looking at the whole value chain including the techno-economic feasibility. The major outcomes of the lively discussion were:

- discussion about strategies for basic structural agricultural problems and possible solutions
- bringing regional perspectives with an outside point of view on business and technology options together and deriving future topics for LEAG together with other stakeholders in Lusatia
- options for different and new marketing strategies for local farmers
- identifying opportunities in the market and trends outside of Lusatia
- evaluation of suitable production areas and fields.

There is a wide range of visions and options existing depending on who is asked. Focusing on some key aspects, the future vision for the region in transition has to include:

- a societal dimension:
    - perspectives for the youth especially in smaller cities and villages, which goes together with making Lusatia under social aspects attractive by creating an innovative mind-set, self-empowerment of the region and in some areas more implementation of the sorbs
- an employment dimension:

  - create transition options for current miners and connected workers
  - attract young people by new and innovative employment opportunities as well as already promoting jobs with a shortage of skilled workers/professionals such as health care, education, craftspeople, etc.
- an economic dimension:
  - usage of the competence roundabout energy production for establishing energy storage systems, a new steady energy structure
  - establish a sustainable "soft" landscape tourism
- a technological dimension:
  - retrofitting and repowering of existing renewable energy systems such as photovoltaic and wind turbines of the first generation
- a research or innovation dimension:
  - with high level of practical relevance
  - identify new opportunities in the market and trends outside of Lusatia and create own business strategies out of this
- an engagement dimension:
  - create spaces for meeting and connection between stakeholders to enhance social capital.

In Lusatia the **transition process started already and picks up speed**. There are **many regional activities, strategy developments and programmes ongoing**, in parallel, on different levels of action and responsibilities - but unfortunately, in general less coordinated so far. Even more, there is a **strong need for a well communicated transition process** by the government in the affected Federal States of Brandenburg and Saxony, which is shaped in consideration of all aspects. It makes more sense for TRACER activities to align with existing strategies/programmes, than creating another "artificial master plan" for transition without adhesion and chance of political implementation. Thereby, **FIB sees TRACER within a communication process - a platform, especially for less represented stakeholders to play a part in the actual discussion about the future of the region**. Thus, one crucial point is that their concrete needs and expectations are considered. Next is to get something started out of more or less vague meetings, conferences, strategies and numerous letters of intent with many self-referential and self-fulfilling phrases.

Thus, FIB decided to start with a smaller working group focusing on one special R&I topic using the weight of their credibility and professional expertise as a landscape research organisation. At this point FIB are talking about the **cultivation of energy and special crops on reclaimed land as a substantial contribution to regional energy transition, restoration of degraded and underutilised land and also providing a sustainable and eco-friendly income perspective for the primary sector in the region**. For the regional mining company (LEAG) and many other smaller players, the structural change caused by the gradual exit from lignite mining and power generation driven by climate policy is a major economic cut in their individual business models. Therefore, it is important to create economic alternatives for employment and value creation, already proactive at an early stage. An existing economic potential in the mining region is represented by underutilised and marginal agricultural land including reclaimed dump areas. In general, these low-yielding sites are used for pasture and feed production, but also renewable raw materials are suitable. In contrast and up to now the growing of special crops has hardly been implemented in regional agricultural practice - although the site and climatic conditions are adequate for oil and medical plants or hemp grown for fibre. As first feasibility studies show, the cultivation of special crops in particular offers a new potential for value creation, especially if regional value chains are formed from harvest to processing and marketing. For existing regional small and medium-sized companies, this can be a decisive contribution to their economic survival during and after the structural change,

since the economic chains can be established with relatively simple and available means. In addition, **these small-scale measures in rural areas offer a visible and tangible point of contact and an opportunity to identify with measures relating to structural change for the population living there in their immediate vicinity**.

Within the TRACER initiative, a first field trial with special agricultural crops was established in spring 2020. The working group members cooperate on this trial and try to generate exemplary value chains for some promising special agricultural and energy crops in their working group meetings.

5.4 Conclusion

In terms of consensus on the emerging themes, the main challenges mentioned in the EDP workshop and the interviews are more or less the same. Depending on the personal position, age and experience of the interviewee, the importance of the challenges varies in its order. There is an agreement that green energy supply without coal is societal consensus, however, it will be challenging. There is already a shortage of skilled workers and professionals in Lusatia, already paralysing some R&I activities. The infrastructure concerning traffic, digitisation, health care and childcare need to be improved.

In terms of next steps, FIB is managing the innovative TRACER field trial for special agricultural crops of LEAG. The focus is on the development of an ecological and economical sounding value chain, which can be scaled up to a real business case. Furthermore, FIB is in contact with different groups to support new ideas and give the stakeholders a platform for presenting and connecting in the field of energy cropping. However, due to the COVID-19 pandemic these working group meetings had to be open air or in smaller groups so far.

6 Western Macedonia, Greece

6.1 Introduction

The Entrepreneurial Discovery Process (EDP) under Work Package 5 of TRACER aims to develop of a set of shared visions concerning the major steps in the (clean) energy transition process. This takes place in parallel with the identification of the main priorities regarding the research and innovation (R&I) strategies, as well as the reskilling/retraining needs of the local workforce. In the Region of Western Macedonia, Greece, this process involved the contacting and further engagement of individuals and representatives of organisations / regional and local authorities / institutions, to participate in this task; these being either stakeholders or experts willing and able to provide CRES experts with their opinions and analytical approaches on the issue of energy transition and the process of coal phasing out.

This chapter describes the methodology followed for the implementation of the EDP in the Region of Western Macedonia, together with the resulting outputs. The methodology as well as the various activities that have been used for the mobilization of the local stakeholders in the region are discussed, along with the analysis of the main findings based on the collected information, followed by the outcomes and next steps used for the purpose of the further involvement of the relevant stakeholders and the planning of the most suitable strategy.

6.2 Methodology

In the frame of the foreseen activities, a number of interviews were planned. The path followed was the one indicated by the quadruple helix stakeholders' approach, according to which various key representatives from a wide range of stakeholders (research and education institutions, public sector bodies, industrial/business associations, NGOs, etc.) were invited to participate in a number of planned interviews within the scope of WP5 of the TRACER project. In view of the imposed restrictions due to the Covid-19 pandemic, as well as the long distance between CRES and the institutions of the Region of Western Macedonia (as CRES is based in Attica, Southern Greece), online "tools" were used in place of conducting interviews face to face.

6.2.1 Interview methodology

The initial procedure for the planning and chronological preparation of the interviews began during Spring 2020, when CRES experts elaborated a list of the stakeholders most relevant to the energy transition topic, with one of the main criteria being the location of potential interviewees in the region of Western Macedonia. Following the quadruple helix stakeholders' approach, a number of representatives were selected from among the regional administration bodies, educational institutions, research and technical development centres, non-governmental organisations (NGOs) and social organisations. The main concept on which the selection of the persons to be interviewed was based was their relevance and their prior active involvement with the topic of coal phasing out for the region, either through their participation in working groups or committees, or through their participation in national and/or European projects addressing the issues of energy transition and the rehabilitation of mining areas.

A total of ten potential interviewees were contacted via email and then with follow-up phone calls in March 2020. This communication finally resulted in the implementation of eight completed sets of "developed structured answers" received in total. In two out of the eight cases, an online interview took place. In the remaining six cases, the contacted persons could not be available for an interview and, using the alternative option, they returned to CRES the elaborated set of questionnaires completed with a set of very analytical answers.

The questionnaire that was sent to the interviewees was the one prepared by the TRACER partner and WP5 leader, STRATH, and provided to all partners for the purposes of offering a more solid and concrete background and backbone to facilitate the implementation of the semi-structured interviews. The content of the prepared questionnaires was translated into the

Greek language so as to facilitate the provision of the answers by the respondents and/or interviewees.

The option of a “one to one” interview was selected as the most suitable one, since it offered the possibility for a more personalised and deepened interaction with each of the interviewees. This way, the gathering of enriched information on the specialization sector of each of the interviewees was assured, while it was possible to dedicate a longer time-period to every interview. The two interviews were conducted with the use of “Zoom” software, due to the fact that the interviewees were located in Western Macedonia, in the North of Greece, many kilometres away from CRES’ premises in Attiki. The checklist (i.e. the elaborated set of questions) was sent via email to the interviewees in advance, so that they had the proper time frame to prepare themselves for the interview.

It must be further mentioned that, in March 2021, ten more persons were contacted by CRES (mayors and deputy mayors of most municipalities of Western Macedonia, as in the region there exists a "Network of Energy Municipalities", with its main scope being the scientific support of the areas of the energy Municipalities for their transition to the metallignant period, as well as the organization of educational and other activities thematically focused on energy), in an attempt to enhance the number of implemented interviews. However, no new input or responses have yet been provided.

In Table 13, the number of interviews and the corresponding institutions that the respondents / interviewees represent are presented.

Table 13: Number of interviews conducted and types of the different stakeholders, Western Macedonia, Greece

Type of stakeholder	Number of interviews	Institutions
Government bodies	1	Region of Western Macedonia, General Director of Development Planning, Environment and Infrastructures
Other public sector organisations	1	PED (Regional Association of Municipalities of Western Macedonia)
Universities	3	University of Western Macedonia
Research institutes	2	Centre for Research and Technology Hellas, Chemical Process & Energy Resources Institute (CERTH/CPERI)
Hybrid organisations (e.g. innovation centres or cluster bodies)	1	Bioeconomy and Environment Cluster of Western Macedonia (CluBE)
TOTAL	**8**	

The conducted interviews and the completion of the relevant extended and specially elaborated questionnaire were followed by the first phase of the analysis of the received feedback. The questionnaires were gathered and each one was synthesised according to the provided answers, to result into eight separate summaries, whose structure was derived by the four main areas of focus, as provided in the questionnaires. Thus, the following four main sections were addressed in the frame of the elaborated summaries based on interview questionnaire (see Box 1).

For the development of the content provided by the above four sections, all the answers corresponding to each category of topics were carefully analysed and a more general overall approach was concluded.

6.2.2 Workshop methodology

In Greece and for the region of Western Macedonia, it has not been possible to hold a joint stakeholders’ workshop as foreseen in the frame of Work Package 5. The main reason for this has been the difficulties imposed by the Covid-19 restrictions, exacerbated by the non-proximity of CRES to the region of Western Macedonia, which since the beginning would evidently limit the number of implemented workshops. Since the appearance of the Covid-19 restrictions at the beginning of 2020, the initial plan of CRES experts was to wait until conditions improved and proceed with a combination of 1-2 workshops, along with the

implementation of the 3rd progress meeting of TRACER (which was foreseen to take place in Western Macedonia, and more specifically in Kozani). This event would have been the perfect opportunity for CRES to gather together all the interested stakeholders of the local community. Unfortunately, the long duration of the epidemic restricting measures and the deterioration of the situation, especially after the summer period of 2021, evaporated the last hopes for a "face to face" stakeholders' workshop. Nevertheless, as explained in the following sections, CRES experts have had the opportunity to proceed with online meetings with a considerably wide network of local stakeholders in the frame of other TRACER work packages, balancing to some degree the "loss" of those foreseen in the frame of WP5.

6.3 Developing a shared vision and priorities

The lack of possibility for the implementation of any workshops in the region of Western Macedonia, as foreseen in the frame of WP5, has resulted in the personal interviews with interested regional stakeholders being the main source for the provision of the most important opinions gathered regarding the approach, organization and addressing of the most crucial topic for the region, being currently the path towards the after-coal era. This, of course, taking place within the current political, social and financial climate, as well as what is provided in the National Energy and Climate Plan (NECP) for Greece.

Based on the analysis of the implemented interviews as well as of the provided extended answers through the gathered questionnaires, there is a slight diversification concerning the attitude of the interrogated stakeholders, depending on their experience, prior involvement or professional identity in the region, as well as some common points of unanimous agreement. It is worth mentioning that all the information provided by the respondents and / or interviewees was very thoroughly set out and argued. The feedback encompasses many different and innovative ideas which are currently on the table, while covering different aspects of the development and efficient transformation of the region of Western Macedonia beyond coal.

One of the issues which is of huge concern and maintains a high ranking in the fears and / or challenges the region is facing is the inevitable loss of a considerable number of jobs directly (and / or indirectly) connected to lignite mining and to the operation of the coal power plants. Although this is an issue of serious concern, according to the opinions expressed by the local stakeholders, it will hopefully be dealt with by the implementation of appropriate strategic approaches that will ensure the replenishment of existing jobs, through the combination of a number of actions and suitably targeted initiatives. **Capacity building and the re-training / re-skilling of the existing labour force and of the human resources employed in the lignite industry should be ranked as a high priority.**

There is an indisputable need for the creation of new potential and perspectives in Western Macedonia. A key point is that there is a **high availability of skilled human resources and of trained technical staff, especially in the energy sector.**

On the other hand, there is also major concern that the region might not be able to deal with the lack of employment opportunities, in view of the de-lignification plan being extremely pressing in terms of time, which does not allow for a smooth treatment of this issue and this will mainly affect younger people. Furthermore, a large number of young scientists prefer to emigrate and look for a job in other regions of the country or even abroad. To prevent this and maintain the interest of the re-skilled workforce **there must be a wide umbrella of financial and fiscal incentives to increase local business activity and attract both domestic and international investments.** The production model of Western Macedonia must be rebooted, regenerated and be ready to be enriched with new activities that will create new jobs.

The next common vision mentioned by almost all the contacted stakeholders was **the need for the restructuring of the overall production model of the region of Western Macedonia**. This is also linked to the previously mentioned topic of jobs replenishment. There was a unanimous approach pointing to the undeniable need for the launching of a totally different production model, thus a comprehensive restructuring leading to a new (multi-sectoral) one. What is visualised is that **the new production model will be non-dependent**

on coal, yet maintaining its "energy" character and be based on the exploitation of new alternative and environmentally friendly resources and technologies (e.g. RES, hydrogen, energy storage). **It should be further expanded to other sectors** (e.g. agricultural, manufacturing, agri-food, mild forms of tourism exploiting the natural landscape and the cultural background).

The attraction of the interest of local, national and / or international investors with a long-term horizon will significantly contribute both to the enhancement of a new production model for the area but also to **the improvement of the R&D / R&I potential in the region**, which is currently rather low. This is due to the lack of competitiveness, as many years of monopoly conditions have not favoured the creation of economies of scale.

A benefit to the region is the existence of a **significant technological and research infrastructure, which could be upgraded and expanded to support new business activities – still energy based, but in innovative sectors and / or products. This, coupled with the highly trained technical staff mentioned above, could constitute a very efficient and powerful tool for the new orienting of the production and economy of the area to alternative (energy and not only) paths.**

6.4 Conclusion

CRES is in regular communication and interaction with a large network of stakeholders from the region of Western Macedonia. Most of the people that were contacted and finally either interviewed or presented their opinions and answers in written form following the structured questionnaire are directly involved in the issue of the clean energy transition of the region, since they are also members of the Working Team for the Coal Platform of Western Macedonia, being responsible for the preparation of the Regional Strategy towards the transition process of Western Macedonia.

Even for the needs of various foreseen activities in the frame of other Work Packages of the TRACER project, CRES experts are quite frequently in contact with the representatives of research institutes, the University of Western Macedonia (UoWM), the government of Western Macedonia Region, the municipalities of the region, experts responsible for the Research and Innovation Strategy for Smart Specialisation (RIS3) and experts representing local bio-economy clusters. This represents a significant network which is directly targeted to the coal phasing out process, made up of important and highly experienced experts. The network meets regularly to consult on the strategy for R&I regarding the energy sector, as well as other equally critical issues, such as the capacity building in the region required for the clean energy transition to the non-lignite, after-coal era.

All the relevant experts have already expressed their deep interest in the topic of the clean energy transition, while they are especially willing to benefit from the activities foreseen in the frame of TRACER and to cooperate with CRES, which is the national co-ordination centre in Renewable Energy Sources (RES), Rational Use of Energy (RUE) and Energy Saving (ES). Further, as the National Energy Centre, CRES is the official consultant of the Greek government on matters relating to RES/RUE/ES in national policy, strategy and planning, creating a very fruitful set of "synergies" and "collaboration" with the exchange of opinions, concerns, expertise, working in a complementary way for the optimum result regarding the smooth transition to a new era for the region of Western Macedonia, with the fewest possible "losses" for the local society.

7 Upper Silesia, Poland

7.1 Introduction

This chapter describes the methodology and the results of the implementation of the TRACER stakeholder engagement process in Upper Silesia, Poland, and the vision and priorities for a just energy transition in the region.

7.2 Methodology

Activities carried out in Upper Silesia consisted of interviews and a workshop. The interviews initially were planned as face-to-face meetings with particular stakeholders. However, at the beginning of March the Polish government introduced a complete lockdown due to the outbreak of COVID-19. The lockdown restrictions were eased at the beginning of May. However, at this time a local but large COVID-19 cluster (with several thousands of infected people) was identified in the coal mines of Upper Silesia. The mines were closed and the miners and their families sent to quarantine. Due to the serious COVID-19 pandemic situation, uncertain future development of the pandemic and the interviewer preferences, the interviews were conducted online using a form with specific questions.

7.2.1 Interview methodology

Eleven interviews were carried out between March and April 2020. The interviews were conducted on-line using a form that contained specific questions. The questionnaire was adapted, and the interviews were divided into four parts (A, B, C and D). In part A, stakeholders were asked questions concerning their perception of the transition in their region. In part B, stakeholders were asked about their cooperation with other entities in the region concerning scientific research. In part C, stakeholders were asked to indicate the strengths of the region concerning research and development. In part D, they were asked questions concerning their vision of development and the challenges that will be faced by the region in the future.

Table 14: Number of interviews undertaken with different types of stakeholders, Upper Silesia, Poland.

Type of stakeholder	Number of interviews	Institutions
Other public sector organisations	3	Marshal's Office of the Śląskie Voivodeship; Jastrzębie-Zdrój City Hall; Boronów Commune Office;
Business associations and chambers	1	Association of Mining Engineers and Technicians, branch in Rybnik
Individual businesses	1	PGL LP State Forests
Universities	1	University of Silesia in Katowice
Research institutes	3	Central Mining Institute
Civil society organisations	1	Polish Ecological Club (Gliwice) Association of mining communes
Others	1	Polish Economic Institute, Climate and Energy Group
TOTAL	**11**	

7.2.2 Workshop methodology

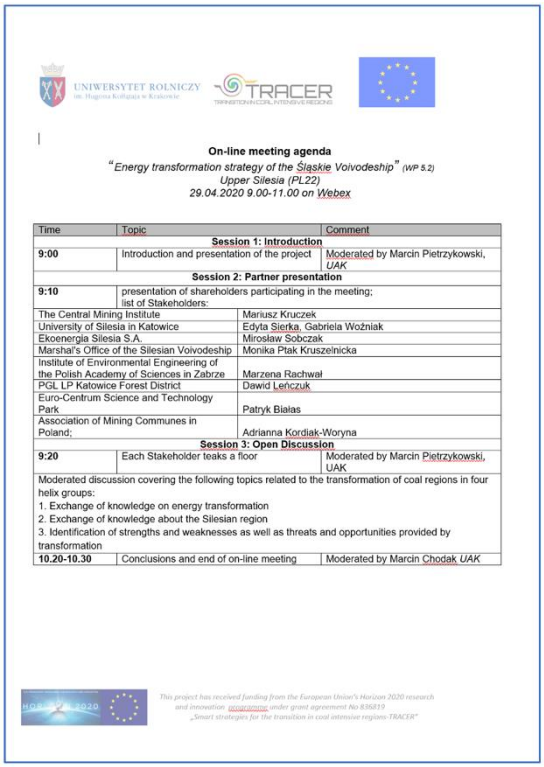
The on-line workshop was organized by the UAK (University of Agriculture) team. The meeting was initially scheduled to be held on 17 March 2020 in Katowice. However, the COVID-19 outbreak made this impossible and instead the on-line format was chosen. The meeting was re-organized on 29 April 2020 as an on-line event using the Cisco Webex platform. The Cisco Webex platform was first tested by the UAK teams, and as it worked well, it was offered to participants.

The objectives of the meeting were:

- Exchange of knowledge on energy transformation;
- Exchange of knowledge about the Silesian region;
- Identification of strengths and weaknesses as well as threats and opportunities provided by the transformation.

The date was chosen after an on-line questionnaire was completed by invited participants (stakeholders) using Google Forms tools. In order to prepare the participation list, first a database of people/institutions suitable for cooperation in the project was created. Then information about the TRACER project was sent via e-mail to these people or institutions. The next step was to plan a meeting that was originally intended to take place on 17 March 2020, at the ICC Katowice. An individual invitation to the meeting was sent to people who expressed willingness to participate in surveys, interviews, and TRACER workshops. However, the COVID-19 epidemic prevented the meeting going ahead as planned in person in Katowice. After planning the on-line meeting, which was chosen due to the restrictions on inter-personal contacts due to COVID-19, the UAK team again contacted people who had expressed an interest in participating in the workshops and invited them to the re-scheduled on-line meeting.

