Smart strategies for the transition in coal intensive regions

Project No: 836819

Roadmap for Jiu Valley / West (RO42) target region, Romania

WP 6 – Task 6.3 / D6.4

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TRACER website: www.tracer-h2020.eu

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Abbreviations

ADR Vest	West Regional Development Agency
CRIT	Coal Regions in Transition Platform
CVET	Continuous Vocational Education and Training
DG	Directorate General
DHCS	District Heating & Cooling Systems
EC	European Commission
EIB	European Investment Bank
GJ	Gorj County
HD	Hunedoara County
MIPE	Ministry of European Investments and Projects (former MEF)
PNRR	Recovery and Resilience National Plan
R&D	Research and Development
R&I	Research and Innovation
RIS3	Research and Innovation Smart Specialisation Strategy
SRSS	Structural Reform Support Service within the European Commission
START	Secretariat's Technical Assistance to Regions in Transition
TJTP	Territorial Just Transition Plan
UPET	University of Petrosani

1 Introduction

A Roadmap is basically a “planning technique” that places a Strategy’s goals, actions and milestones on a timeline. It also serves as a communication tool that helps articulate strategic thinking behind both the goals/objectives and the plan for reaching them. This TRACER Project’s report - Roadmap - is presenting the transition from coal pathway for the Jiu Valley micro-region as analysed and projected in previous deliverables (D6.1, D6.2 and D6.3) of TRACER, namely:

- Projections for the transition to 2030 / 2050 in Jiu Valley micro-region / West (RO42) target region, Romania (TRACER-D6.1, 2021);
- Research & Innovation Strategy in the field of energy for Jiu Valley / West (RO42) target region, Romania (TRACER-D6.2, 2022);
- Report on the needs for workforce retraining (TRACER-D6.3, 2022).

As outlined in the IEA report “Net Zero by 2050: A Roadmap for the Global Energy Sector” (IEA, 2021), so is this Roadmap for the people in Jiu Valley and about the human capital able to adapt, conceive, plan and implement a technically feasible, cost-effective and socially acceptable transition from coal. The main objective of Jiu Valley Roadmap is to correctly plan, on the timeline 2022 to 2030 / 2050 (with milestones in 2027, 2028/29 and 2030), an effective energy transition from coal and a just/fair socio-economic transformation.

This Report is complementary with the following two documents, endorsed by the local governance structure "Asociația pentru Dezvoltare Teritorială Integrată Valea Jiului" - ADTIVJ (Jiu Valley Integrated Territorial Development Association):

1. “*Action Plan of the Strategy for the economic, social and environmental development of Jiu Valley (2021-2030)*” (MIPE, 2021), developed with the financial and technical support of the EC – DG Reform, through the Structural Reform Support Service (SRSS) within the European Commission, under the coordination of the Ministry of European Investments and Projects (MIPE);
2. “*From Strategy to Action: Delivering a Just Transition in the Jiu Valley, today and tomorrow*” (EC-CRIT, 2022), developed through the assistance services of EC - DG Ener - CRIT, accessed in 2019, by all 6 Jiu Valley’s Mayors via START (Secretariat's Technical Assistance to Regions in Transition).

For synchronising Jiu Valley Roadmap for energy transition with the above documents, in order to avoid overlaps, consultations were held with local stakeholders organized by the TRACER Project, MIPE (through PwC) and START (through Ecorys). Thus, the proposed axes, measures and specific actions were correlated and, finally, a set of concrete actions and a list of indicative projects are being proposed (Annexes 1-3).

Jiu Valley’s Roadmap for energy transition includes:

- a series of measures and actions for the achievement of the targets set within the R&I Strategy in the field of energy for Jiu Valley / West (RO42) target region of Romania (TRACER-D6.2, 2022);
- guiding directions to policy makers, aiming to enhance the legislative framework
  - to integrate the new energy technologies in the energy system;
  - to implement the re-/up-skilling programs;
  - to stimulate investments in the low-carbon energy sector.