Figure 3: Agenda and screenshots from the online workshop, Upper Silesia, April 2020

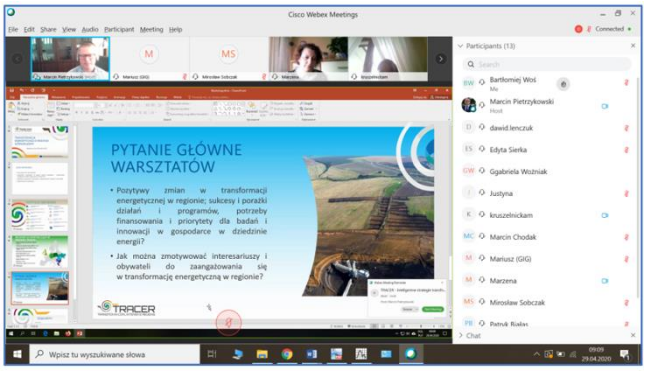


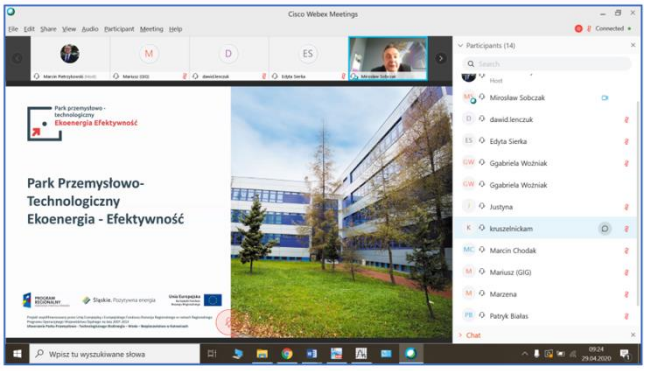
On-line meeting agenda

"Energy transformation strategy of the Śląskie Voivodeship" (WP 5.2)
Upper Silesia (PL22)
29.04.2020 9.00-11.00 on Webex

Time	Topic	Comment
	Session 1: Introduction	
9:00	Introduction and presentation of the project	Moderated by Marcin Pietrzykowski, *UAK*
	Session 2: Partner presentation	
9:10	presentation of shareholders participating in the meeting; list of Stakeholders:	
The Central Mining Institute	Mariusz Kruczek	
University of Silesia in Katowice	Edyta Sierka, Gabriela Woźniak	
Ekoenergia Silesia S.A.	Mirosław Sobczak	
Marshal's Office of the Silesian Voivodeship	Monika Ptak Kruszelnicka	
Institute of Environmental Engineering of the Polish Academy of Sciences in Zabrze	Marzena Rachwał	
PGL LP Katowice Forest District	Dawid Leńczuk	
Euro-Centrum Science and Technology Park	Patryk Białas	
Association of Mining Communes in Poland;	Adrianna Kordiak-Woryna	
	Session 3: Open Discussion	
9:20	Each Stakeholder teaks a floor	Moderated by Marcin Pietrzykowski, *UAK*
Moderated discussion covering the following topics related to the transformation of coal regions in four helix groups: 1. Exchange of knowledge on energy transformation 2. Exchange of knowledge about the Silesian region 3. Identification of strengths and weaknesses as well as threats and opportunities provided by transformation		
10.20-10.30	Conclusions and end of on-line meeting	Moderated by Marcin Chodak *UAK*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 835819 „Smart strategies for the transition in coal intensive regions-TRACER"





A total of 10 people registered for the on-line workshop. However, in the end, nine persons took part. The on-line workshop lasted 1.5 hours (from 09.00-10.30). Key stakeholders represented at the workshop included:

- The Central Mining Institute
- University of Silesia in Katowice
- Ekoenergia Silesia S.A.
- Marshal's Office of the Silesian Voivodship
- Institute of Environmental Engineering of the Polish Academy of Sciences in Zabrze
- PGL LP Katowice Forest District
- Euro-Centrum Science and Technology Park

- Association of Mining Communes in Poland

There were three sessions in the on-line workshop. In the first session, Marcin Pietrzykowski (UAK) presented the TRACER project and its main goals.

In the second session, participants all spoke individually to start with (each of the nine people participating) and gave short presentations. Each participant introduced themselves and the institution from which they came and said how they were associated with the transformation. Each of the participants could comment on each of the three identified main topics of the meeting (exchange of knowledge on energy transformation; exchange of knowledge about the Silesian region; identification of strengths and weaknesses, threats and opportunities provided by the transformation). Subsequently all the participants were given the opportunity to relate to the presented speeches and engage in the discussion, alerting the moderator via chat or the “raised hand” tool. This strategy allowed UAK to moderate the discussion and ensure that everyone had the opportunity to speak. All participants took the floor and commented on the issues of transformation, providing the necessary information.

Next, the participants took part in an open discussion. This third session was moderated by Marcin Pietrzykowski (UAK). In this session, the stakeholders shared their knowledge, expressed their opinions and discussed the positive and negative effects of the ongoing energy transformation in the Upper Silesia region. They presented the hopes and fears of the citizens and the institutions they represented as well. During the discussion several examples of programmes for energy transformation in the past were given. Some participants were able to develop this discussion by summarizing positive or negative aspects. The main discussion points highlighted the following views among the stakeholders:

- The Upper Silesia region **has already changed in terms of energy transformation**. The transformation should be considered in both technological and social aspects. Alternatives to coal are already available (as RES). Upper Silesia does not have a great potential for wind energy, but it has similar conditions for solar and water energy as in Germany. In social terms, people should be at the centre of the transformation. A fair transformation should be based on dialogue with the inhabitants and on planning. A good transformation plan is understood as a vision that will be of interest to the residents and will not overlook any citizen and the state of the natural environment. The need to move from a centralized to a dispersed economy was highlighted, including for consumer energy.
- The current strategy of the Silesian Voivodship puts great **emphasis on energy transformation and care for the environment**. The transformation is understood as a transformation of the economy, in which social policy and education, as well as taking care of the environment are very important. In the voivodship there are negative trends in demography - depopulation of cities. Major challenges are also associated with the restructuring of the workforce in connection with the closure of some mines. The restructuring carried out so far is assessed as positive. However, it is necessary to finance investments which require huge financial outlays. Good practice at the scale of the voivodship is to develop post-industrial areas (e.g. for tourist and structural facilities) and carry out annual projects related to the social culture of the region (Industriada).
- In Silesia, **significant changes in the approach to fossil fuels and RES** can already be observed. For example, recently there has been a decline in water sales for large industrial plants, i.e. Tauron Wytwarzanie, which uses water to process solid fuels. This was due to the increase of energy acquisition in wind power plants.
- **Biomass can be an alternative energy source,** as a popular substitute for hard coal and supplementing hard coal in the balance sheet. The State Forests conduct thermo-modernization of buildings and equip them with devices using renewable energy sources (e.g. solar collectors and photovoltaic panels, heat pumps or biomass boilers),

thanks to which the share of clean energy used by LP will increase. The region's forests significantly mitigate the impact of industry.

- The major positive aspects of the energy transition are **improvements to the inhabitants' quality of life**, their environmental awareness and health, as well as the fact that the region is beginning to be perceived as green. From the point of view of residents, the positive aspects of the transformation that can already be observed are: improvement of air quality, investment in thermal upgrading of buildings from the 1950s and 1960s, improvement of landscape quality and investment in recreational facilities during reclamation of heaps.
- However, there is seen to be a lack of transparency of activities and communication with society, especially with the part working in the mining sector. The transformation should not be understood as a complete abandonment of coal. Motivation for transformation should be promoted by **showing good practices and the sense of transformation**. Transformation programmes should be aimed primarily at supporting the economy, and especially **new opportunities for the mining sector**. Focusing only on the energy transformation is an insufficient view.
- The mining communes fear the unsuccessful transformation of mining as it was in the 1990s. Small communes in particular are afraid that they will be neglected, mines closed and abandoned, and all revitalization activities abandoned. The **transformation should be done fairly**, not imposing ideas from above, but cooperating with the society. It is particularly necessary to reach out to the smallest local communes. It is necessary to take advantage of the experience of municipalities that did not manage the transformation in the 1990s to **avoid making the mistakes that were made in the past,** when many small towns fell into poverty.
- Receiving subsidies for developing or establishing one's own business does not make sense without appropriate **support and training**.
- The biggest failure is the state of the environment in Upper Silesia as a result of heavy exploitation of the region. The **resources for conducting research on the use of coal and energy are extremely needed**. A broad education of society is necessary (e.g. consumer power engineering) highlighting the potential for transformation in environmental resources other than coal. Attention should be paid to the potential of biomass, municipal waste and other sources from which energy can be obtained.

The participants represented various groups of stakeholders – authorities of mining communes, scientists related to the mining industry and environmental protection, representatives of business organizations and environmental activists. All of them shared a common vision that **the state of environment is important for local communities and inhabitants of the region**. Improvement of living conditions in Upper Silesia has been mentioned as a positive aspect of the transformation. It is evident that local communities and inhabitants of Silesia do not want their region to be regarded as a place of ecological disaster and **highly value changing the reputation of the region into more "green"**. However, it is also evident that for some groups of stakeholders other aspects of transition - namely **social and economic issues - are also highly important**. There are relatively large groups of people that are afraid of upcoming changes and their anxiety comes from previous experiences with mining industry transformation. The region is also not ready to completely cease from coal but opts rather for different use of this commodity.

The meeting revealed also that in Upper Silesia the energetic transformation is not a question of the future but it is **an already ongoing process**. It is manifested in increasing production of energy from renewable sources and results in improved air quality in the region. There is increasing interest in obtaining subsidies for ecological solutions in households and therefore

the process is likely to continue if sufficiently supported by central government of European Community means.

7.3 Vision and priorities in Upper Silesia

The energy transformation process of the Upper Silesia region will require changes in the production structure and development of the energy sector. Renewable energy sources must play a key role in the region's energy system in the future. Due to the fact that the Upper Silesia region is the largest hard coal consumer in the country, it is necessary to support this type of investment in the regional policy. Among the main challenges for Upper Silesia is also the improvement of air quality through the implementation of investments enabling the transition to a zero-emission economy. The challenge for the region is the significant share of industrial and post-industrial areas as well as areas where the effects of mining have occurred or will occur. A significant problem is land reclamation and revitalization after mining, as well as the retraining of employees leaving the mining sector. When planning economic development, one should also take into account the need to ensure the possibility of operation for companies from the mining-related industry or their re-industry. This industry sector currently employs from 96,000 up to 400,000 workers depending on the adopted methodology for estimating. Liquidation of the mining sector in the analysed area will weaken the pace of economic development and the taxes revenues for municipalities. Until now, some mining municipalities bear the social and economic costs of the restructuring of the mining sector carried out in the 1990s.

For these reasons, a just transition of the region should take into account goals in three thematic areas: economy, environment and society. In the area of economy, it is necessary to build an innovative and high-tech industry, a diversified, resource-efficient and energy-efficient economy by increasing the number of companies and creating jobs in sectors alternative to mining and conventional energy. In the area of environment, it is necessary to build a balanced energy based on alternative energy sources, effective use of post-industrial areas for economic, environmental and social purposes, an effective system enhancing the mobility of the region by reducing the emission of transport and improving communication. In the area of society, the goal should be to build an attractive and effective education system and to raise qualifications, the labour market support system and social activation, and the transformation management system.

7.4 Conclusion

The workshop delivered a lot of new important information; however a distinct drawback was the absence of representatives of mining companies. Hence it was not possible to discuss energetic transformation with stakeholders who will be probably the most affected by upcoming change.

The first workshop will certainly be followed by further meetings. One additional meeting is foreseen specifically for mining companies as soon as the epidemic situation allows. Furthermore, a real-life (not on-line) meeting has been announced for September 2021. This meeting will have much wider audience with more representatives of the mining communes of Upper Silesia. UAK would like to invite also other institutions not yet consulted, and which were mentioned by stakeholders participating in the workshop (e.g. BoMiasto, Tauron Wytwarzanie, KOBIZE). UAK expect that this will enable more intensive collaboration in the future.

7.5 References

Urząd Marszałkowski Województwa Śląskiego 2021. Regionalny Plan Sprawiedliwej Transformacji Województwa Śląskiego 2030. Wstępny projekt – v. 01.

8 West Region / Jiu Valley, Romania

8.1 Introduction

In Romania's RO42 West Region (NUTS2) – Hunedoara County (RO423 NUTS3), there are several initiatives taking place in 2020-2121 in parallel with TRACER project implementation, against a background of the global pandemic. These initiatives have generated relevant strategic reference documents that are still under development, targeting especially the transition from coal of the Jiu Valley micro-region:

- "Strategy for the transition from coal of Jiu Valley" for the period 2021-2030 , developed with the financial and technical support of the EC – DG Reform, through SRSS (Structural Reform Support Service within the European Commission) under the Ministry of European Funds (MFE) coordination;
- EC (DG Ener - CRIT) assistance services accessed in 2019 by all six of Jiu Valley's Mayors through START (Secretariat's Technical Assistance to Regions in Transition);
- Territorial Just Transition Plans (TJTP) preparation in Romania, for six communities with carbon-intensive industries, low-productivity, a risk of increasing unemployment, poverty, and deepening of the already high regional disparities – Hunedoara, Gorj, Dolj, Galați, Mureș and Prahova NUTS3 regions, with the financial and technical support of EC – DG Reform, through SRSP (Structural Reform Support Programme), for the Government of Romania (Ministry of European Investments and Projects MIPE – former MFE).

In this context and with additional intersections with other H2020 projects (i.e. Tipping PLUS[6], CINTRAN[7] and ENTRANCES[8]), additional efforts have been made to synchronise all actions for their complementarity, thus avoiding overlaps.

The intensive process of information dissemination, public consultation and engagement in decision making, through a bottom-up approach, was long awaited and appreciated in Jiu Valley communities, but was also overwhelming, as the key stakeholders were being targeted by different initiatives at the same time.

This is the reason why some stages of the EDP process have been assimilated with events organized by START or MIPE (Ministry of Investments and European Projects – former MEF) or by local initiatives such as ACIVJ – Jiu Valley SMEs Association.

It was important that all categories of stakeholders were informed, consulted and engaged in the EDP process.

This chapter describes the methodology and the results of the implementation of the Entrepreneurial Discovery Process, which has targeted business organisations, research and educational institutions, government and public bodies, and civil society.

8.2 Methodology

The research methodology represents "that know-how by which one can reach a goal, in general, a goal in research, in particular and especially. It provides rules, norms, methods, techniques or practices through which we can come to know "how to do" and "how to apply"

[6] https://tipping-plus.eu/home
[7] https://coaltransitions.org/projects/cintran/
[8] https://entrancesproject.eu/

something we know or have learned, how to walk the path from a vague idea, from a hypothesis to a solution, to a generalisation or a scientific theory" (Zaiţ şi Spalanzani, 2006)[9].

By developing the following activities, a wide-ranging consultation with stakeholders was undertaken:

- Mapping key stakeholders and drawing out a data base structured around the "four helixes"
- Setting up a working group
- Interviewing the working group members and other key stakeholders
- Organising four workshops, one with each of the four helix categories of stakeholders
- Organising three working group meetings.

The working group involving broad stakeholder participation (i.e. business, research/education, government/public sector, and civil society) was set up in order to avoid duplication with existing structures, considering the governance initiative of the Romanian Ministry of European Funds. Actions were synchronised for their complementarity, information was disseminated, knowledge was shared, and the entire EDP process established in the end interconnected shared visions and priorities.

8.2.1 Interview methodology

Interviews were planned and conducted with key stakeholders from all four helix categories. Compared to the initial premises of the project, in Jiu Valley there were three external influencing factors, which led to using the online method, as an alternative to face-to-face meetings, for questionnaires and workshops, as well as the individual interviews:

1. sanitary measures imposed due to the COVID-19 pandemic, after March 2020;
2. lack of an authentic, non-formal democratic consultation and participation exercises inside the decision-making process at community level, with few exceptions related to the public administration and others already accessing European Structural & Investment Funds (ESIF) 2014-2020;
3. the existence, in Jiu Valley, of three European support initiatives (SRSS, START, SRSP) overloading stakeholders with various activities / tasks.

Due to the travel interdictions generated by the state of emergency or alert existing in Romania during the period 2020-2021, when the research team implemented the EDP process and assessed the existing state of play in Jiu Valley, guided online interviews (using google forms) were prepared for both TRACER WP3 and WP5 work packages, in the Romanian language in order to evaluate several aspects presented below.

Within the TRACER project, using the online questionnaire as a research tool for the elaboration of this report, the qualitative and (to a lesser degree) the quantitative data were analysed. Chelcea (2007) considers the questionnaire as an investigative tool, consisting of a set of written questions and, possibly, graphic images, logically and psychologically ordered, which through the administration by the survey operators, or through self-administration, determine from the persons, answers to be recorded in writing.[10]

[9] Zaiţ, D., Spalanzani, A. (2006), Cercetarea în economie şi management. Repere epistemologice şi metodologice, Editura Economică, Bucureşti.
[10] Chelcea, S. (2007), Metodologia cercetării sociologice. Metode cantitative şi calitative, ediţia a treia, Editura Polirom, Iaşi.

Interview structure

The questionnaire included a set of three tests, which are presented in Annex 1 and aimed at:

I. identifying and prioritising internal and external factors with a major impact on the current context in Jiu Valley, with a focus on social and workforce (re-skilling) aspects (WP3)

II. assessing in Jiu Valley the current situation, potential and challenges for defining a common vision with focus on the energy sector transition (WP5);

III. defining possible future actions for Jiu Valley's transition from coal to a sustainable green energy system (WP5).

The questionnaire was structured in five parts:

1. Basic information, including demographic / factual data;
2. How do you see the micro-region's transition from coal?
3. Mapping connections;
4. What works well in the micro-region?
5. Vision for the future.

The demographic factors considered were:

- Gender / Age / Education / Occupation / Field of activity / Place of residence / Organization.

According to the classification of questions according to their content first presented by professors Krausz and Stegar (2007)[11], the TRACER online questionnaire included:

- factual questions that collected data about the respondent (name, organization, location and date of interview, gender, age, education, occupation, field of activity, place of residence);
- opinion questions, which are numerous, including also attitude questions (II.4 4. Are you interested in contributing to discussions on a new strategy for future-oriented energy R&I in the region?) (i.e. I.1 In your opinion, what are the chances of sustainable energy development in the Jiu Valley, in the absence of mining? I.2, I.3, I.4, I.5, I.8, I.11, II.1, II .2, II.3, II.9, II.10, II.11, II.12, III.1, III.2, III.3, III.4, III.5);
- knowledge questions that help to characterize and appreciate the respondent (i.e. I.6, I.7, I.9, I.10, II.5, II.6, II.7, II.8).

The TRACER questionnaire included:

- open/free questions, where the question is structured and the answer is free (i.e. all factual questions, I.11, II.1, II.2, II.3, II.4, II.5, II.6, II.7, II.8, II.10, II.11, II.12, III.1, III.2, III.3, III.4, III.5);
- closed-ended questions, where both question and answer are structured (i.e. I.1, I.2, I.3, I.4, I.10);
- questions with polychotomic responses, with several variants, from which the respondent chooses the one (those) that correspond to his opinion or situation; these are also called "fan" questions and all are in "closed fan" (i.e. I.1, I.2, I.3, I.5, I.6, I.7, I.8, I. 9, II.9).

Different stakeholders' views on the **region's current situation**, **potential and challenges**, **and possible future actions** were assessed based on the interviews. In this way, a range of viewpoints were collected, including critical ones.

[11] Krausz, S., Stegar, I. (2007), Metodologia şi metodica sociologiei, Editura Matrix Rom, Bucureşti, p.148

At total of 59 representatives, from the four helix stakeholders' databases were interviewed, as presented in Table 15.

Table 15: Questionnaire respondents 2020-2021, West Region/Jiu Valley, Romania.

Type of stakeholder	Number of interviews	Category rate (%)
Public authorities (local, regional, national)	12	20.3
R&I and academia	10	17.0
Civil society (NGOs, Unions, priests, former miners)	20	34.0
Business environment / SMEs	6	10.1
The working group	11	18.6
TOTAL	**59**	**100**
of which young people (18-24) and (25-34)	24	40.7

Wrapping-up

Feedback from the online interviews was synthesized, with the main findings being presented below:

Problems facing Jiu Valley micro-region:

- Lack of vision; relatively low civic spirit and no desire for engagement in the participatory process of public consultations;
- Lack of consistent collaboration between national and local authorities; more and more marginalised, vulnerable neighbourhoods;
- Energy poverty - natural gas is more expensive than coal, and the inhabitants with very low incomes, cannot bear the high costs of the bills;
- Lack of social cohesion among communities and mayoralties;
- There is not only a lack of interest of central authorities in Bucharest towards Jiu Valley, but also the marginalisation of this region compared to the rest of the country, something that is perceived not to happen in other countries with coal regions; a process which has been happening for 20-25 years;
- High levels of unemployment;
- Marginalisation of the civil society role;
- Lack of financial resources for investments in the energy field; high bureaucratic procedures for accessing grants;
- The centralised DHS (transport and distribution infrastructure) is completely obsolete; several collective dwellings are still not connected to the heating distribution network; lack of interest and expertise/skills from mayoralties to attract European funds, to support local subsidies programmes for energy poverty; no heat and hot water supply (last year 2018); only Petrosani and Vulcan (partially) DHSs could become functional after implementing an upgrading and retrofitting program; the centralised DHS being bankrupt means that the majority of the population switch to individual heating installations, based on natural gas – GHG emission sources (CH4, CO2 …); dissolution of the DHS companies under the pressure of individual heating installations suppliers; massive disconnection of the population from the centralised DHS;
- Natural gas will become more and more expensive;
- In the field of electricity generation, the problems are mainly related to the disastrous financial situation of the Hunedoara Energy Holding - CEH (economically inefficient) - coal based electricity generation is no longer feasible, CO2 certificates have high prices; mines closure will lead to a series of economic and social issues, with an impact both at regional and national level; the security of the NPS will not be endangered if Paroseni CHPP and

Deva TPP (Mintia) will be switched to natural gas via new flexible CCGT-CHP technologies, as the governmental representatives are stating in mass-media;

- The aggressive ecological activism which blocked several hydropower (Jiu River) and roads (Campul lui Neag – Herculane) projects without any solid environmental and social impact assessment studies;
- The road and railway transport network needs rehabilitation;
- Lack of economic development support programmes suitable for full-chain zootechnical activities (eco-efficient zootechnical farms, products collecting-processing factories, delivery services and efficient marketing).

Political and legislative aspects, with impact on Jiu Valley future development:

- Corruption and the inability of the justice system to punish / discourage such attitudes;
- Total lack of real interest (only mimicked) from the local/regional political leaders for the sustainable development of the area; history has always shown that when there is real interest at governmental level for the sustainable economic development of an area, region, etc. projects were initiated, supported and successfully monitored during execution/commissioning and operation;
- Lack of active measures and policies for enhancing the implementation of green sustainable solutions in all economic fields;
- Lack of transparency and of change in local elected political leaders;
- Lack of participatory governance;
- Much too complicated and bushy political and legislative system;
- State aid intensity for Jiu Valley micro-region, as part of the West Region (RO42) is considered, by local SMEs, small in relation to the local economic status; coal intensive regions (Oltenia, Jiu Valley) must have similar state aid rules, thus boosting access to grants and projects submission;
- The micro-region has insignificant and inert representatives in government and parliament;
- Policies, measures and funding sources are all focussed on problems caused by the pandemic.

Threats to future development of Jiu Valley micro-region:

- Youth and skilled labour force migration;
- Low capitalization of the area’s tourist potential;
- Lack of investments in the young human resources in the area; not enough development of tourism and related services, together with other alternatives such as sports, culture and art to attract youth;
- Moral and psychological wear and tear; around 25 years of poor mood, inactivity and total lack of trust in the authorities, with no prospect of an "antidote" to help boost public commitment and active engagement; resistance to change;
- No “empowering agreement” between the public administration and the local community; lack of an integrated management institution, with experts responsible for the planning, implementing and monitoring of the transition process;
- Poor and outdated education system;
- Poorly qualified workforce;
- No interest of the county administration (Hunedoara County Council) towards the problems of the area;
- Lockdowns of local businesses/bankruptcy and of community life.

Viable energy transition and sustainable development solutions for Jiu Valley micro-region:

Energy

- The revitalization (retrofitting and upgrading programmes based on ESIF) of SACET (centralised DHS) would create new jobs, would lead to the reduction of the heating costs for the population in the area, and would increase the incomes of the utility operator, on the condition that it is a company from the Jiu Valley that would be subordinated to the local councils;
- There is enough electricity generated in the NPS which can also cover the thermal energy demand in Jiu Valley (electric heating), provided it is delivered to consumers at an affordable tariff;
- Mine-water to be used as resource for a heating pumps system;
- Paroseni CHPP could be converted for biomass incineration (domestic waste and woody and agricultural biomass) for supplying thermal energy in a centralized regime; briquetting of green biomass and its use as a co-generation fuel;
- Developing production facilities for RES installations spare parts;
- Using Paroseni CHPP as a pilot station for the use of the NG - Hydrogen energy mix; construction of a hydrogen production facility for this purpose;
- Renewing the R&I studies on CCS (injection in already closed hard-coal deposits);
- Building a common voice and a joint action at local and regional level (NUTS 3 and NUTS 2) for developing partnerships with advanced researchers in the EU and USA in the field of nuclear fusion for a pilot installation for nuclear energy production, and subsequently possible tritium storage facilities, considering the existence of the necessary facilities for such a technology (Paroseni CHPP and related closed mines assets) and the electrical substation for power grid interconnection to NPS;
- Establishing, based on SEIG (Economic Services of General Interest) for a limited period (2025-2028), of the new energy entity Valea Jiului Energy Holding, including the last four operational underground hard-coal mines Paroseni CHPP, where a new CCGT-CHP power unit (≤ 110 MW) should be built to operate in parallel with coal, until all mines will be closed, and the Prest-Serv branch;
- In order to ensure the energy security of the country, an energy mix would be the best choice, and the transition to alternative and renewable energy resources to be prepared at least with 10 years before the last mine closure procedure starts; each country has to use its own resources (if they still have them);
- A step-by-step transition with step 1. NG as next fuel after the coal era, considering that the natural gas pipeline passes via Merișor - Vulcan – Schela, and step 2. RES; step 1 providing the time needed for in-depth planning of step 2;
- Wind turbines located in hilly areas, where the wind blows hard and consistently;
- Solar energy would be an alternative for a sustainable energy development. Considering climate change and global warming, this resource could bring a benefit to the energy development of Jiu Valley;
- Continuation of coal mining through modernization and increased efficiency;
- Urgent, not in 10 years, closure of mines exploitation that generate huge losses, through a determined action - not preservation for social reasons.

Agriculture

- Zootechnical micro-farms would be a solution of interest;
- Unlocking the potential of the area in terms of berries and edible wild mushrooms;

- Sustainable mountain animal husbandry;
- Ecological agriculture.

Tourism

- Sustainable and integrated development of tourism.

Infrastructure

- Public, commercial and residential Green Buildings concept planning and implementation and monitoring;
- Investments in infrastructure, e.g. road infrastructure: to Valcea, Alba, Sibiu counties on Jietului gorges, Campu lui Neag to Herculane.

Environment

- All project proposals to be checked on their viability with Investments Feasibility Studies and ESIA, knowing that Jiu Valley micro-region is surrounded by NATURA2000 and other categories of protected areas; assessing the energy resources of the area and implementing corresponding technologies, in an environmentally sound manner;
- Naturally revegetating the mine tailings;
- Transition from coal strongly considering environmental protection.

Others / General

- Recommendations made together by Greenpeace Romania and Bankwatch Romania in the Report “Just transition in Hunedoara – Fair and sustainable economic diversification”12
- Establishment of a single integrated administrative territorial unit in the Valley, instead of six different small local councils;
- Supporting and promoting private entrepreneurship;
- Independent craft activities, handicrafts;
- Jiu Valley economy needs to be rethought; efforts must be made to attract strong investors to sustain the local economy; public authorities are not open enough in this regard, and the local business environment, including small local entrepreneurs, is very poorly encouraged and supported;
- Possibilities exist, we only need committed involvement, strong will and especially determination ... in other words we need "quality" leaders, true "locomotives" for the implementation of the best identified transformation solutions;
- Establishing of a unique integrated governance structure to manage the transition process;
- Identifying alternative sources of "clean" energy; capitalization of local resources in agriculture and animal husbandry, with capitalisation of local products; improving transport infrastructure (road and railways) to ensure a better connection with neighbouring regions; tourism development; stimulating entrepreneurship together with digital education for young people, entrepreneurs and employees; an integrated approach could help the transition;
- Exploitation of quartz deposits;
- Local policies and supporting schemes/measures for developing hydropower resources in Jiu Valley;

[12] https://www.greenpeace.org/romania/comunicat-presa/2029/raport-tranzitie-justa-lupeni/

- Involving the local community in the decision-making process is extremely important; empowering the population;
- Supporting cultural reconversion projects, such as the Petrila mine;
- Taking into account specific environmental, economic and administrative issues for a sustainable energy development of the micro-region;
- The maximum involvement of governmental authorities and of local entrepreneurs;
- Transformation processes hardly evolve in Romania, and the proactive involvement of local and central authorities is very weak;
- Factors to be considered: a) existing human resources and skills; b) their ability to adapt to a new economic profile; c) geomorphological conditions, taxonomy, soil quality;
- Attracting investors; creating sustainable jobs; attracting European funds for the development and continuation of coal production;
- Promoting Jiu Valley through local products, local specifics, beautiful surrounding areas;
- Learning from the experience and best practices examples of similar regions in countries with successful transitions from coal.

8.2.2 Workshop methodology

To encourage participation, the publicity for the meetings and workshops emphasised the following points:

- Deploying the EDP in Jiu Valley will help enabling the energy transition process by identifying barriers, needs, local potential, opportunities and possible future actions;
- The EDP might be considered a first step in developing a real constructive and sustainable communication and cooperation between the local administration, businesses, academia and NGOs;
- The meetings and workshops will be interactive, allowing participants to ask questions and contribute to a constructive dialogue, thus motivating the local actors to action and empowering them to engage with all the aspects of the energy transition process (technologies, environment, labour market and social transformation, policies, resources etc.);
- A common vision and future-oriented priorities for Jiu Valley energy transition will be defined by key stakeholders, which will form the basis for building strategies and roadmaps;
- Proficient connections can be made between local stakeholders, in order to plan and cultivate future strategic relationships, to create and maintain strong foundations for projects.

Key topics

The following **key topics** were addressed in the meetings and workshops:

- Identification and prioritisation of **Jiu Valley barriers and needs**;
- Assessment of the micro-region **potential**, emphasising the **opportunities and possible future actions/projects**;
- Setting up a **common vision** in **fields of interest**, such as:
    - *Sustainable/carbon neutral economy*

- energy efficient technologies (industry and construction) and greener resources (RES and alternative energies vs. fossil fuels/hard-coal);
- attractive infrastructure for potential investors (roads, utilities – water/n.g./electricity and heat, ICT, tourism);
- agriculture adequate for the particularities of the area (e.g. animals breeding, growing medicinal/aromatic plants and berries/shrubs);

o *Safe and clean environment* (former mining areas)

- land and buildings reclamation and use reconversion (urban and rural regeneration oriented to leisure/industrial/cultural tourism)

o *Labour market and social issues*

- repopulating the area by creating sustainable jobs and developing financial support tools for young people,
- encouraging and supporting entrepreneurship,
- retraining former miners by merging with new investments and dual education system,
- regaining citizens' livelihood and stability.

Agenda structure

Stakeholders' workshops

All four workshops had the same structure of the programme and the same approach – as presented in Annex 2, the element that made the difference, depending on the audience, being the vocabulary – more technical (business, academic environment and SMEs) or less technical (authorities and civil society) related to the details provided during Power Point presentations. The workshops were organised online for half-day duration (from 2-4 hours).

Table 16: Workshops, participants and date, West Region/Jiu Valley, Romania.

4 helix stakeholders' categories		Online attendees	Date
1	Civil society (NGOs, Unions, priests, former miners)	16	28 May 2020
2	Business environment / SMEs	8	3 December 2020
3	R&I and academia (Petrosani University, INSEMEX research institute)	15	18 December 2020
4	Public authorities (6 mayoralties in Jiu Valley and other regional and national authorities) - *First event generated by TRACER – Romanian partners for introducing our work to other initiatives for assistance as CRIT-START, Ministry of European Funds, DG Ener, DG Reform* - *Second event organised by CRIT-START*	 21 25	 24 November 2020 28 June 2021

In addition to the workshop scheduled with the business environment representatives – ACIVJ (SMEs Association), there were numerous virtual meetings with SME representatives on the common vision, challenges, opportunities and solutions for the micro-region.

In order to avoid overburdening the representatives of the local authorities (by the stakeholder engagement and EDP initiated through TRACER project, as well as DG-Reform - SRSS and DG-Ener – START actions), the workshop scheduled with the six mayors of the micro-region (Petrosani, Vulcan, Uricani, Petrila and Aninoasa) was made up of two events:

- one generated by the TRACER research team, from the desire to synchronize the European initiatives for the Jiu Valley (November 2020)

- one organized by CRIT-START in which the TRACER team were invited to actively participate (June 2021).

ISPE and AISVJ also participated in the consultation with stakeholders in the workshops organized by PwC, within the SRSS assistance programme of the European Commission - DG Reform, which took place in the form of online workshops (Table 17Table 17).

Table 17: SRSS workshops, organised by PwC.

Workshop (s)	Consultation topic	Data	Stakeholder structure
1 & 2	Jiu Valley energy reconfiguration	27-28 May 2020	CEH, SNIMVJ, Public Authorities, Business environment
3	Capitalisation of local specificity	29 May 2020	Public Authorities, Business environment, NGOs
4	Environmental protection and sustainable development	3 June 2020	Regional Environmental Protection Agency, utilities operators
5	Smart City and urban development	4 June 2020	Public Authorities
6	Economic diversification, entrepreneurship and innovation	5 June 2020	Business environment
7	Education, health and social assistance	9 June 2020	Education, R&I, health and social assistance, NGOs
8	Road and rail-way infrastructure	10 June 2020	Public Authorities, Business environment, Romanian railways (CFR)
9	Governance options for managing Jiu Valley Transition Strategy	12 June 2020	ADR Vest, County Council, Public Authorities, Business environment, Education, R&I, NGOs

Figure 4: The mind map from online workshops 2020-2021, West Region/Jiu Valley, Romania.

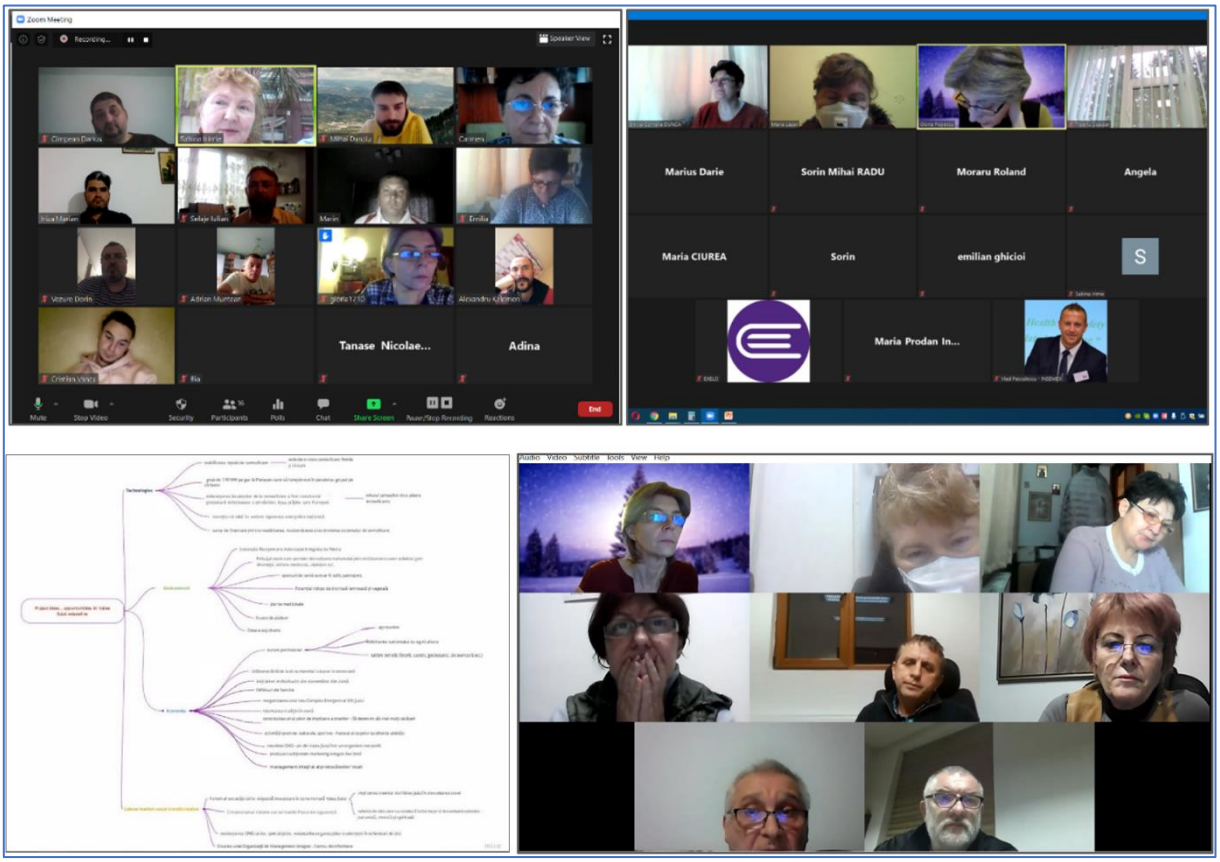
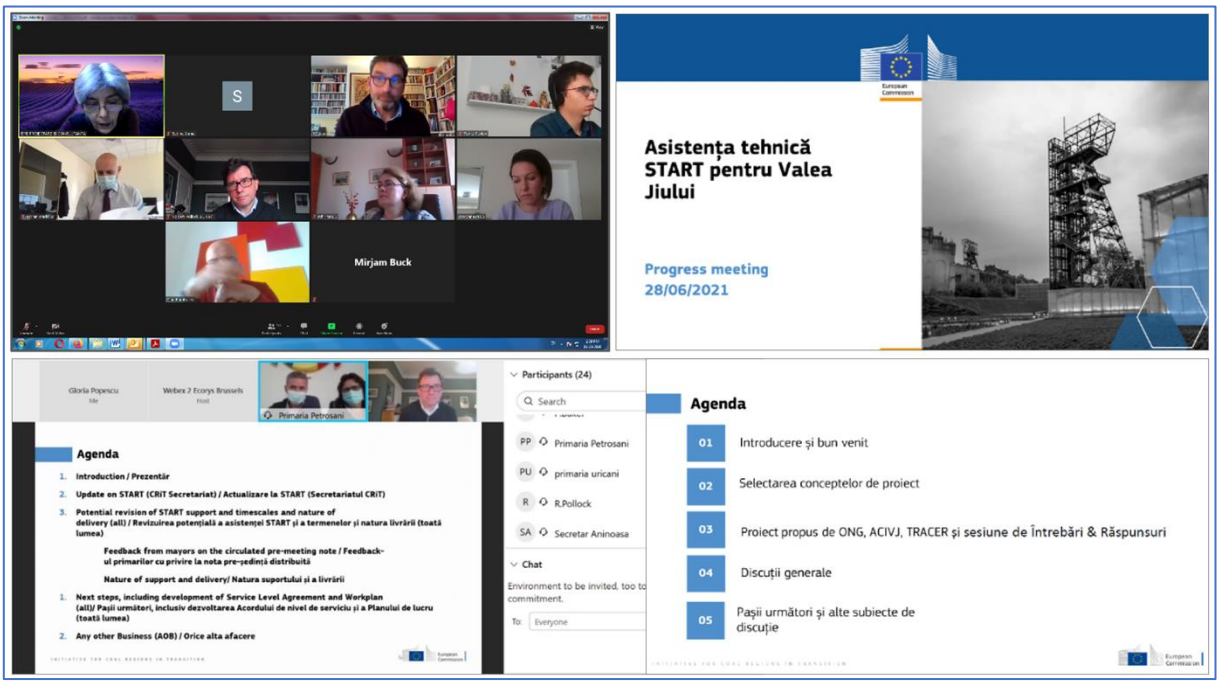


Figure 5: Jiu Valley online workshops 2020-2021



Working Group workshops

The Jiu Valley working group structure was developed around the existing Just Transition MoU set-up by the six territorial administrative units (Petrosani, Lupeni, Vulcan Municipalities and Petrila, Aninoasa and Uricani Cities). The initial structure of the working group, with around 20 members, included:

- 19% business environment;
- 14% research and academia / education;
- 43% public authorities;
- 24% civil society.