The step-by-step approach, in developing Jiu Valley energy transition Roadmap, follows the pathway according to figure below:

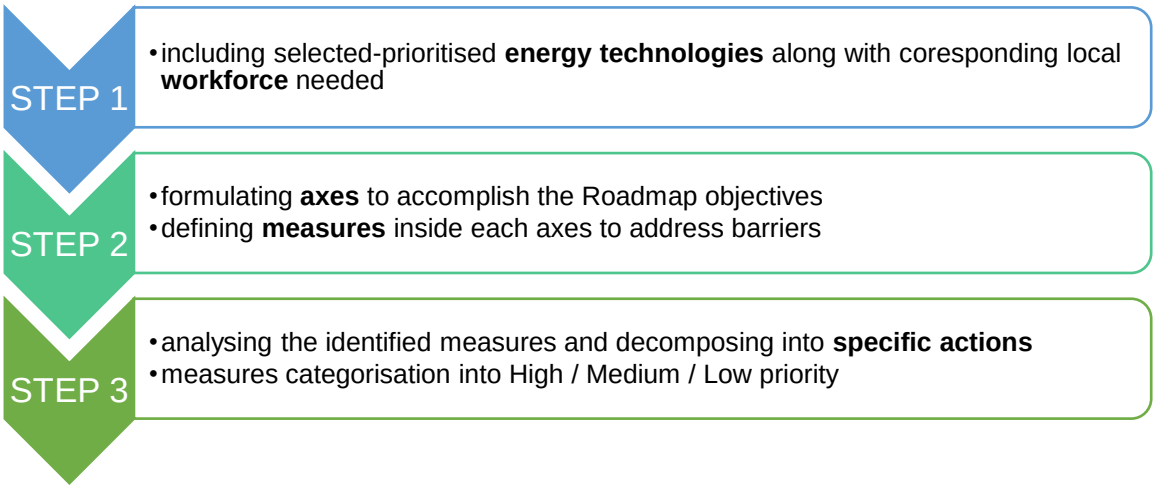

Figure 1: Step-by-step approach for developing Jiu Valley transition from coal Roadmap

For successfully implementing the Jiu Valley energy transition Roadmap the following enabling conditions are compulsory, according to both PwC and Ecorys (EC-CRIT, 2022) and TRACER reports (D3.2 – D6.1):

- Institutional capacity and competences, for both ADTIVJ and local authorities, to deploy identified projects ideas (from projects preparation to financing and implementation management);
- Commitment for an integrated cooperation and active engagement in the micro-region and for connecting Jiu Valley to R&I HUBs, transnational value chains and business networks;
- Enhanced ability of local and regional (NUTS2 and NUTS3) authorities to attract investors;
- Local stakeholders and citizens interest to efficiently and responsible use resources, and to reconnect to initial centralised DHS or to new micro-grids for district heating;
- Policy measures at national-regional level put in place to:
  - ✓ mitigate local authorities and SMEs co-financing incapacity (State Aid rules);
  - ✓ more flexibly manage post-mining assets (land and buildings) for ownership transfer, reuse or repurpose;
  - ✓ update mine-closure procedure to be R&I oriented, opened to safely make-use of the existing potential (i.e. MMC, UCG, heat storage, mine waters heat pilot projects tec.), from early stage of the closure process;
  - ✓ promote fiscal incentives encouraging existing SMEs green & digital investments and attracting investors;
- Market oriented re- and up-skilling programs and dual education or apprenticeship system developed;
- Adequate connectivity infrastructure (roads, railways, ICT) developed in parallel;
- Stable and predictable geo-political context in terms of energy and fuels prices.

2 Strategic approach for the development of the Roadmap

2.1 Prioritization of R&I activities for the selected energy technologies

As underlined in Jiu Valley R&I Strategy in the field of energy (TRACER-D6.2, 2022), based on the following reference documents:

- SET Plan - Strategic Energy Technology Plan (EC, 2021) with its defined 10 key actions and fourteen technology areas that have the highest innovation potential;
- RIS3 in Vest Region / RO42 (ADR Vest, 2021) with its 6 Smart specialisation priority areas;
- Jiu Valley Transition Strategy 2021-2030 (MIPE, 2021) and Territorial Just Transition Plan HD / RO423 (TJTP Hunedoara, 2021) targeting areas of interest and support for R&I;

a set of R&I priorities were selected and presented in Table1, as areas with corresponding actions/activities to be carried out for the priority energy technologies in the micro-region.

Table 1: Jiu Valley micro-region R&I priority areas – actions and technologies/systems/services