Due to the overlap of the TRACER project EDP activity with stakeholder consultations initiated shortly before by MIPE (Ministry of Investments and European Projects), with the support of DG Reform - SRSS and later by DG Ener with START assistance, the simultaneous mobilisation of all members of the TRACER working group was practically impossible. Also, the governmental changes that took place led to the discontinuance of the excellent connection initiated with MIPE Secretary of State and the Jiu Valley Initiative team. Following this context, AISVJ had several individual dialogues with each member of the working group. Thus, discussions were held with those who were open, consistent and eager to be further involved - around 10 members (e.g. University of Petrosani, ACIVJ, INSEMEX, ANRM, NGO, Public administration). The working group members' points of views were also synthesised below.

Wrapping-up

Individual ideas and concepts were synthesized, and were also in some cases, represented graphically using the mind map (Figure 4Figure 4). Main findings from the workshops are listed below:

- the union's voice stands for the transition from coal by using natural gas as bridge fuel to RES deployment;
- the transition to a sustainable energy system must take into account Romania's security of energy supply and energy independence;
- the need for power grid interconnection at European level;

- Paroseni CHPP is a model coal power plant, including all environmental permits; after coal phasing out former assets could be transformed in a regional hydrogen hub;
- knowledge in the energy field was not at the level of a predominantly technical dialogue;
- the main cause of DHSs bankruptcy is the lack of involvement, capacity and competencies from the local authorities in the Jiu Valley;
- there is a lack of political will to get involved in DHS recovery;
- apart from the union representatives, the rest of the participants (civil society, SMEs, academia-research) are not concerned about the role of Jiu Valley power injection in the national system;
- RES potential assessment and mapping is a must; all feasibility studies and economic profitability for investments in RES must include ESIA studies;
- local positive news are hardly promoted via local-regional mass-media; there are huge difficulties in overcoming/changing the “mono-industrial” attitude and understanding that a sole/unique industry will not be changed by another unique industry – a customized socio-economic mix is the solution;
- there is a hiatus from university R&I projects to market implementation, these, unfortunately, having only an educational role;
- there is a need for greater flexibility of the local university curriculum and a much more proactive attitude in creating training programmes which are useful for the local-regional-national labour market;
- the need to associate various stakeholders’ entities for a strong common voice was understood; at the same time, the importance of a positive, proactive attitude that generates an active involvement in the decision-making process was recognised;
- the R&I environment is interested in putting in place a regional twinning programme, to allow for peer-to-peer sharing of expertise and knowledge, and for the development of projects partnerships and capacity building programmes;
- there is existing potential for the development of an integrated professional tourism industry, not an amateur one, chaotic and lacking an efficient management;
- the agro-touristic and family zootechnical potential must be capitalised, especially that related to a traditional group of population “momârlani”;
- poverty must be eradicated and the depopulation of the micro-region must be stopped; living standards should have a positive trend and concerns for tomorrow disappear;
- assessment of the demographic trend is needed, including analyses of the real situation related to employment opportunities, the tendencies of the local market needs correlated with the real existing and perspective unemployment;
- investments in young human capital are needed for their attraction and motivated involvement; the spiritual wealth of the young generation must be praised, allowed and supported to manifest and develop;
- there is an urgent need for training experts in accessing European Funds, attracting investors and projects’ implementation; urgent fiscal measures implemented by local authorities and sustainable jobs offer to attract youth back to the Valley;
- ground PV can be installed on mining tailings dumps, even if the slopes have a specific inclination degree, the local University of Petrosani (UPET) having the necessary expertise to implement mechanical stability solutions for the development of the agri-voltaic concept;
- due to some standard/classic historic mines closing procedures, it is necessary to update them in order to make the most of the energy potential of the last four active hard-coal underground mines, of which two are now in a safely closing process;

- former mining underground can offer interesting research topics such as the field of particle physics, by creating an underground microenvironment (drilling a research well) to detect astroparticles;
- heat-pumps (mine water), UCG and MMC are technologies of interest for the local R&I representatives;
- based on INSEMEX's experience and competencies in the field of combustible gases, the development of a mixed team (institute-university) for the development of hydrogen research-deployment projects is also a possibility;
- cultural-sports and educational activities for children must be supported and developed;
- agriculture must not be forgotten, but rather promoted, including area specificities;
- micro-region infrastructure and connectivity projects are a must for attracting investors;
- there is a need for organizing a joint local R&I team to channel the efforts in identifying calls for project proposals, corresponding to Jiu Valley needs, accessing funds and managing project implementation.

8.2.3 Stakeholders' analysis

As a project develops and reaches a more advanced stage, actions taken affect more and more people. And the more people a project affects, the more likely it is that some of them will have significant power and influence over it, being strong supporters or blocking it. So, for successful project implementation, **stakeholders' identification and engagement from the early stages of the project is a must**. The stakeholder analysis is an effective three-step process which identifies, prioritises and understands stakeholders.

The purpose of the analysis, within TRACER, is to identify the relevant stakeholders for Jiu Valley transition from coal to a sustainable energy system, to group them according to their potential role and interest in the project and to create appropriate communication tools for each group throughout the life of the project. In addition, interviews and discussions with key stakeholders will allow exploration of how the project can be better promoted at regional / national / European level and how relevant stakeholders can influence its development as effectively as possible.

The **objectives of the stakeholder analysis** were set as follows:

1. Identification and analysis of the most relevant persons, networks and institutions to be involved in the development of the project;
2. Categorization of identified stakeholders in a network of interests and influence, thus involving in the TRACER project key individuals to effectively communicate with;
3. Project development and results dissemination optimisation, including suggestions on how relevant stakeholders can better influence the project development.

The TRACER team performed a systematic approach to exploring stakeholders in the identified value chains, their interests and capacities to influence the transition process. As tools for this analysis, the team used the Stakeholder Analysis Matrix (SAM) and the two-dimensional Stakeholder Prioritization Diagram.

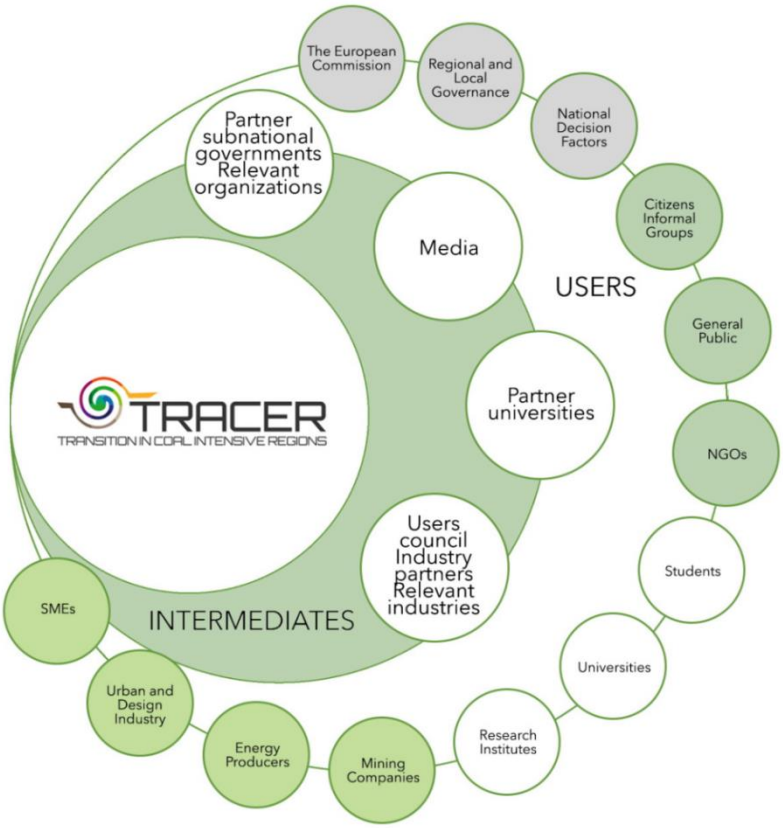
The analysis is initially based on information and research (internal Romanian TRACER partners meetings, CRIT[13] events and cooperation with other initiatives and projects in Jiu Valley) and then reviewed based on information gathered during stakeholder consultations. Thus, a solid basis was provided for the ongoing analysis of the stakeholders' roles and their contribution to the project. However, further research is needed to better understand

[13] CRIT – Coal Regions in Transition European Initiative https://ec.europa.eu/energy/topics/oil-gas-and-coal/EU-coal-regions/initiative-for-coal-regions-in-transition_en

stakeholders' interests in Jiu Valley's transition from coal and the implications considering their areas of activity. The stakeholder analysis is not an exhaustive list of all relevant stakeholders, but a support in defining which are the affected and vulnerable groups and the powerful influencers – informal leaders. The stakeholder's analysis is static, based on the current situation, but is designed to be refined and updated as information is gathered (all initiatives conducted simultaneously in the Valley - presented in the introductory section of this chapter). This exercise does not take into account future stakeholders who are likely to materialize later during the transition process, even if some of them may be important for the R&I sector.

Following the stakeholder analysis, the team had a better picture of the R&I landscape with a focus on the energy - environment - social sectors, which allowed them to approach and involve key selected stakeholders in a focused manner. In addition, the stakeholder analysis provided a basis for the long-term local communication strategy in the internal and external environment of the project, with the possibility to formulate recommendations on the optimal communication tools-mechanisms on the complexity of the transition process and on the most appropriate related governance structure.

Figure 6: Jiu Valley stakeholders' mapping



The TRACER project is relevant and of interest for large and diverse stakeholders' categories in Jiu Valley, as presented in Figure 6, structured in the following quadruple helix:

Group 1: Public authorities. This includes national, regional, and local administrations interested in improving the transition from coal to sustainable energy systems, which nevertheless struggle with a complex public task and the engagement of and partnership with private partners and civil society.

At national level, this includes governmental officials and decision-makers, such as: Ministries of Investments and European Projects (MIPE); Energy (ME); Environment, Water and Forests (MMAP); Labour and Social Protection (MMPS); Research, Innovation and Digitalisation (MCID); Development, Public Works and Administration (MDLPA); Agriculture and Rural Development (MADR); Romanian Parliament - Chamber of Deputies with "Commission for

Industries and Services"; National Regulatory Authority for Mineral Resources (NAMR); National Energy Regulatory Authority (NERA); National and Regional (NUTS3) Agency for Employment (ANOFM); National and Regional (NUTS3) Agency for Environmental Protection (APM); National Administration of Romanian Waters (ANAR).

The regional public administration consists of the Regional Development Agency (ADR Vest) at NUTS2 level RO42 – as Managing Authority for the Regional Operational Programme 2021-2027; the Hunedoara County Council (CJH) at NUTS3 level RO423 – as coordinator of the Territorial Just Transition Plan elaboration process, elected every four years and which coordinates the activities of local councils (six mayoralties in Jiu Valley), on the provision of public services of county interest.

Local Councils (Petrosani, Petrila, Vulcan, Uricani, Aninoasa and Lupeni), acting under the MoU signed in 2019 “Jiu Valley Partnership for a Fair Transition”, including their commitment and proactive involvement aiming to support: governance development; planning and implementation of transition processes; identification of projects and the appropriate financial mechanism and funds for deployment; co-creating a roadmap to pave the way for a sustainable energy transition and socio-economic development for the benefit of their citizens.

Group 2: Civil society. This is increasingly present in the daily life of the community and consists of representatives of the general public and NGOs in the micro-region (environmental groups, conservation groups – i.e. Valea Jiului Implicata; professional, business associations – i.e. ACIVJ and RDI associations; Labour Unions – i.e. CNSLR Frăția - Hunedoara County Union; Muntele Jiului Valley Union; community interest groups / citizen groups and the media - local / regional press).

Jiu Valley NGOs have gained credibility among the population, have a strong common voice, and make efforts to materialize their activity in tangible / concrete projects for the micro-region transformation.

A very important group of stakeholders is the former unemployed miners, who are directly interested in the coal transition process. A special concern is to ensure that their rights are respected in a transparent and intelligible transition process, including compensation measures and, moreover, the development of vocational reskilling programmes in correlation with the micro-region transition strategy and the needs of the labour market.

Other groups in communities (e.g. ethnic minority groups, religious groups, the elderly, young people, etc.) must be closely monitored and the transition process must be socially acceptable.

Group 3: Research and academia. This includes pupils, students and teachers of all education levels (pre-university, vocational, university and post-university). They play a crucial role in this transition process, working closely with the business sector, investors, technology developers and clusters (energy, mining, metallurgy, water management, automotive, ICT, etc.), and underlining the increasing need for dual education infrastructure development.

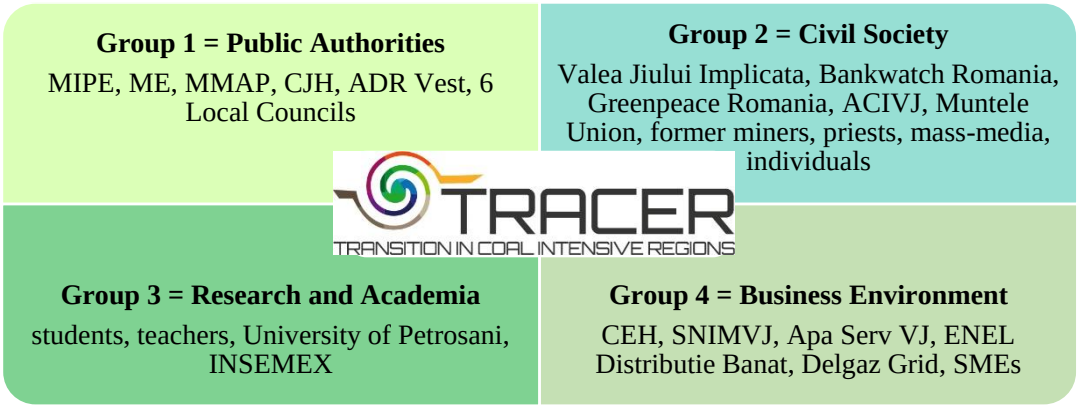
The first competitive advantage of Jiu Valley micro-region is the existence in Petroșani of both the University of Petrosani and the National Research and Development Institute for Mining Safety and Explosion Protection (INCD - INSEMEX Petroșani). INSEMEX's mission includes conducting basic and applied research, technological development, as well as risk assessment and prevention in activities with explosive and toxic hazards. "INSEMEX is a research and development centre that has evolved very well and with which the University collaborates very well." (Prof. Dr. Eng. Irimie Sabina)[14].

Group 4: Business environment. This includes SMEs, which are the "engine of the economy", the County Chamber of Commerce, Industry and Agriculture, also public companies in the energy and mining sector (Hunedoara Energy Holding and the National Mine Closure Company Jiu Valley - SNIMVJ), utilities operators (e.g. APA Serv Valea Jiului, ENEL Distributie Banat, Delgaz Grid), other industries and services (IPROMIN). For this stakeholder group, the

[14] http://mfe.gov.ro/wp-content/uploads/2020/03/7f3a9377cd9970debee44a318f6d8003.pdf

TRACER project is an opportunity to improve their own practices, providing information on funding sources and potential partners for the development of future R&I projects.

Figure 7: Jiu Valley quadruple helix stakeholder groups



The tool developed by the TRACER team for the systematic stakeholders' analysis, SAM (Stakeholders Analysis Matrix), was applied to the Jiu Valley stakeholders' database. Stakeholders are characterized in terms of their interests, influence, capabilities and potential role in R&I systems. This analysis provides an opportunity to combine stakeholders' characteristics in a profile of their contribution to R&I systems and transition pathways. For example, the contribution of a stakeholder with a strong influence on decision-making processes, but no interest in a low-emission transition is likely to be weak or even negative, while someone with strong interests in green technologies may become a transition stimulator. A potential weakness of SAM application is that stakeholder profiles are initially based on Romanian TRACER partners' expert assessments. This is why all information will be refined based on stakeholder consultations through online questionnaires, live interviews and workshops, both online and offline, due to the current COVID-19 context.

In Table 18Table 18, the position of each stakeholder in the project and their objectives are described. The team estimated the influence and interest of each of them towards the project, noting the influence from 1-10 and the interests from 1-5, revealing the following relationships among stakeholders.

Table 18: SAM (Stakeholders Analysis Matrix), West Region/Jiu Valley, Romania.

Stakeholder	Position	Goals	Influence	Interest	Relationship with other stakeholders
Local – regional public administration **Regional Development Agency (RO42)**	Public administration institutions at local and regional level, local and county councils; public authorities ensuring connections between society and governmental and parliamentary representatives	Managing the implementation of local and regional level strategies	10	5	**European Commission, national decision makers; NGOs, business environment, research and academia, the large public, mass-media**
Government, Parliament, national decision and policy makers	Main national institutions with supervisory and regulatory authority in various fields	Establishing and developing policies. Elaboration and monitoring of legislative norms	10	4	**Local – regional public administration, ADR Vest, civil society, business environment (SMEs and mining-power generation and utilities companies), research and academia, mass-media**

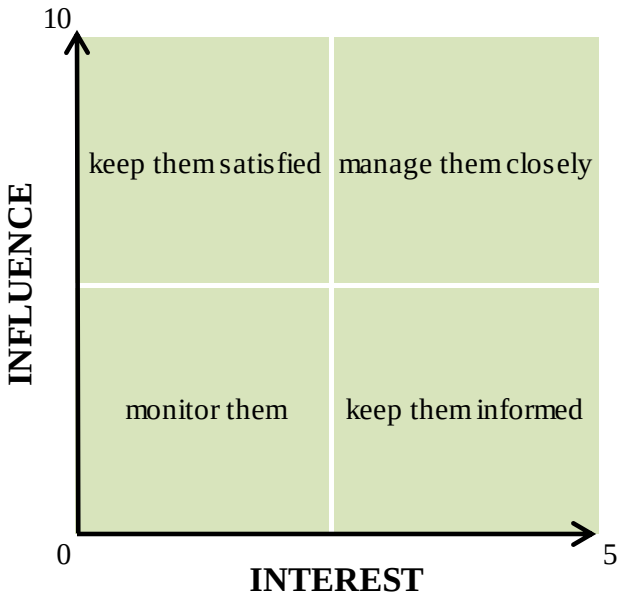
Stakeholder	Position	Goals	Influence	Interest	Relationship with other stakeholders
Civil Society **NGOs** **Mining Unions**	Non-profit organizations, with a common goal in the interest of the development of society, without political purpose; Mining unions which contribute to the protection of employees' rights and promotion of their professional interests.	Contributing to the development of society; Attracting resources for the activities carried out.	8	4	**Local – regional public administration, ADR Vest, large public / individual citizens, business environment (mining and power generation companies), research and academia, mass-media**
Mass-media	The main source of information for society, which allows individuals to express their interests and build common perspectives.	Information dissemination Attracting resources for the activities carried out	6	2	**EC, civil society (NGOs and Mining Unions), Local – regional public administration, ADR Vest, national entities, mining - power generation and utilities companies**
Jiu Valley large public / individual citizens	A society oriented towards change and development	Contributing to the development of society and co-creating better living conditions	2	4	**Local public administration; academia – pre-university and higher education; business environment (SMEs and mining-power generation and utilities companies)**
Former miners	Unemployed citizens who are looking for jobs	Re-skilling, competences development, new and sustainable jobs opportunities	3	5	**Mining and power generation companies; mass-media; local – regional public administration, SMEs**
Higher education - research	Youth training and development and CVET for adults Encouraging the involvement in the transition process	Updating and making more flexible curricula so as to meet the new labour market requirements Development of R&I centres of profit	7	5	**Large public / individual citizens, mass-media, business environment (SMEs and mining-power generation and utilities companies), local public administration, academia – pre-university education**
Pre-university education **Dual education**	Primary-secondary-tertiary education, responsible for educating children and encouraging them to contribute to the society development	Developing new styles of thinking, technical achievements and innovative educational policy practices.	4	4	**Large public / individual citizens, research and higher education, business environment (SMEs, future RES power generation, utilities companies), local public administration, mass-media**
Research	Responsible for fundamental and applied research, and technological developments of national public interest.	Research in fields like mining, sustainable development, technological development, risk assessment & prevention, environmental protection; Equipment testing and certification; Regulation's development and application; Personnel training and authorisation.	8	5	**University of Petrosani, professional associations, local – regional public administration, ADR Vest, national entities, mining and power generation companies, NGOs, mass-media**

Stakeholder	Position	Goals	Influence	Interest	Relationship with other stakeholders
Power generation companies **Utilities companies**	Generating electricity for the national power grid and heat for the local DHS Managing and distributing public utilities as (water, sewage, natural gas, electricity, communications etc.)	Ensuring the stability of the national power system (NPS) and becoming a profitable business Ensuring public utilities and a decent standard of living Providing constantly jobs opportunities	6	4	**Local – regional public administration, SMEs; Mining companies, research and academia, large public / individual citizens, civil society (NGOs and Mining Unions), former miners, mass-media.**
Mining companies	Exploiting sources and providing raw materials locally, regionally and nationally.	Consolidate its position Providing jobs and paying local taxes Investing in human capital and local infrastructure	7	5	**Local – regional public administration, SMEs, power generation and utilities companies, other industries, research and academia, large public / individual citizens, civil society (NGOs and Mining Unions), former miners, mass-media**
SMEs (industry, agriculture, trade, tourism)	Production of goods and services in different fields with local, regional, national and international clients	Relevant role in the local-regional economy Providing constantly jobs opportunities and developing the dual education system Making investments in new, green and advanced technologies	3	4	**Local – regional public administration, large public / individual citizens, civil society (NGOs and Mining Unions), Dual education, University of Petrosani, mass-media**
Others industries (goods and services)	**Consulting, engineering and trade companies in various fields**	**Consulting services** **Design and architecture** **Import-export services and trade**	**8**	**2**	**Local public administration, mining - power generation and utilities companies, large public / individual citizens, research and academia, mass-media**

Key relevant stakeholders are those with an influence higher than level 5. The position that is assigned to a stakeholder on the grid shows the actions to be taken towards him (Figure 8):

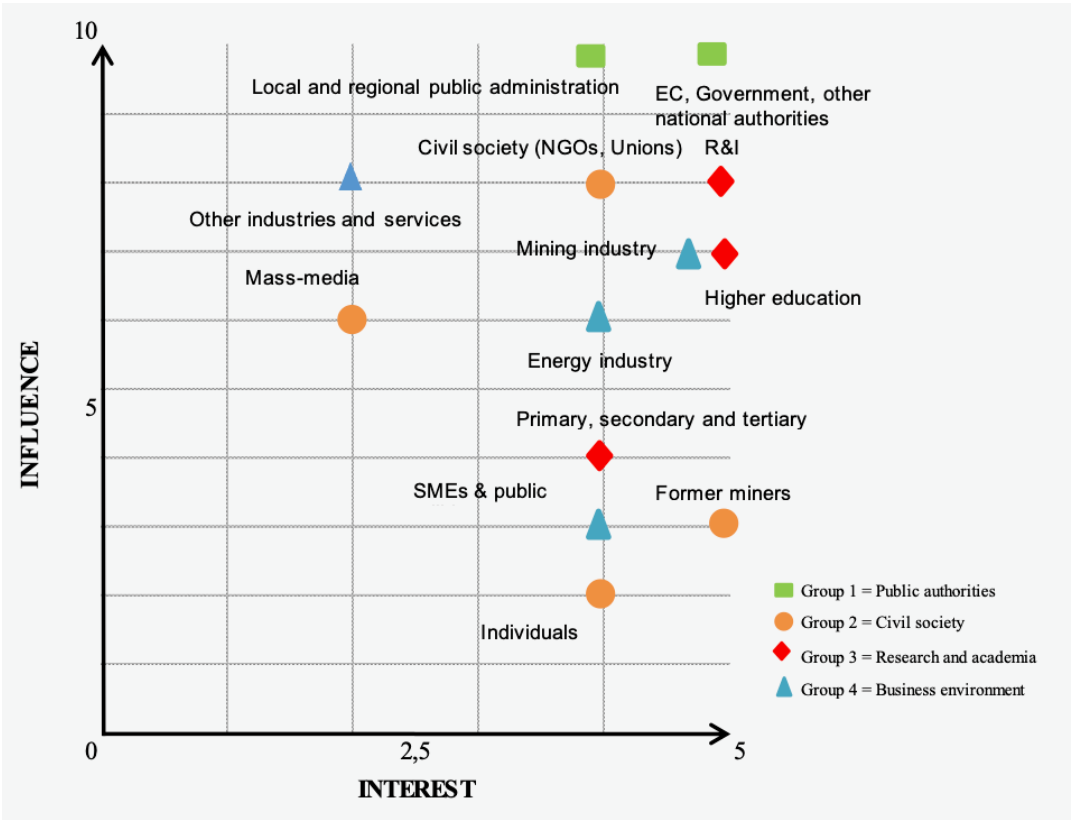
1. High influence, extremely interested (Manage them closely): the connection with this type of stakeholders must be very close and every effort must be made to satisfy them;
2. High influence, less interested (Keep them satisfied): enough work has to be done with these categories to keep them satisfied, but not to get bored of the message;
3. Low influence, very interested (Keep them informed): this category needs to be properly informed and needs discussions to ensure that no major problems arise; they can often be very helpful with project details;
4. Low influence less interested (Monitor them): this category can be monitored, but not bored with excessive communication.

Figure 8: Jiu Valley – Stakeholder Positions Grid.



Data obtained in SAM are needed to perform the Stakeholder Prioritization Diagram for Jiu Valley micro-region (Figure 9Figure 8Figure 9). This is important to understand the needs, desires and potential barriers of relevant stakeholders for a specific implementation, development and change. By assessing the needs of each category, proactive steps can be taken to ensure that the affected actors will synergistically affect the objectives of TRACER project in Jiu Valley and will not undermine its success. Due to the identification, prioritization and stakeholders' monitoring, the probabilities of successful implementation and acceptance of the TRACER project in the micro-region will increase.

Figure 9: Jiu Valley – SPD (Stakeholder Prioritization Diagram)



As seen in Figure 9, the key Stakeholders of the TRACER project in Jiu Valley micro-region are:

- Local and regional authorities ADR Vest;
- MIPE and other National Decision Makers;
- R&I - Research Institutions (INSEMEX), Institute of Higher Education (University of Petrosani);
- Mining companies (SNIMVJ) and Power generation company (Hunedoara Energy Holding);
- NGOs.

The following categories of stakeholders, who have also a high interest, include: former miners and their unions, SMEs and public utilities, pre-university education institutions, the general public / local residents (retirees, students, ethnic and religious groups, etc.).

Following this diagram, the key stakeholders, i.e. those which require the greatest attention, were identified. During TRACER EDP activity the TRACER team has tried to find out how key stakeholders feel about the project; and figured out how to best engage them and how to communicate with them.

8.3 Developing a shared vision and priorities

As mentioned in the Introduction section, the background of the TRACER stakeholders' consultations activities and EDP, during the pandemic years 2020-2021, was strongly characterized by the simultaneous development of the following European initiatives and projects in Jiu Valley micro-region:

- "Strategy for the transition from coal of the Jiu Valley" for the period 2021-2027, developed with the financial and technical support of the EC – DG Reform, through SRSS (Structural Reform Support Service within the European Commission) under the Ministry of European Funds (MFE) coordination;
- EC (DG Ener - CRIT) assistance services accessed in 2019 by all six of Jiu Valley's Mayors through START (Secretariat's Technical Assistance to Regions in Transition);
- Hunedoara Territorial Just Transition Plan (HTJTP) preparation in Romania, with the financial and technical support of EC – DG Reform for the Government of Romania (Ministry of European Investments and Projects MIPE – former MFE).

Common vision for the future

During the development of all four initiatives and projects (TRACER, SRSS, START, HTJTP), an unprecedented stakeholder consultation process took place in Jiu Valley micro-region, which finally generated a common vision, valid for any approach for the next period. Thus, the vision commonly shared was:

I. **Jiu Valley micro-region revitalised from a social point of view, with a sustainable development, interconnected with the major regional, national and European networks, and having a competitive economic environment.**

II. **The integrated transition of Jiu Valley micro-region will be implemented by investing in human's potential, education, spirituality and morality, thus creating the right environment and generating the necessary force for the human capital, able to develop the local economy by implementing innovative ideas.**

This vision is intended to be supported by investments, with a consistent component of innovation, for making Jiu Valley micro-region recognized for its local specificity.

Priorities

Given the common vision shared, Jiu Valley's priorities were formulated, at the level of "Strategy for the transition from coal of Jiu Valley" for the period 2021-2030[15] in four convergent strategic axes/pillars:

1. **Increasing life quality and creating a healthy and sustainable environment for future generations**

The transition from coal in regions with a long mining tradition is a complex process, with a major impact on the local community and the integrity of the environment. The social challenges are major, given the changes in the structure of the workforce through massive layoffs that have amplified, since 1997, the unemployment rate and the impact on the miners' status, former employees often being reluctant to focus on other activities/jobs. Given this state of play, the **main objective** is to create a dynamic and efficient socio-professional climate for optimising living standards and for ensuring socially acceptable transition of the Jiu Valley to the green economy, with four significant components:

- **1.1** Calibrating local human potential to increase employment and combat social exclusion;
- **1.2** Upgrading and optimising medical services, together with developing social services to overcome vulnerabilities and sanitary crisis;
- **1.3** Upgrading and making more attractive the education system, at all levels (primary, secondary, tertiary and higher); enhancing access to education and investing in skills (dual education and re-skilling programs correlated with the market needs) and competences (ICT and foreign languages);
- **1.4** Supporting the transition to a green economy to protect the environment.

2. **Economic diversification, innovation and entrepreneurship**

The economic transformation from the mono-industrial period is proving to be a complex and slow process, with significant challenges for all stakeholders. Although previous attempts to revitalise the area have not materialised, Jiu Valley has a high potential for economic diversification, as long as existing resources are used optimally and the actions taken will aim to create an environment conducive to economic development. The **overall objective** is to create a diversified economic environment, focused on strengthening existing SMEs growth and competitiveness, with high value-added activities and products, and attracting other enterprises to the micro-region. To this aim, policies and fiscal mechanisms have to be put in place for supporting R&I initiatives and local entrepreneurship, focused on developing the entire value chain of an industry in the micro-region. The three components are:

- **2.1** Reconfiguring the energy sector of the micro-region by capitalising the development potential, on various levels;
- **2.2** Attracting investments, in areas specific to the profile and needs of each city in the Jiu Valley, with potential for a sustainable economic development of the area;
- **2.3** Supporting entrepreneurship by developing specific skills and competences; individual local businesses and new economic initiatives.

3. **Sustainable capitalisation of the local specificity**

The joint effort in transforming Jiu Valley

[15] Strategia de dezvoltare economică, socială și de mediu a Văii Jiului (2021-2030), PwC, 2021 https://mfe.gov.ro/initiativa-valea-jiului/

- from a mono-industrial area to one with a diversified economy,
- from an area with aging population, dominated by the youth migration phenomenon, to one where high-school and university students prefer to continue their studies and develop a career, and
- from an area little known at national and international level, with a rather negative image, in one with a well-defined and attractive identity,

is based on the enhancement of the local cultural, industrial and social heritage, through:

- the integrated development of local tourism,
- the organisation and promotion of relevant new cultural and sporting events,
- the strengthened infrastructure of school and leisure camps,
- the co-creation and deployment of urban regeneration activities, with the active participation of locals,
- the boosting of creative industries, craftsmen and creators, and
- the rediscovery, re-evaluation and promotion of local specifics.

The **general objective** is the coherent and sustainable development of tourism, culture, sports, leisure activities and creative industries, by stimulating local producers and creators, highlighting the natural, cultural, industrial and social heritage of Jiu Valley and by connecting/twinning with neighbouring regions. The four components are:

- **3.1** Developing an integrated tourist concept of Jiu Valley micro-region;
- **3.2** Upgrading and diversifying tourism infrastructure and services;
- **3.3** Developing cultural and sports activities, leisure and creative industries, adapted to the local specifics;
- **3.4** Certifying, promoting and using local resources in the agri-food and handicraft field.

4. Accessibility, mobility and connectivity

Creating the necessary and appropriate framework for the future economic transformation of Jiu Valley is essential. Connecting the micro-region through fast roads and railways, upgraded streets infrastructure (related to parking spaces and dedicated detour roads) and developing utility networks will open new opportunities, generating interest both for current residents, as well as tourists, businesses and potential investors. The **general objective** is the sustainable development of multi-modal urban mobility, in a unitary way, facilitating accessibility in all areas of the micro-region by strengthening the connectivity between the component cities / municipalities and the immediately neighbouring areas. The four components are:

- **4.1** Rehabilitating and upgrading of the road and railway infrastructure for connecting the Jiu Valley at territorial, regional and cross-border levels;
- **4.2** Developing an eco-efficient public transport system in an integrated, sustainable and intelligent manner;
- **4.3** Rehabilitating and developing streets and pedestrian areas with improved accessibility conditions for people with reduced mobility / disabilities, arrangement of public spaces;
- **4.4** Development of utility networks, communications and street lighting networks.

All these priorities must be sustained, at local and regional level, by an adequate, flexible and attractive fiscal system for young entrepreneurs and new investors, which

will be also specific enough for the needs and financial capacity of the existing business environment in the micro-region to further develop.

All proposals and recommendations of actions / projects / measures / policies made for the Jiu Valley micro-region within the TRACER deliverables (mainly D3.2, D6.1), with a focus on R&I solutions towards a sustainable energy transition, fall within the four priorities of the Jiu Valley reference document "Strategy for the transition from coal of Jiu Valley" for the period 2021-2030"[16], mainly in the following strategic directions:

- **1.1** Calibrating local human potential to increase employment and combat social exclusion;
- **1.4** Supporting the transition to a green economy to protect the environment;
- **2.1** Reconfiguring the energy sector of the micro-region by capitalising the development potential, on various levels;
- **2.2** Attracting investments, in areas specific to the profile and needs of each city in the Jiu Valley, with potential for a sustainable economic development of the area;
- **2.3** Supporting entrepreneurship by developing specific skills and competences; individual local businesses and new economic initiatives;
- **3.2** Upgrading and diversifying tourism infrastructure and services;
- **4.4** Development of utility networks, communications and street lighting networks.

8.4 Next steps and outcomes

The next steps in the key stakeholder involvement process closely follow the progress made at national level in finalising funding programmes and guidelines for the 2021-2027 programming period, and the implementation tools / mechanisms - see governance structure. Thus, the following opportunities are mainly considered of interest for Jiu Valley micro-region:

- **Regional Operational Programme**. Starting with the programming period 2021-2027, at the level of the eight development regions of Romania, the Agencies for Regional Development become the Managing Authorities for the Regional Operational Programmes. ADR Vest, as Managing Authority, prepares and negotiates directly with the European Commission its own Regional Operational Programme[17], according to regional needs and specifics, elaborates the applicant's guides establishing the conditions for granting funding to beneficiaries, evaluates and contracts at regional level the submitted projects, manages their implementation and makes payments to the beneficiaries. For the development of the Regional Operational Programme 2021-2027, ADR Vest made the necessary correlation with both existing planning documents at regional level and existing regulations at European level, the proposed investments being focused on the five main policy priorities[18] of the European Commission;
- **Just Transition Mechanism**. The European Commission will direct investments for the 2021-2027 JTF (Just Transition Fund) to six territories (NUTS3) significantly affected by the transition to a neutral economy in terms of greenhouse gas emissions: Hunedoara, Gorj, Galați, Mureș, Prahova and Dolj. Valea Jiului micro-region is part of Hunedoara County (RO423). The National Operational Programme for Just Transition

[16] Strategia de dezvoltare economică, socială și de mediu a Văii Jiului (2021-2030), PwC, 2021 https://mfe.gov.ro/initiativa-valea-jiului/
[17] https://adrvest.ro/por-2021-2027/
[18] https://ec.europa.eu/regional_policy/en/policy/how/priorities

(POTJ 2021-2027) has an indicative allocation of approx. 1.947 billion euros, to which are added the national and regional (RO423) contributions[19]. Hunedoara County Council is the coordinator for the elaboration of the Just Transition Territorial Plan (JTTP) and the majority of TRACER key stakeholders in Jiu Valley micro-region are members of the HJTTP working group;

- **Integrated Territorial Investments (ITI) mechanism**. On the proposal for a Regulation of the European Parliament and of the Council COM (2018) 375 final art. 22 provides for the possibility of supporting integrated territorial development through local and territorial development strategies known as Integrated Territorial Investments (ITI). ITI is an optional territorial development tool that makes it possible to combine resources from several European funds, within the priority axes of one or more Operational Programmes. The use of the ITI instrument in the Jiu Valley was also determined by the fact that Romania joined the European Platform for Coal Regions in Transition with a pilot project in the Jiu Valley micro-region. By implementing the ITI mechanism in Jiu Valley micro-region, it is estimated that the desired effect of achieving a diversified economy for the benefit of the community strongly affected by the transition and reconversion in the area will be achieved. For the ITI application in the Jiu Valley, the observance of the provisions from articles 22, 23 and 24 of the aforementioned Regulation proposals will be taken into account.

Given the opportunities outlined above, stakeholders are working together to further plan the changes needed. Currently, the key stakeholder's EDP is focusing on:

1. Identifying and briefly describing several concrete **projects proposals**, during TRACER WP4 and WP6 activities, which will be highlighted in the next TRACER reports;
2. Participating to the discussions related to the **future official governance structure,** managing the ITI mechanism and the implementation of Jiu Valley Transition Strategy, including lobby activities for establishing **specific micro-regional co-financing rules**;
3. Planning the future **matchmaking sessions with potential investors**.

8.5 Conclusions

Stakeholder theory is an effective tool offering grounding for inclusion of stakeholders in decision making (Aaltonen, 2021).[20] This message has also been reflected in project stakeholder discourse as more and more papers are discussing stakeholder engagement instead of stakeholder management or involvement. Stakeholder engagement includes communicating with, involving, and developing relationships with stakeholders (Greenwood, 2007[21]; Lehtinen & Aaltonen, 2020[22]).

The TRACER project initiated, highlighted, identified, sensitized, supported and harmonized local, regional and national stakeholders, so each one understands its role, and actively engages in the complex process of planning the sustainable energy transition in Jiu Valley micro-region. Through a dialogue between the four helix stakeholders' categories, problems,

[19] https://mfe.gov.ro/mecanismul-pentru-o-tranzitie-justa/

[20] Kirsi Aaltonen, Roya Derakhshan, Francesco Di Maddaloni, Rodney Turner, Call for papers: Project stakeholder management, International Journal of Project Management, Volume 39, Issue 6, 2021, pp. 709-711, https://doi.org/10.1016/j.ijproman.2021.08.001, https://www.sciencedirect.com/science/article/pii/S0263786321000892

[21] M. Greenwood, Stakeholder engagement: Beyond the myth of corporate responsibility, Journal of Business Ethics, 74 (4) (2007), pp. 315-327

[22] J. Lehtinen, K. Aaltonen, Organizing external stakeholder engagement in inter-organizational projects: Opening the black box, International Journal of Project Management, 38 (2) (2020), pp. 85-98

needs and opportunities have been identified, and solutions have been proposed. Thus, mechanisms were created for generating real added-value on both - a difficult institutional, pandemic and cultural background or a formal pre-existing one, in which communities are engaged.

Naturally, in the pandemic situation and the digital world in which we are living, the dialogue has adapted using new communication channels and tools (e-mail, telephone, meetings and workshops on digital platforms, online questionnaires), all according to the guidelines made available by the European Policies Research Center (EPRC), University of Strathclyde, UK (TRACER, WP5 Deliverable D5.1 October 2019 and March 2020).

The context in which the TRACER research was carried out in Jiu Valley micro-region took into account the complementarity with the previously stated European initiatives/projects and the COVID-19 pandemic situation in the area. A number of activities were postponed or virtually organized, which also involved a brief training on digital communication tools for key engaged stakeholders.

Although the energy issues in Romania have political colour, the legislation is vast and uncorrelated, and related responsibilities are spread between several ministries, causing many blockages in the transition process, nevertheless “this type of community can reinvent itself by learning to use alternative sources of energy and “alternative” industry.” [23]

A successful transition process in Jiu Valley micro-region, with a positive impact, will depend on the increasing involvement of all four helix stakeholders’ categories. Thus, observing stakeholders attitude during the EDP activity, starting from a slight initial skepticism (Figure 10 and Figure 11), the TRACER team will be able to coagulate constructively and pragmatically their ideas and to **set-up a citizens' energy community in Jiu Valley micro-region**.

Figure 10: What are the chances of the development of Jiu Valley, in the absence of mining?

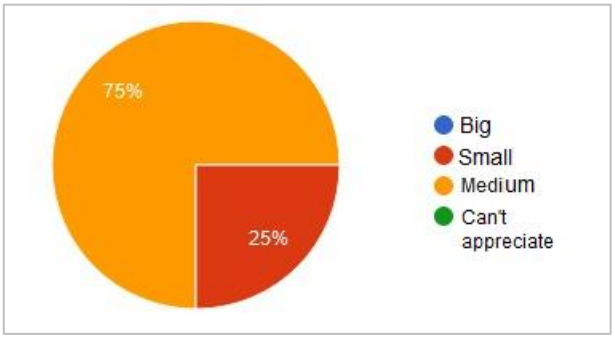
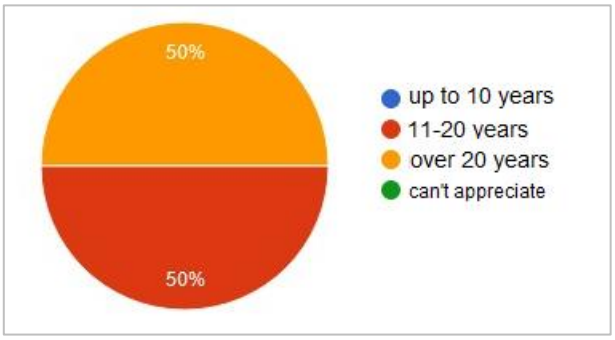


Figure 11: What is the period in which you see sustainable energy development in Jiu Valley being feasible, in the absence of mining?



[23] Anna Ackermann, Kostiantyn Krynytskyi, Martin Schön-Chanishvili R. (Eds.), Dudău, G. Ghinea, K. Krynytskyi, V. Kryzhanivskyi, P-Y. Oei, M. Schön-Chanishvili, K. Sutlovičová, Z. Vondrová, T. Wehnert; Transformation Experiences of Coal Regions: Recommendations for Ukraine and other European countries, Center for Environmental Initiatives Ecoaction. K: ALT Company, 2019, p. 87, https://en.ecoaction.org.ua/wp-content/uploads/2019/06/transformation-experiences-en-full.pdf

The entire public consultation process (TRACER EDP, START, SRSS and SRSP consultations), without precedent in the history of the Jiu Valley, brought hope and generated a change of attitude in the micro-region communities. EDP is a participatory process, and once the stakeholders are involved in the decision-making process, their opinions being taken into account, they became pro-active and eager to be engaged.

Currently, most of the unknowns refer to the role of Hunedoara Energy Holding (CEH) in the future development of the Jiu Valley. Thus, the main unsolved issue is at the level of the Government - the Ministry of Energy, the actual ownership of CEH (Paroșeni CHPP and Mining Division assets).

The lack of an assumed decision on both important aspects below, maintains the state of uncertainty and fuels the restraint and distrust of potential investors:

- The national coal phase-out date announcement,
- The fate of Paroseni CHPP,

thus generating for Jiu Valley a dilemma - whether or not it will continue to be a pawn on the National Power System chessboard, as ETS producer together with RES prosumers, or will remain mainly a consumer, with few RES prosumers organised as energy communities.

Although, in 2020, CEH was the largest employer in Hunedoara County, now, with the insolvency proceedings and closure of Mintia facility (Deva TPP), the importance of this public company was significantly reduced.

The main role for **planning and managing the economic transformation process** in Jiu Valley micro-region, **including transition from coal**, is taken over by the new official local governance structure properly designed also for **conducting the ITI mechanism** "*Asociația pentru Dezvoltare Teritorială Integrată Valea Jiului*" (Jiu Valley Integrated Territorial Development Association), hereinafter referred to as the *Jiu Valley Association*. The main purpose of *Jiu Valley Association* is to provide services in the field of initiation, development and promotion of competences and local development policies, to support the implementation of the ITI mechanism inside the micro-region's territorial administrative units. The role of this *Association* is to coordinate and ensure the implementation of the Transition Strategy (in correlation with ITI Valea Jiului), providing indirect support for matching existing funding with projects that are integrated into the priority axes of Jiu Valley Transition Strategy. The *Association* will have as founding members:

- Hunedoara County Council;
- Six Local Councils in Jiu Valley: Petroșani, Lupeni, Vulcan, Petrila, Uricani and Aninoasa;
- University of Petroșani;
- NGOs from each sector: social, economic, environmental, urban development.

In terms of organisational chart, the *Association* could include a General Assembly, an Administrative Board and executive staff, the decision-making mechanism being performed based on the majority vote. It is assumed that this *Association* will play a key role in securing a sustainable future development for Jiu Valley.

The message of the TRACER team is that stakeholders experience the transition due to changes in their professional and private life or those in national, European and global socio-technical and political systems. As stated in the Transition Strategy Toolkit developed by EC-Platform for Coal Regions in Transition[24] "**The transition process towards a zero-carbon society is nothing less than a fundamental transformation of our society**", which brings

[24] https://ec.europa.eu/energy/sites/default/files/documents/transition_strategies_toolkit_-_platform_for_coal_regions_in_transition.pdf

along changes in all dimensions: new business models and new companies emerging, changes in consumer practice, social behaviour and cultural habits, or new legislation and institutions.

Thus, the EDP made a significant contribution by bringing a positive change in the attitude of the quadruple helix stakeholders towards innovation and their visions for long-term transformation. Such transitions are vulnerable and painful periods that are of concern to all, from simple citizens to governors[25].

In this current context, it should be remembered that Jiu Valley Transition from coal strategy can also benefit additionally from the opportunities mentioned in Chapter 4, from support interventions in order to be adapted and connected to the energy component of the PNNR (National Recovery and Resilience Plan) on green transition and digitalisation of the energy sector by promoting "Electricity production from RES, energy efficiency and technologies of the future"[26], according to the common shared vision "**Jiu Valley micro-region revitalised from a social point of view, with a sustainable development, interconnected with the major regional, national and European networks, and having a competitive economic environment**."[27]

[25] Dan Dobre, Raluca Petcu, Romanian government's coal phaseout blabber, Bankwatch Romania, Just Transition blog, June 16, 2021, https://www.just-transition.info/romanian-governments-coal-phaseout-blabber/

[26] MIPE, PNNR, 2021, http://mfe.gov.ro/pnrr/

[27] MIPE, PwC, Strategia pentru dezvoltarea economică, socială și de mediu a Văii Jiului (2021-2030), 2021, p.9, https://mfe.gov.ro/initiativa-valea-jiului/

9 Kolubara Region, Serbia

9.1 Introduction

Alongside mine closure, coal regions in transition face a number of challenges. Locations formerly used for mining and related industrial activities require environmental rehabilitation, and the repurposing of former mining assets and infrastructure may be necessary to make them available for future use and people's lives.

As Kolubara target region is one of the biggest industrial complexes in Serbia, mostly comprising coal fired energy plants and the associated industries, its transition is a very sensitive one. Among other factors, the development and completion of a successful transition process is highly dependent on stakeholder mobilization and consultation from the very beginning. For this reason, in the scope of the TRACER project, ENTEL contacted different types of stakeholders to get their insights and opinions on resolving the forthcoming problems in different domains.

The stakeholders were contacted through interviews and workshops. The interviews were conducted in line with the template provided, while the workshops' programmes were tailored according to the stakeholders' profile.

This chapter describes the methodology used for the interviews and the workshops, as well as the main results of the performed activities in Kolubara region.

9.2 Methodology

The activities carried out in the region consisted of:

- Introducing all stakeholders in the region to the TRACER project through a short description by phone or mail or meeting, whichever was convenient, as an introduction to the project. As per the scope of the TRACER project, ENTEL decided to contact stakeholders from different branches (Quadruple Helix) connected to mining and energy production from coal, with the aim of getting their opinion on the project subject.
- Since the pandemic covered the period when the interviews were scheduled, the questions were sent by e-mail to allow interviewees to get acquainted with the content of the interview, and according to the wishes and possibilities of the interested parties, an interview was conducted either on line or face to face. The majority of the interviews were held online.
- ENTEL summarized the views of all interviewees regarding energy transition in the region in general, and about the potential for new activities in energy research and innovation (R&I).
- A Working Group has been established, initially with five members, and later supplemented with two more.

9.2.1 Interview methodology

The interviews were conducted according to the interview questionnaire provided by STRATH. For the purpose of interviews, the questionnaire was translated into the Serbian language.

ENTEL contacted several tens of individuals from four helices in the region, primarily those who either have the personal capacity to drive strategy-building and implementation and can bridge across sectoral boundaries or have connections outside the region, and outside main interest groups, but may contribute to the transition process with some new ideas.

The interviewees were kindly asked to respond, either in writing or verbally in the meetings, to the questionnaire, to give an insight into their views in relation to the transition in the Kolubara

target region, the largest both in terms of intensive coal exploitation and in terms of power generation in Serbia. About a half of the contacted persons responded. The interviews were mostly held online due to the outbreak of COVID-19. Several interviews took place in ENTEL's offices, and one was held in stakeholder's office. In each interview, ENTEL's representative opened the meeting with a brief presentation of the TRACER project. After the introduction, stakeholders were provided with the questions from the interview questionnaire. All meetings, both online and face to face, were scheduled and held in the period between February to May 2020.

There were 12 interviews carried out in total. Three interviewees represent the Governmental helix, four interviewees come from the Academic helix, including the Serbian Academy of Sciences and Arts, the Academy of Engineering Sciences of Serbia, as well as two faculties (Mechanical Engineering and Mining and Geology) of the University of Belgrade and two scientific research institutes, one dealing with mining and the other with energy matters, including nuclear. Two interviewees come from the industry helix. One comes from the Chamber of Commerce and Industry of Serbia and one from the mining and power generation industry, represented by the thermal power generation sectors of the Serbian electric power industry (EPS). Three interviewees from the civil society helix come from non-governmental organizations dealing with energy matters (Serbian Committee of the World Energy Council, Association of Energy Engineers, and Society of Thermal Engineers of Serbia) and from the public services of one of the five municipalities directly affected by coal mining in the Kolubara target region.

Table 19: Number of interviews undertaken with different types of stakeholders, Kolubara region, Serbia.

Type of stakeholder	Number of interviews
Government bodies	3
Other public sector organizations	1
Business associations and chambers	1
Universities	2
Educational institutions	2
Civil society organizations	3
TOTAL	**12**

9.2.2 Workshop Methodology

In line with the guidelines, the aim of the workshops was to mobilize broad stakeholder participation in the regions, and to cover most of four quadruple helix groups of stakeholders, i.e. business, research/education and civil society. The expected outcome of the workshops was to develop their visions of transition and to identify future priorities.

The main objectives and aims of the workshops are to animate interested stakeholders to the process of transition, as well as to open the discussion on the issues that will appear in this process. Although mine closure in Kolubara region has already started as some of the open pit mines resources are exhausted and operation phases have been ended (Fields A, B and C), the potential issues are not yet visible, as at the same time other fields are continuously opened. However, the experiences in land reclamation already exist on the abandoned fields as well as on the overburden disposals.

Three workshops were organised during March and April 2020. Bearing in mind the role of Kolubara coal basin in the national economy, mainly in the energy sector, the following stakeholders' groups were invited to workshops:

- Faculty of Mining and Geology & Mining Institute, Belgrade, 23 March, 2020
- Electric Power Industry of Serbia – Mining Sector, 3 April 2020
- NGO related to the energy sector (Members of Energy Association), 23 April 2020.

A further 28 stakeholders were involved in the three workshops (see Table 20: Stakeholder participation in workshops, Kolubara region, Serbia.Table 20). The selected stakeholders represent the main organizations/industry/R&I dealing in sector of energy production from coal, and are the most relevant institutions for the project subject. The focus for each workshop was defined in accordance to the prevailing profile of participants.

Table 20: Stakeholder participation in workshops, Kolubara region, Serbia.

Type of stakeholder	Number of participants
Other public sector organizations	12
Universities	5
Research institutes	3
Civil society organizations	3
Hybrid organizations (e.g. innovation centres or cluster bodies)	5
TOTAL	**28**

The reports on the discussions and the main conclusions of each workshop are as follows:

1. Workshop 1: Future operation of the open pit mines in Kolubara coal region

The first workshop was held on 23 March 2020. In line with the COVID-19 pandemic restrictions and recommendations in place at the time, the workshop was organized on-line. The participants were invited to the workshop by e-mail.

There were five participants from the Faculty of Mining and Geology and three from the Mining Institute. The Workshop was planned to be held as a morning and afternoon session. The Workshop Agenda is presented in the Table below.

Table 21: Workshop 1 Agenda, Kolubara region, Serbia.

Time	Title
Session 1	
10.00 – 10.30	Introduction to TRACER project
10.30 – 11.00	The role of coal utilization in future energy generation in Serbia
11.00 – 11.30	Coal exploitation improvements in Kolubara Basin
11.30 – 12.00	Experiences in open pit mines reclamation in Kolubara coal region
Session 2	
14.00 – 16.00	Discussion

As the focus of the workshop subject was on the future operation of the open pit mines, bearing in mind increasingly stringent requirements regarding environmental protection in the region, as well as the continuous provision of lignite of the required quantity and quality.

All participants agreed that in the forthcoming period (of about the next 15-20 years) energy resources in Serbia should still be based on fossil fuels, in order to preserve security of supply and avoid risk of total dependence on foreign markets. To fulfil the mentioned conditions for sustainable mine exploitation, future mine operations should be supported by Faculty and Institute R&I work in relation to the utilization of modern mining machinery, providing better lignite extraction efficiency while minimizing environmental impacts. Mine exploitation technology should be improved to provide the possibility of coal quality control in the defined range of parameter values. In addition, coal quality parameters should be monitored continuously, before delivering to the final consumers.

2. Workshop 2: The role of the Electric Power Industry of Serbia in energy transformation in Kolubara

The second Workshop was held on 3 April 2020. The participants were invited to the workshop by e-mail.

The workshop was organized in the Electric Power Industry of Serbia (EPS) offices in Belgrade. All participants were from the EPS, Mining Sector. Twelve participants attended the

workshop: three from the mine operation department; four from the mine reclamation and environmental protection department; and five from the energy sector.

The Workshop was planned to be held as half-day session only. The Workshop Agenda is presented in the Table below.

Table 22: Workshop 2 Agenda, Kolubara region, Serbia.

Time	Title
9.00 – 9.30	Introduction to TRACER project
9.30 – 10.00	The role of coal utilization in energy strategy of Serbia
10.00 – 10.30	Transition in Kolubara coal basin – existing plans and future activities
10.30 – 11.00	Existing and expected social and environmental issues in Kolubara coal region in the transition process
11.00 – 11.30	Coffee break
11.30 – 13.00	Discussion

The main subject of this workshop was directed to the role of the EPS in the process of Kolubara coal basin transition, considering economic, social and environmental aspects.

In spite the fact that Serbia still relies heavily on coal as the major energy resource, EPS, as the biggest and main coal and electricity production public enterprise, has the major responsibility to prepare the Kolubara coal complex transition plan. This plan should include both mine closure, environmental reclamation and rehabilitation, and sufficient electricity generation. In this sense, all possibilities related to energy production from renewable sources should be examined and prepared for development in the real time span.

The participants from EPS have confirmed that some of the projects in the field of renewables have been already launched, such as installation of solar power plant on Kolubara A ash disposal site (after Kolubara A shut down at the end of 2023), and installation of PV plants on all suitable sites within the Kolubara complex.

All participants agreed that financing of mine closure and all above mentioned activities shall be the main issues for realization of the planned projects. However, as this plan is in line with decarbonisation policy, there is the strong hope that EU funds will be available to a greater extent than today.

3. Workshop 3: Future energy strategy in Serbia

The third Workshop was held on 23 April 2020. The participants were invited to the workshop by e-mail.

The workshop was organized in the Offices of Energoprojekt ENTEL, in Belgrade, partially face to face (with four participants), with the rest participating from computers in ENTEL offices. There was a total of eight participants at the workshop, all of them being members of the Energy Association.

The Workshop was planned to be held as half-day session. The Workshop Agenda is presented in the Table 23 below.

Table 23: Workshop 3 Agenda, Kolubara region, Serbia.

Time	Title
9.00 – 9.30	Introduction to TRACER project
9.30 – 10.00	Energy strategy of Serbia in the view of transition to low carbon energy generation
10.00 – 10.30	Renewable energy resources in Kolubara coal basin
10.30 – 11.00	Development opportunities of Kolubara basin in the view of transition process
11.00 – 11.30	Coffee break
11.30 – 13.00	Discussion

The main subject of this workshop was future energy strategy in Serbia, with which EPS' future development should be closely connected and harmonized.

The Energy Association is a non-governmental professional organization, including experts from all technical, economic, legal and social branches dealing with energy matters. In the past, members of the Energy Association were frequent advisors to the Ministry of Energy and Ministry of Environmental Protection in creating national policy for energy strategy in Serbia. They have also participated in EPS management (as members or chiefs of the Supervisory Board).

The Energy Association members are aware that transitions towards a low carbon economy will be an inevitable process in the forthcoming period, but also a very sensitive one. For this reason, the forthcoming National Energy and Climate Plan (NECP) should be drafted in such a way so as not to jeopardize the national economy by a rapid increase of electricity prices due to the introduction of full-scale carbon emission taxes.

The second issue raised in this workshop, which requires specific attention, is related to the provision of sufficiently skilled staff for the new development opportunities, i.e. industries that may be implemented instead of coal mining and associated activities. A comprehensive approach to this issue should be carried out, together with exploration of the possibilities of re-skilling the employees in mining and electricity generation from coal.

9.3 Vision and priorities in Kolubara

The general impression derived from the interviews is that the interviewees have rather different points of view on the topic and they do not share a common opinion regarding the Kolubara coal transition. Different perspectives and incentives have been proposed and discussed.

ENTEL's conclusions from the meetings can be summarized in the following standpoints/opinions:

- **Considerable investment is needed for the transition, but without a clear vision of the source of financing,** both for the replacement of the coal fired power plants and for solving the social problems caused by closing mines and leaving miners unemployed;
- There is an absolute reliance on **local expertise for important decision-making**, which needs to be gathered within a multidisciplinary institute to permanently monitor and direct national energy policy matters;
- Transition should include **another low carbon source**, since renewables alone are not a sufficiently secure option;
- Coal will remain an energy source, either in the existing form or in any of the possible new ways of its transformations;
- There is a possibility of transferring and combining world and European aspects of transition into a **single strategy for Serbia** to ensure a stable energy supply;

- **Proactive planning for the energy transition must occur many decades in advance**, which usually is not the case even in the long-term development strategies developed in a reactive top-down approach.

The present and future major issues and concerns impacting the transition process are as follows:

- The Energy Community Ministerial Council's decisions have a key impact on the EU transition dynamics that may prove questionable for the current conditions in Serbia;
- There is a lack of continued education of energy professionals, resulting in a lack of ability to competently participate in the multidisciplinary research required to support or direct and monitor transitional processes for the benefit of citizens as consumers of energy;
- There is a need to identify well in advance the primary energy sources that will be acceptable for Serbia to replace more than two-thirds of its current coal-based electricity generation since the natural gas is considered only as a bridge towards the long term solution;
- Mobilization of different stakeholders is required to establish a coherent strategy to exploit the significant potential in the region for cooperation between R&I institutes and faculties;
- Two conflicting trends can be identified: new construction for a continued use of coal in the future, and transposition of regulatory instruments that may forbid that use;
- The long-term economic feasibility of excavating and burning of indigenous coal under conditions of falling market prices of electricity from renewables and growing risks of imposing taxes on carbon emissions will be reflected in a considerable increase in generating costs from coal;
- Bearing in mind that Serbia missed its target of 27% of gross final energy from RES in 2020, as well as the need to adopt ambitious new targets for 2030, there is scepticism among experts concerning the key role of renewables in the transition;
- Coal production in the Kolubara target region should be aligned with the supply needs of about 3 GW of thermal power plants under conditions of variable operation with an ever increasing share renewable generation;
- There is a need for coherent and timely planning (currently focused on Integrated Energy and Climate Plan by 2030 and new Energy Sector Development Strategy by 2040) under the newly established regulatory framework to drive the transition;
- There is a need to improve the capability of local industry and services to absorb the workforce left jobless with shutdowns of mining and power generation and the needs for re-skilling to do so.
- There are doubts among experts about the practical possibility of the intention to use renewables as a single backbone of the future energy systems as promoted in;
- As the possibility of carbon capture from the flue gases and its use or storage is still not commercially applied as the measure to cut carbon dioxide emission, and carbon taxes are applied instead, the use of coal should be conditional in the future.

There are still topics of interest that should be discussed in the near future, such as the influence of the Green Agenda for the Western Balkans on the dynamics and extent of the energy transition away from coal in the Republic of Serbia. Also, some of the interviewees are of opinion that it would be interesting to learn more about the possible impact of 'clean coal' technologies on the deployment of renewables for energy transition purposes in long-term strategies. It would also be good to learn about different scenarios for transition in the countries of the region.

9.4 Conclusion

The common conclusion of all workshops' discussions was that **transition in Kolubara target region to coal phase-out should be planned well in advance**, bearing in mind all issues that may appear during implementation of this process.

The following issues should be mentioned:

- Coal phase-out in Serbia, as well as in the countries in the region, will be postponed compared to European countries, due to the specific energy resources mix and an economic situation strongly dependent on electricity prices. In the current and next decade, the role of coal in electricity production in the region will still be significant.
- Regional and local policies in the Kolubara target region are currently guided almost exclusively by the national energy policy, but with due regard to the wellbeing of the local population.
- However, the **transition should be gradual** and supported by additional hydro pumped storage facilities with the aim to keep the electricity supply stable and minimize dependence on imports. Approximately 12,000 employees are working in Kolubara coal basin, both in mining and associated industries, and for the majority of them this is the main source of income.
- Besides new RES facilities, the potentials of the Kolubara coal region are basically in the fields of agriculture, forestry, and tourism, but this will require a long-term reclamation period. For this reason, **transition and reclamation activities should be well prepared before and developed immediately after each mine field closure**.
- The development of a new economy needs the creation of new perspectives for employment and careers, as well as the willingness of people to keep their households, re-skill, and stay living in the region. As re-skilling the workforce is a rather complex and time-consuming process, there is a fear that many former mining employees would feel discouraged to search for new jobs, as they have limited to non-existent opportunities in the community they belong to after coal mines are closed down.

In conclusion, to support the transition process, new energy-related research and innovation (R&I) activities need to be developed, focused on the application of innovative technologies in line with the resources present in the Kolubara target region.

No fast transition from coal is supported. The reasons are numerous, ranging from the serious fears of Serbia losing its current independence in electricity supply, to a great distrust in the renewable energy sources to be a reliable practical substitute for coal, both in terms of quality and quantity.

In this context the lack of funding of the transition process is seen as a serious problem for the Serbian weak economy, accompanied by the social consequences of the threatened unemployment.

Of particular concern is the improvement of energy efficiency both in generation (to keep environmental and climate impacts as low as possible) and in consumption (to prevent losses and reduce the energy intensity of goods and services).

For the R&I on that and other hot subjects related to the energy future, more trust was gained by local experts and R&I institutes than by foreign consultants. The idea of the need to form a specialized multidisciplinary institute for national energy matters was proposed.

Whether or not coal mining stops before its complete depletion, there are only a few decades left for it to be completely replaced by other energy sources with less or zero environmental and climate impacts. In the meantime, for a transition towards 100% renewables the chance was estimated rated lower than for another low/zero carbon substitute for coal to be implemented into the system. Bearing in mind that in the post-coal period the existing and in the meantime added infrastructure will remain fully operational, it was rated smart to ensure a

continuous use of both the transmission networks and the remaining infrastructure at the sites of the existing and new coal fired power plants, with no option/technology being left aside.

9.5 References

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10 Donetsk Region, Ukraine

10.1 Introduction

In order to obtain up-to-date data on the prospects for the development of such a coal region as the Donetsk region, it was necessary to establish contacts with various stakeholders in the region. Due to the existing COVID pandemic, stakeholder interaction took place online.

The main ways of interaction were replies to e-mail questionnaires, online conferences and online roundtables. Based on the measures taken, information was collected on the vision of the current state and possible development of the region in the near future. This allowed the research team to draw conclusions about the current prospects for the transformation of the Donetsk region, the existing development problems and the vision of possible ways to solve them. This chapter describes the methodology and the results of the implementation of the stakeholder consultation in the Donetsk region.

10.2 Methodology

In the course of the work, contacts were made with stakeholders, on the basis of which a list of interview participants and seminars was compiled. The list included representatives of various areas of activity - research institutes, government officials, representatives of small and medium-sized businesses and educational institutions.

Due to the COVID-19 pandemic, the interviews were carried out in the form of correspondence, sending stakeholders a list of questions that were answered, analysed and the conclusions of which are presented in this chapter. Meetings and seminars were also held in the form of online conferences, which allowed many participants to take part in them, with whom it would not be possible to meet physically.

10.2.1 Interview methodology

The first mapping of stakeholders interested in coal transformation processes in Ukraine was formed during the summer of 2020. An initial list of stakeholders covering all parties was developed and an agreed list of questions was completed. This led to a total of 12 interviews that were carried out between July and November, covering all stakeholder groups.

The interviews were conducted partly by telephone, partly in the form of answers to questions sent by e-mail.

The list of questions provided for the interview was based on the list provided by STRATH. It has been modified to improve the understanding of the TRACER project's objectives.

The number of interviewed participants and distribution in areas of activity is given in Table 24.

Table 24: Number of interviews conducted with different types of stakeholders, Donetsk region, Ukraine/

Stakeholder type	Number of interviews
Government bodies	1
Other public sector organisations	1
Business associations and chambers	1
Individual businesses	1
Universities	2
Research institutes	6
Educational institutions	0
Civil society organisations	0
Hybrid organisations (e.g. innovation centres or cluster bodies)	0
Others	0
TOTAL	**12**

10.2.2 Workshop methodology

Stakeholder meetings took the form of online conferences and thematic round tables. The meetings included:

1) **Online scientific-practical conference "Coal power engineering: ways of reconstruction and development**", 19-20 October 2021. The purpose of the conference was to exchange information on the development of clean coal energy technologies and prospects for their implementation to ensure efficient operation of thermal power plants with high technical and economic and environmental indicators, introduction of TRACER project materials. The conference was attended by 23 participants from many organizations.

   The conference was held in the format of online reports, which covered the problems of energy generation, CO2 capture, hydrogen production and replacement of coal with alternative energy sources.

2**) Online round table "Disposal of coal beneficiation waste, solid household and agricultural waste in old industrial mining regions on the basis of a circular economy**", 2 November 2021. The round table was attended by 16 participants from various sectors.

3) **Online round table "Energy diversification of mines as a direction of smart specialization of mining regions of Ukraine**", 10 November 2021. The roundtable was attended by 14 participants from various sectors.

4) **Online round table "TRACER: investment strategies and mechanisms for financing a fair transition"**, 17 November 2021. The round table was attended by 15 participants from various sectors.

The number of participants with distribution in areas of activity is shown in Table 25.

Table 25: Number of participants in each seminar, Donetsk region, Ukraine.

Type of stakeholder	Seminars			
	Online conference	Round table 1	Round table 2	Round table 3
Government bodies	1	1	1	1
Other public sector organisations	1	2	1	1
Business associations and chambers	1	1	1	1
Individual businesses	3	3	2	3
Universities	4	2	1	2
Research institutes	12	6	7	6
Educational institutions	0	0	0	0
Civil society organisations	1	1	1	1
TOTAL	**23**	**16**	**14**	**15**

10.3 Vision and priorities in Donetsk region

All participants agree that for many decades the main energy sources in Ukraine have been the extraction of non-renewable natural resources, such as natural gas, coal, etc. However, due to changes in the environmental situation, global trends, price conditions, the introduction of new technologies, the share of non-renewable resources in the energy balance of Ukraine is declining. This is especially true for fossil fuels such as coal.

To overcome the negative trends and problems of socio-economic development of coal regions, the formation of the coal industry of Donetsk Region of Ukraine must be accompanied by "Smart Transformation" of territories.

Due to the active development of new technologies, alternative energy sources, changes in the energy market, as well as insufficiently effective formation and implementation of State

policy in the field of support for the coal industry in previous years in the relevant areas, there was a tense situation, in particular in the economic, social, housing and environmental and environmental spheres, which may deteriorate due to the beginning of reforms in the country's energy sector, namely the coal industry.

Based on the analysis of meetings and interviews, participants believe that the following problems need to be addressed:

- low level of investment attractiveness and practically no diversification of the local economy in the coal regions;
- unprofitable State enterprises of the coal industry;
- ineffective State policy in the field of employment and education, health care and culture in coal regions;
- poorly developed social and critical infrastructure in the settlements of coal regions;
- deterioration of the environmental situation due to the operation and / or closure of coal enterprises;
- social tensions among the population of the territories where coal enterprises are located, which are in the stage of liquidation, conservation or reorientation to other types of economic activity.

Therefore, the main prerequisites for smart transformation of Donetsk region are:

- broad public dialogue - open discussion by representatives of State executive bodies and local governments of all problematic issues that need to be addressed, with representatives of trade unions, their associations, employers' organizations, scientific, expert and business environment;
- graduality and a phased exit - no shock measures and at the same time no dismissal of employees of coal enterprises without the simultaneous creation of new jobs or social guarantees;
- synchronicity of different processes - attracting new investors, creating new jobs, retraining of employees, etc. are carried out comprehensively and with the prior consent of central and local executive bodies, local governments and entrepreneurs;
- State budget support - part of the costs associated with the transformation of the coal regions of Ukraine shall be borne by the State;
- environmental sustainability - the introduction of a set of environmental measures that will ensure the ecologically balanced functioning of coal regions and allow citizens to effectively exercise their rights to environmental safety;
- the long-term - the corresponding qualitative changes in the structure of the regional economy through its transformation will take until at least 2030.

As a result of the meetings on mechanical engineering, the following priority areas were developed:

1) Production of equipment for the implementation of the full cycle of waste management (reloading stations, waste sorting stations, waste processing plants, plastic, glass processing plants, etc.);

2) Creation of an industrial machine-building technopark with integration of innovative, economic, investment, logistic and production processes of small and medium business enterprises of the Donetsk region, with involvement of educational and scientific institutions, investors and authorities in these processes;

3) Production of components and consumable parts for machines and mechanisms used for construction and repair of roads;

4) Production of equipment necessary for the development of the ceramic production industry, with a high component of automation of technological processes through the involvement of IT enterprises;

5) Application of autonomous power supply systems with hybrid alternative sources and hybrid energy storage devices using Smart technologies;

6) The use of belt conveyors with variable length of transportation in the creation of competitive machines;

7) The use of tower cranes equipped with a bucket elevator and concrete distribution boom in the creation of high-performance, energy-saving and reliable equipment for transporting concrete during the construction of high-rise buildings.

10.4 Conclusion and next steps

The Ministry of Community and Territorial Development together with other interested central executive bodies has been determined by the resolution of the Cabinet of Ministers of Ukraine dated 22 September 2021 as the main executors of the State Target Program for Fair Transformation of Coal Regions of Ukraine until 2030.

The interviews and meetings allowed ties to be deepened with experts from the Ukrvugheinnovatsiya Center (Ukrainian Coal Innovation Center), the Institute of Industrial Economics, Ptoukha Institute for Demography and Social Studies, Dnipro University of Technology, the Association of Mining Towns, the Donetsk Regional State Administration, the Donetsk Research Center, and representatives of private enterprises.

For further interaction between stakeholders and to determine the further development of the region, TETI plans to hold broad meetings on the following issues:

A. Creating the conditions for investment development:

- support for the development of appropriate engineering infrastructure to attract investment (industrial parks, industrial sites, construction of transport infrastructure, reinforcing power plants, warehouses, etc.);
- introduction of a mechanism to support the implementation of State investment projects related to the elimination of the negative consequences of the liquidation of coal mining enterprises;
- support for investors, creation of databases of greenfield and brownfield objects, etc.

B. Improving living conditions, promoting the development of quality and convenient infrastructure:

- creation of places of cultural rest, leisure, sports and other public spaces;
- ensuring the provision of quality educational and medical services.

C. Transition to alternative energy sources and increase the level of energy efficiency in the housing and communal sphere:

- modernisation of district heating systems in coal communities, in particular through the use of waste heat of coal enterprises;
- construction and reconstruction of water supply systems, treatment facilities, water de-ironing and purification systems;
- management of community energy resources by reducing the dependence of municipal systems on coal and the transition to alternative (renewable) energy sources.

D. Creation of points of economic growth taking into account the available economic and human potential for diversification of the local economy:

- revitalisation of former industrial facilities by creating cultural and sports spaces, museums of Ukrainian industry, etc.;
- creation of centres of creative economy, development of pilot projects and stimulation of creation of innovative enterprises;
- implementation of pilot projects to diversify the economy of coal communities;
- providing services to promote employment and self-employment of the population of the coal regions of Ukraine in the same area.

E. Re-profiling of vocational education institutions:

- modernization of equipment, development and implementation of training programmes for the acquisition of skills in related professions that meet the needs of the labour market and promote the organization of self-employment, etc.;
- dissemination of the form of dual education for employees of the coal and related industries on the basis of vocational education institutions.

F. Solving environmental problems:

- comprehensive land reclamation and ecological restoration of coal-mining regions;
- ensuring the preservation, restoration and balanced use of protected areas;
- ensuring the development of objects and territories of the nature reserve fund;
- reproduction of ecosystems, improvement of land structure;
- ensuring the efficient use of gas (methane) from coal deposits, in particular the production of heat and electricity from gas (methane) from coal deposits (including co-generation potential) for the needs of coal regions;
- ensuring the development of environmental education, conducting educational activities on the sustainable use of natural resources;
- ensuring the efficient use of mine water (introduction of effective technologies for treatment, disposal and utilization, use in energy systems, etc.).

11 Wales, United Kingdom

11.1 Introduction

To develop a broad vision for energy transition and identify future-oriented priorities in Wales, the research engaged with a broad range of stakeholders, experts and decision-makers to collect a varied set of views, and mobilise Welsh energy and R&I stakeholders. The participants of the Entrepreneurial Discovery Process (EDP) were consulted on their perceptions of the existing situation in Wales; the regional opportunities and challenges; and their views on what needs to be done. This chapter describes the methodology and the results of the implementation of the EDP in Wales.

11.2 Methodology

The activities described in this chapter were prepared in consultation with Welsh Government. Welsh Government is a TRACER project partner and a key stakeholder in the policy fields of energy (including renewable energy), decarbonisation, employment, training and skills, and research and innovation. The activities carried out in Wales consisted of interviews and a webinar. The interviews were planned and carried out with key stakeholders from all quadruple helix stakeholder groups. Due to the COVID-19 pandemic, online methods rather than face-to-face meetings were used after March 2020.

11.2.1 Interview methodology

Initial mapping of stakeholders in Wales took place during Spring 2020. The initial list of stakeholders covering all sectors was shared with Welsh Government and by August 2020 an agreed list of interviewees was finalised, with priority stakeholders identified. A total of 56 potential interviewees were contacted in batches between July and November. This resulted in a total of 30 interviews, covering all four sectors of the quadruple helix (Table 1).

It was decided to concentrate on one-to-one interviews rather than group activities, and to expand the number of interviews from the 10-15 initially foreseen in the TRACER proposal. This was considered the best way to gather in-depth knowledge from the interviewees and gain meaningful and time efficient input from a broader set of experts in different sectors and disciplines. In addition, it was easier to plan one-to-one meetings rather than group sessions, given the COVID-related flexible working times of those involved.

Due to the COVID-19 pandemic, all interviews were conducted by Zoom, Microsoft Teams or by telephone, depending on the preference of the participant. All interviewees were provided with the questionnaire in advance. The interviews lasted around one hour, which allowed a reasonably deep discussion on the issues. Where participants were specialised in a particular area, the interview process was sufficiently flexible to focus on this area. Table 26Table 26 specifies the number of interviews and institutions per sector.

Table 26: Number of interviews undertaken with different types of stakeholders, Wales, UK.

Type of stakeholder	Number of interviews	Institutions
Welsh Government bodies	7	Decarbonisation and Energy Division Energy Policy Chief Scientific Adviser's Division Welsh European Funding Office
Other public authorities or third sector organisations	8	Natural Resources Wales Industrial Communities Alliance Welsh Local Government Association Bridgend Local Authority Energy Systems Catapult Local Partnerships[28]
Business associations and chambers	1	Federation of Small Business
Individual businesses	2	Ynni Glan, clean energy consultancy CR Plus, sustainability consultancy
Universities	3	Cardiff University
Research institutes	2	Energy Safety Research Institute (Swansea University) Energy Systems Research Institute (Cardiff University)
Educational institutions	2	ColegauCymru / Colleges Wales
Civil society organisations	4	Renewable UK Cymru Community Energy Wales Bevan Foundation National Energy Action
Others	1	Wales Trade Unions Congress
TOTAL	**30**	

The analysis of the interviews took place in three steps. The first step consisted of transcribing and summarising the interviews upon completion. The second step was to organise and analyse the interview data. The last step was to organise the interview data into specific themes, which could be developed as shared visions and priorities. The analysis was conducted as a shared task between the researchers using the visual collaboration software *Miro*.[29] This tool allowed the researchers to create different whiteboards under identified themes, draw links between them, and group statements about similar topics. The researchers used the option to edit each other's whiteboards in real-time, which facilitated interactive group work and co-creation while working from home. Interview statements were analysed by the researchers, merged and agglomerated in larger themes where possible (e.g. challenges of the energy transition and regional challenges).

11.2.2 Workshop methodology

An online stakeholder webinar was held on 30 June 2021 using Zoom. The webinar aimed to continue the dialogue started in 2020 with the interviews with key stakeholders in the Welsh energy transition. The meeting presented findings of the round of interviews and provided the opportunity to discuss the contextual changes since mid-late 2020. This included the post-Brexit and pandemic landscape, as well as new policies and strategies introduced, such as publication of the Regional Investment in Wales Framework, the strategies developed during the regional energy planning process in Wales, and the recently published recommendations

[28] Local Partnerships is a joint venture between the Local Government Association, HM Treasury and the Welsh Government, who work for the benefit of the public sector through the provision of support and advice over disciplines including housing, energy, infrastructure, climate response and the Re:fit procurement initiative.
[29] See https://miro.com/.

by the Innovation Advisory Council for Wales. This discussion enabled revisiting identified challenges, strengths and priorities in the light of recent developments.

The meeting focused on:

- Presentation on the TRACER project and its results from the eight other regions;
- Presentation of the 'sister' Horizon 2020 project ENTRANCES;
- Presentation and discussion of findings of the stakeholder interviews in Wales;
- Discussion on the prioritisation of energy transition priorities for Wales.

Seventeen people attended the two-hour webinar (including the STRATH team). Participants joined the webinar from Welsh Government, the higher and further education sectors, research and innovation bodies, consultancies working with industry, workers representative bodies and local government representatives.

During breakout sessions, participants were asked to 'sense-check' the TRACER findings, whether priorities had changed in the period between the interviews and the webinar, and what issues remained to be tackled in terms of energy transition in Wales. Participants highlighted a broad range of issues and priorities. Although some time had passed since the interviews, the main findings of the interview analysis seemed to remain valid.

There were strong messages about the need for communication with citizens and communities, and a recognition of the potential impact of the current energy transition on particular places (and the risks associated with this).

Key priorities included: the need for a clearer path to help planning for the future, including for jobs and skills; the need for high quality jobs and fair work practices; the need for continued infrastructure investment, especially in rural areas; recognition of the trade-offs involved around conservation and biodiversity; and discussion of the requirements of a just transition for Wales. Opportunities for decentralisation and changing policy delivery for a just transition were highlighted. The point was also made that Wales should frame this energy transition and transformation purposefully in a way that is beneficial to society, and thus differently from the coal transition which was imposed upon Wales.

11.3 Vision and priorities in Wales

The interview process generated extensive material and, as COVID-19 was still a factor in getting larger groups together, this output was used to develop some initial findings towards the end of 2020. A spreadsheet was used to identify and group the main themes and issues emerging from the interview process with stakeholders. The STRATH research team held several meetings to discuss the emerging findings and possible narratives. The detailed knowledge of the participants allowed the researchers to summarise the different (contradictory and shared) visions for the region. These findings were confirmed during the June 2021 stakeholder webinar.

The main findings emerging from the stakeholder consultation are as follows:

11.3.1 Perception of the transition out of coal

Wales is undergoing a dual transition – an incomplete long-term socio-economic transition from coal mining, and the current energy transition to renewables. Both have a profound territorial dimension.

The impact of the historical mine closures was enormous and extends to the economic, social and environmental domains. These effects are still felt nearly 40 years later, in particular in areas where most of the socio-economic structure depended on the coal sector.

The energy transition is widely seen as a separate, second transition that has materialised in the last decade and affects the whole of Wales. Although challenges remain (community

involvement, decarbonising industry, affordability), Wales now has an energy mix that is well placed to make the shift to a zero-carbon economy.

The two transitions are perceived through temporal, geographical and sectoral lenses. Current and future developments should be seen in the light of historic and generational trajectories. Some territories are better placed than others to take part in and benefit from green energy developments. Beyond the energy sector, the transition will affect high-tech industries, IT, communications and the creative sector.

11.3.2 Views on policies addressing the transition out of coal

The socio-economic transition from coal has lacked (and still lacks) a long-term spatially focused policy framework, with potentially damaging implications for net zero strategies.

The succession of policies to address the impact of the mine closures has been reasonably successful in terms of landscape and re-greening, but has proved to be ineffective in terms of the impact on affected communities.

Targeted policy interventions have been too marginal and too short-term, and over time the focus on coal communities has been diluted, with investment 'mainstreamed' into wider regeneration and business support programmes.

In terms of the 'two transitions' – the phase-out of coal mining and the present energy transition – opportunities were missed to link former mining communities with the transition to renewable energy and to promote community ownership and local involvement.

At the time of reporting there is a significant policy focus on the transition to net zero, energy decarbonisation and the role of renewable energies within this. However, the policy landscape is also congested and lacks a joined up approach, leaving the pathway to net zero unclear.

There is a need for improved coordination and an overarching framework within which activity and progress can be mapped and monitored. The strategies emerging from the Regional Energy Planning process could help to achieve this.[30]

11.3.3 Perceptions of the energy transition challenges

Transition to sustainable energy in Wales is perceived as facing significant infrastructure and technological barriers. A major shift in policy focus is needed to address the problems of governance, unequal access and societal involvement. Challenges can be grouped under two main headings – technological and policy challenges, and organisational, social and cultural challenges.

a) Technological and policy challenges

Participants witness a number of political challenges involving the devolution structure, public funding opportunities, and difficulties related to public procurement and the promotion of public sector innovation. Policy reform would be needed, e.g. regarding local (tax) revenue support, as well as political leadership, consistency and capacity at the Welsh and local levels.

In terms of infrastructure, the current gas grid is argued as not being well equipped to reach all energy users. Additionally, some large renewable energy infrastructure projects have struggled to materialise, caused by a variety of environmental and political factors. Also

[30] A summary of the Energy Strategy for Cardiff Capital Region is available here: https://cardiffcapitalregion.wales/wp-content/uploads/2020/02/item-8-energy.pdf and here: https://www.cardiffcapitalregion.wales/wp-content/uploads/2019/03/item-10-energy-vision.pdf. See also The Comprehensive Energy Vision for Mid Wales here: https://www.ceredigion.gov.uk/resident/news/comprehensive-energy-vision-for-mid-wales-developed/

transport infrastructure and accessibility are limited, especially the public transport network.[31] Interviewees highlighted the few and low-quality bus and train connections between the Valleys and the main cities in the South of Wales. Residences and other buildings are in need of retrofitting in terms of energy efficiency. Scenarios with reliable data on the infrastructure and built environment could lead to joined-up strategies.

The physical geography and climate of Wales means there is a large demand for heat throughout the year. It poses challenges to solar PV in some areas, while also limiting physical connections. Some of the isolated areas were most affected by the historic coal transition.

Renewable technologies have a great potential benefit, but they also come at a socio-environmental cost. Examples in interviews of this cost relate to the negative impact on the landscape (onshore and offshore wind farms), lack of local involvement and ownership (wind energy), as well as the current lack of storage opportunities for the renewable energy produced to allow for a consistent year-round energy flow (specifically mentioned regarding solar PV).

Interviewees perceived that planning interest in renewable energy schemes had reduced, with initiatives remaining small-scale, and wider deployment obstructed by governance powers and land access issues.[32] Wales is not a global leader in this sector and projects are at risk of being outpaced by policy or technological change.

Besides energy generation, other sectors will have to be mobilised when decarbonising the economy and finding sustainable employment opportunities (heavy industry, green R&D, health, wellbeing and tourism). Funding opportunities will be selective and are harder to access for smaller and non-urban local authorities. The skills and labour market effects of (new) sectors need to be considered prior to supporting their development.

The decarbonisation agenda will only relieve socio-economic inequalities if poorer households and disadvantaged areas are recognised and prioritised. Issues with digital access, health, accommodation and energy affordability are especially problematic in former mining areas. Improving the societal understanding of the usage of new energy systems will support behavioural change by all citizens.

b) Organisational, social and cultural challenges

The research has offered the opportunity for participants to reflect on a number of contextual issues that were prominent at the time of the interviews. The COVID-19 pandemic (alongside Brexit) has put a strain on the capacities of multiple levels of government to respond to energy-related issues. COVID-19 has permeated many other parts of society, and participants were asked about its current and potential future impact on the energy transition in Wales. Despite its widespread challenges, participants also perceived the standstill of many aspects of life as presenting opportunities for a more conscious energy use, for digitalisation and labour market development. In this sense, COVID-19 has strengthened the case for accelerating the green transition, with interviewees arguing that solutions for climate change and COVID-19 could be self-reinforcing, and accelerate a green recovery. One such example is related to town planning, with neighbourhoods being re-thought to allow for people to access services within a short distance of their residence (e.g. in line with the 15-minute neighbourhood concept[33]). There are also other increasing pressures related to COVID-19 that will need to be addressed, for instance with increasing resident numbers coming from England to Wales as remote work gains traction. While this presents opportunities, it also pressurises the Welsh housing market and the capacity of digital infrastructure.

[31] Note recent news relating to the EV charging network: https://gov.wales/plans-boost-electric-charging-points-wales

[32] A major upswell has been noted in early consultations on solar and wind developments, as well as offshore wind, since the interviews were conducted.

[33] See e.g. https://www.bbc.com/worklife/article/20201214-how-15-minute-cities-will-change-the-way-we-socialise.

A second observation made by participants was the need for cultural change and a shift in mindset within Wales. Changes in cultures and assumptions were widely agreed as key elements to enable a quick green energy transition that involves large-scale roll out and societal embeddedness. These include not only mindset changes on the demand side of the consumer, but also changes to the "business-as-usual" mentality. This involves a shift in policy and industry priorities, from short-lived projects to long-term ones that can enable effective transformation. In practical terms, existing government bodies may be bolstered or take on further responsibilities related to the energy transition, or new bodies may be created to support it. For example, interviewees have suggested a heightened role for Public Service Boards linked to the Wellbeing of Future Generations Act, and the creation of a Minister of the Valleys or a Development Board Agency for the Valleys. In a geographical context where the social, economic and environmental impacts of mine closure are still felt, this is particularly significant, as in some places this heritage even created perceptions of a "legacy of underachievement".

In sum, there is a need to change behaviour cautiously, with consideration of these contextual elements, while also pursuing the necessary investment and lifestyle changes. On the consumers' side, an understanding of the transition and changes to their energy use will be required. For policymakers and businesses, it is thus important to be creative in engaging end users and e.g. incentivising commercial property to adapt as well. These suggestions may enable the achievement of a critical mass in projects that will boost the grid and power networks. In particular, boosting the grid means investing in updating it to current needs on the demand side, but also adapting it to the requirements of new energy sources. The energy grid and network should therefore be expanded to reach places it currently does not, allowing for smaller connections, and be reinforced to ensure present and future reliability.

Lastly, two further cross-cutting challenges were identified: a successful energy transition would require to break with business-as-usual vested interests. Changes in culture and assumptions were widely agreed as key elements needed to enable a quick green energy transition that involves large-scale roll out and societal embeddedness. This also involves a shift in policy and industry priorities, from short-lived projects to long-term ones that can enable effective transformation. Related to this, current decision-making and power structures create limitations to the representation of different voices in the energy transition. Involving local communities that are primarily affected by energy issues and projects is seen as a priority by stakeholders. Additionally, when talking about a system that is fit for the future, stakeholders noted the importance of having young people around the table, as well as more women and people of different ethnicities.

11.3.4 Views on regional strengths

Despite the challenges, Wales has important strengths – research expertise, the industrial bases, internal and external linkages, and collaborative networks. There was strong consensus about many of these strengths:

- Excellent natural resources that are favourable for renewable energy technologies, as well as opportunities around tourism and green industries.
- An existing industrial base and supply chains that offer potential for repurposing.
- Existing renewable energy clusters providing opportunity for development.
- On-going high level research on renewable energy technologies and decarbonisation, a well-regarded academic and research sector with strong international links, and existing collaboration with industry on decarbonisation.
- Highly motivated collaborative networks and the political will to achieve net zero.
- Significant new developments at regional and local levels, providing an opportunity and potential strategic framework to strengthen synergies and connections between the various renewable energy and decarbonisation policies and societal benefit.

- Of particular relevance to TRACER objectives, there are interesting geographical linkages between the 'two transitions' in the mine water project at Caerau, which plans to use heat from a former coal mine, and in the work underway on skills development related to low carbon (Bridgend), which was home to several quarries until the 1970s.

11.3.5 Vision for the Future

Interviewee's visions highlight the need for political leadership and collective effort in the just transition. Recognising the mistakes of the past is necessary to seize present and future opportunities. Participants identified three main areas in which new ideas and priorities should be developed: the political, regulatory and financial incentive frameworks; infrastructural and sectoral investments; and labour market, skills and community support. Within these, it is possible to identify priority areas, or areas of need, as well as areas of opportunity. Table 27 provides a summary of the vision of participants for the energy transition in Wales.

Table 27: Interviewee's visions for the energy transition in Wales: areas of need and opportunity.

	Areas of Need	Areas of Opportunity
Political, regulatory and financial incentive frameworks	• Transition incentives; • Mapping of energy needs and R&D in Wales; • Align Welsh needs with domestic and potentially other funding and development sources.	• Public procurement & seed funding; • Local leadership (e.g. city-region deals); • Alignment with Welsh Government economic, energy and related policies and strategies.
Infrastructural and sectoral investments	• Decarbonising heat; • Upgrading and decentralising energy grid; • Improving public transport; • Investment in energy storage; • Reduce energy dependency; • Sustainable and considered green energy shift.	• Retrofitting houses & building design; • Mix of renewables (solar, tidal, wind, nuclear, hydrogen); • ICT, artificial intelligence and high-value manufacturing; • EV infrastructure, methane and CO2 capture; • Circular economy;
Labour market, skills and community support	• Public ownership of energy transition; • Promote local infrastructure and wealth creation; • Access to education and training and skills development; • Creating good quality jobs; • Effective communication of transition benefits for energy literacy; • Identify locational dynamics (e.g. job & residence location); • Address deprivation, especially in former coal mining areas.	• Digitalisation; • Large scale initiatives; • Connecting training providers with businesses and policymakers; • Create and/or promote "centres of excellence" in energy; • Community energy projects.

Overall, the vision-oriented topics and ideas strongly emphasise a place-based approach. This is an integrated way to identify and address local needs, weaknesses and strengths, in order to develop tailored solutions. Throughout the different themes identified above, interviewees underlined the importance of consulting the community regarding its own transition needs, which is paramount to create more useful and efficient strategies, and vibrant communities across Wales. In particular, the specific circumstances in the former coal mining regions in South Wales need to be understood. This enables the Welsh Valleys to be recognised as an economically viable and/or productive area, alongside the cities and towns that follow the major transport corridors in South Wales. In the case of North Wales, interviewees view the area as a potential renewable energy powerhouse, and as a leading region in a net-zero or carbon negative economies.

11.4 Conclusion

The visions and priorities as identified in this chapter should be seen in the light of Wales' position as a region within the TRACER project. Compared to other TRACER regions, active coal mining has stopped for a longer period of time, and the last coal-fired power station ended operations in 2019. The transition out-of-coal largely occurred in the 1980s, and most of the land affected by mining has been reclaimed. The ongoing legacy of coal mining mainly consists of the impact of the transition, unplanned at the time, resulting in a decreasing socio-economic status of former coal mining communities and other areas suffering from industrial restructuring. In Wales, the 'energy transition' is thus twofold: the region is having to deal with structural spatial inequalities that are related to its coal mining past, whereas the shift towards renewable energy sources is a second challenge, and differs in terms of technologies, R&I needs, policy context and territorial incidence. At a higher education level, there is an awareness of local needs and development of energy R&I (e.g. FLEXIS' consortium of strategic partners and the Menai Science Park). However, the picture for future R&I needs in Wales is generally 'obscured' given the diffusion of investment and potential – thus lacking specialisation. The regional situation also closely intertwines with other sectoral and societal needs that vary locally.

Table 28: Summary of vision and priorities for Wales.

Perceptions of coal transition:	Wales is undergoing a dual transition – an incomplete long-term *socio-economic* transition from coal mining, and the current *energy* transition to renewables. Both have a profound territorial dimension.
Views on policies addressing the transition out of coal:	The socio-economic transition from coal has lacked a long-term spatially focused policy framework beyond European Structural & Investment Funds, with potentially damaging implications for net zero strategies.
Perceptions of energy transition challenges:	A transition to sustainable energy in Wales faces significant infrastructure and technological barriers. A major shift in policy focus is needed to address the problems of governance, unequal access and societal involvement.
Views on regional strengths:	Despite the challenges, Wales has important strengths – research expertise, the industrial bases, internal and external linkages, and collaborative networks.
Vision for the Future:	Interviewee's visions highlight the need for political leadership and collective effort in the just transition.[34] Recognising the mistakes of the past is necessary to seize present and future opportunities.

[34] In the current policy context, the just transition refers to a framework developed to ensure an inclusive, just and sustainable transition towards a climate-neutral economy.
For more information see: https://www.worldfuturecouncil.org/what-is-just-transition/

Annex 1 - Interviews structure in Jiu Valley, Romania

Interview I – Jiu Valley energy transition

BASIC INFORMATION
Name of interviewee:
Organisation:
Location of interview:
Date of interview:
Consent obtained: ***(including recording)***
A. How do you see the region's coal transition?
1. In your opinion, what are the chances of sustainable energy development in the Jiu Valley, in mining absence? *big / small / medium / can't appreciate*
2. How do you consider the economic situation in - Your city - Jiu Valley - Romania *very bad / bad / moderate / good / very good / can't appreciate*
3. And the situation of the energy sector (generation, transmission, distribution and supply of electricity and heat) from: - Your city - Jiu Valley - Romania *very bad / bad / moderate / good / very good / can't appreciate*
4. Which sector do you consider having more issues? - Electricity - Heat and hot water *Briefly argue the answer*
5. What do you think are the most important problems facing the Jiu Valley? - Emigration and depopulation of the area - Lack of skilled labour force - Authorities lack of interest for the recovery and transformation of the micro-region - Lack of capacity and competence at the level of local authorities in accessing European funds - Generalized and institutionalized corruption - Lack of skills at the level of local authorities to attract investors - Too few major investment projects (urban infrastructure) in the area - Too few market-oriented R&I projects and lack of necessary infrastructure - Reduced connectivity (road, rail, electricity, natural gas, communications, etc.) - Resistance to change of community members

- No evaluation and monitoring of renewable energy potential in the area
- No economic alternatives that generate sustainable jobs
- Lack of area-specific eligibility rules for accessing funding sources
- Lack of correlation of re-skilling and up-skilling programs with the labour market demand

very important / important / moderate / less important / unimportant / can't appreciate

Other problems not specified above?

6. From a political and legislative point of view, what impact do the following aspects have on the future development of the Jiu Valley?

- Government policies for regional development
- Alternation of political lead at central level
- Alternating the political lead locally
- The interest for the micro-region of the local representatives in the government and in the Parliament
- Frequent legislative and regulatory changes
- The bureaucratic character of the application norms

very strong / strong / moderate / weak / very weak / can't appreciate

Other political and legislative aspects

7. Please appreciate the state of the following aspects regarding the living standards in your city:

- Working conditions
- Quality of medical services
- Quality of education
- General standard of living
- Quality of utility services - electricity
- Quality of utility services - thermal energy
- Quality of utility services - water-sewer
- Quality of utility services - natural gas
- Quality of utility services - sanitation
- Infrastructure (connectivity - road / railway / energy / communications)
- Living conditions
- Air quality
- Leisure opportunities
- Political life at the local level
- The degree of involvement of local authorities in solving community problems
- The degree of involvement and commitment of the local community
- Professional perspectives of those in the area (jobs, alternative economic fields)
- The existence of local personalities / informal leaders with an impact on social development

very bad / bad / satisfactory / good / very good / can't appreciate

8. How do you consider the following threats to be in the future development of the Jiu Valley micro-region?

- Reduced capacity and lack of specialists to monitor projects implementation, of any type
- Lack of public / private partnerships

- Lack of cooperation and community involvement in the development of alternative energy strategies
- Lack of government policies to support the energy, environmental and social technological transition of Jiu Valley
- Lack of government and local funds needed for projects implementation (contribution from the state and local budgets to co-financing European projects)
- Inability to carry out viable and integrated development projects in the micro-region, through the collaboration and synchronization of all included units
- Lack of a common vision, strategic planning and an integrated management structure
- Population aging
- Financial inability of SMEs to co-finance research and innovation projects
- Low renewable energy potential, up to existing capacity, to bring about change from coal
- Gradual cut of state aid in the energy sector

very high / high / moderate / low / very low / can't appreciate

What other threats do you think should be mentioned?

9. Please appreciate the importance of the following environmental issues:
- General environmental issues (climate profile changes, drought / desertification conditions, flood hazard, pollution) - at national level
- General environmental issues (climate profile changes, drought / desertification conditions, flood hazard, pollution) - at local level
- Impact of planned or ongoing activities / initiatives on the environment
- Impact of climate change on the transition process implementation
- Geographical location
- Legal status of land / buildings, free of juridical charges, after mines post-closure monitoring period

important / moderate importance / unimportant

10. What is the period in which you see feasible the development of the Jiu Valley, in the absence of mining?

up to 10 years / 11-20 years / over 20 / can't appreciate

11. Please express your point of view on possible viable energy transition and sustainable development solutions for the Jiu Valley micro-region

Gender
Age
Education
Occupation
Field of activity
Place of residence

Interview II – Jiu Valley common vision for the energy transition

BASIC INFORMATION
Name of interviewee:

Organisation:
Location of interview:
Date of interview:
Consent obtained: *(including recording)*
B. How do you see the region's coal transition? / Cum vedeti tranzitia de la carbune a micro-regiunii Valea Jiului
1. Do you see a need for the region to transition out of coal to other sectors/activities? Why?
2. What is your view of past and present coal transition programmes in the region? What has – and has not - been successful, and why?
3. What do you see as the priorities for the region in relation to socio-economic development or coal transition?
4. Are you interested in contributing to discussions on a new strategy for future-oriented energy R&I in the region?
C. Mapping connections / Harta conexiunilor
5. Who do you already work with in the field of coal or energy R&I? *(E.g. main customers, suppliers, partners on R&I projects, members, sources of labour…)*
6. How do you work with them?
7. Which other regional stakeholders are active in the field of coal or energy R&I (or have potential to be active)?
D. **What works well in the region? / Ce functioneaza corespunzator in micro-regiunea Valea Jiului?**
8. Does the region have future-oriented thematic strengths in relation to energy R&I?
9. What do you see as the most important regional resources / capacities for energy R&I? E.g. in terms of the following: ▪ Generators of knowledge (universities, research centres, business R&I); ▪ Skilled/educated workers and organisations generating skilled educated people (universities, colleges etc.); ▪ Innovative businesses translating knowledge into products and services; ▪ Connectors between sectors, organisations and themes (e.g. chambers, cluster agencies, innovation centres, development agency etc.) ▪ Sources of funding (e.g. private funds, quasi-public funds, and public programmes); ▪ Important customers for R&I (public or private); Supportive institutions, regulations and infrastructure.
E. **Vision for the future / Viziunea pentru tranzitia energetica durabila a micro-regiunii Valea Jiului**
10. Looking 10 years into the future, what changes would you like to see in the region: ▪ In terms of R&I / sustainable energy transition?

In broader terms?
11. What do you see as the challenges facing the region, in terms of energy R&I / sustainable energy transition?
12. What are the possible solutions to these challenges?

Interview III – Proposed solutions for a sustainable energy transition in Jiu Valley

BASIC INFORMATION
Email address:
INTERVIEW
1. What do you want to achieve? What are the objectives and benchmarks?
2. How will you achieve the objectives?
3. When did you intend to carry out the activity / project? What is the schedule?
4. What is the estimated budget required for implementation?
5. Who is responsible for this proposed activity? or Who is responsible for implementing the proposed solution?

Note: All online interviews were in Romanian language.

Annex 2 - Stakeholders workshops in Jiu Valley, Romania

HALF DAY EVENT STRUCTURE

<table>
<tr><th>Sessions - Topics</th><th>Approach details</th></tr>
<tr><td colspan="2">Chairs: Representatives from AISVJ and SPE Proiectare și Consultanță</td></tr>
<tr><td colspan="2">Official opening
Tour de table
The current background
- Ongoing projects / initiatives in Jiu Valley and existing RIS3 for NUTS2 West Region
- State of play (coal-based power and energy related R&I)</td></tr>
<tr><td colspan="2">TRACER Project brief overview (accomplished; next steps, including events to come)
Best practices in coal regions in transition related to
- Technologies
- Environment
- Labour market – social transformation</td></tr>
<tr><td colspan="2">TRACER Project analyses related to technical concepts for the transition to sustainable energy system
- Preliminary assessment of existing RES potential in Jiu Vally micro-region</td></tr>
<tr><td>Interactive session and Q&A
Discussions on
- TRACER and sustainable energy R&I
- energy transition
- socio-economic transformation
- EDP</td><td>Open discussions were encouraged on the presentations
Each participant identified pros and cons in the context of regional transition, what could be done better in future, and shared their views on the region’s experiences & policies ideas (positive and negative) and potential solutions with the group.
Fields of activities tackled: energy, tourism, agriculture, other industries, environment, socio-cultural, education etc. from people / activities / resources / programs and background perspectives
What works well already?
What didn’t work?
What could be done differently?
What do you want to achieve?
Which are the goals?
How to accomplish/put in practice?</td></tr>
</table>