R&I priority areas	Priority actions / activities	Technologies / systems / services
R&I.I. Renewable and alternative sources; and bioenergy generation	RES potential assessment, mapping and 3D modelling/ simulation	- GIS, Digital solutions for 3D modelling/simulation and LCA - Hybrid solar panels and solar thermal (roof type) - Concentrated solar power / CPV; Ground PV and roof PV - Vertical wind turbines - Various type of HPs and geothermal pumps, including research drillings for assessing the potential - Mine Methane Capture (MMC) or UCG (Underground Coal Gasification) for syngas production used in micro-CHP - RNG from energy crops to produce bio-methane - Green sustainable biomass - Green hydrogen from RES for heating, transport, electricity storage - Training simulators for different nuclear energy technologies
	RES integration for public/private consumers and prosumers and energy communities	
	Performant RES integrated in the NPS	
	Renewable fuels production	
	Green hydrogen generation hub	
	Nuclear energy	
R&I.II. Urban regeneration	Integrated urban and territorial planning, specific to a functional urban area (such as Metropolitan Area or Integrated Development Association)	- GIS - BIM (Building Information Modelling) - Digital solutions for innovative energy technologies planners - Cost-effective innovative construction materials (converting the building envelope into electricity-producing surfaces, sheep wool thermal-insulation etc.) - Energy and resource efficient workflows - Digital solutions for integrated energy demand-response - Digital solutions for building automation control - NZEB and positive energy buildings / districts / neighbourhoods - Smart city, smart districts, smart campus - Smart micro-grid infrastructure - Smart metering and data centres - New construction standard / Smart-green renovation concept and creation of the Jiu Valley buildings registry - Air quality/natural ventilation, natural lighting - Innovative and more energy efficient Building Integrated Photovoltaics (BIPV) - Micro-CHP biomass-based and/or syngas-based - Reversible HPs with no GHG
	Smart and green solutions for district heating and cooling (H&C)	
	Energy and resource efficient buildings renovation	
	Architectural aesthetic in line with the local cultural heritage	
	Buildings' functionality reconversion	
	RES integration in district / zonal / building H&C systems RES integration in buildings combined with urban service facilities	

R&I.III. Energy storage	Electricity storage hubs for e-mobility and stationary sources	- Energy management - Digital solutions to optimise the storage systems for different technologies (i.e. li-ion, sodium-sulphur, hydrogen from electrolysis, or second life eVs batteries) - Energy storage systems with bidirectional charging - Thermal energy storage tanks in former underground mines
	Thermal energy storage pilots/ proof of concept	
R&I.IV. Environmental protection	Monitoring and preserving air, water and soil quality	- Digital solutions for LCA and EIA and carbon footprint calculation, for air and water quality - Digital solutions for modelling and simulation - Digital innovative solutions for traffic management - New innovative solution for industrial wastes re-use - Innovative soil remediation solutions by making the most of its energy potential (i.e. reuse of mine waters for heating, ground PV on unproductive lands, energy crops and biofuels production etc.) - New smart green constructions on unproductive lands / former historically polluted site based on new construction standard and regreening an equivalent surface or regreening the entire historically polluted site - Ecosystem services to increase life quality by increasing the quality of the environment
	Updating mining closure guidelines and regulations for a sustainable remediation of former mining sites	
	Unproductive lands mapping and capitalisations	
	Industrial wastes re-use (i.e. ash and slag, construction materials from buildings demolition/ renovation etc.)	
	Assessing and constantly monitoring the carbon footprint of Jiu Valley micro-region	
	Development of green-blue corridors between urban, peri-urban and the natural environment	
R&I.V. Competitive and innovative manufacturing and processing industries	Energy efficiency and sustainable use of resources - solutions for industry	- Heat recovery in industry - Digital solutions for smart metering, processing and decision-making support tools - Digital solutions for industrial process automation & control - Digital solutions for LCA and EIA - VxG charging systems production for e-buses, e-vehicles, e-bicycles and e-scooters - PCB (printed circuit board) production in compliance with RoHS and REACH Directives - Advanced electricity storage systems production - Innovative green biomass production - Digital hubs / industrial parks / business incubators
	Cost-effective manufacturing of electric and electronic, micro-electronic parts for various fields/niches (i.e. e-mobility, urban digitalisation, smart metering, industry automation, RES spare-parts etc.)	
	Green biomass sustainable generation from wood processing industries and agriculture	
R&I.VI. Innovative technologies and services for consumers (public, private, energy communities, individual prosumers)	Utilities, fuels and other urban indicators monitoring, reporting and management (i.e. energy, water, carbon footprint, climate, indoor-outdoor air quality, biofuels and others, wastes etc.)	- Smart metering - BMS – building management system - ICT, IoT, big data, open data models - Innovative protective systems for potentially toxic / inflammable / explosive atmospheres - Mobile applications - User-friendly interfaces - Green schools and innovative, flexible and adaptive curricula - Living labs / proof of concept
	Advanced protection for industries and civilian areas against toxic / inflammable / explosion hazard	

	Decision making support tools	
	Developing new and supporting existing CVET, higher-education and dual-education systems and programs curricula to be innovative, flexible and adapted to market needs	
	Consumers' behaviour monitoring for rising awareness and changing attitudes	
	Facilitating social innovation, co-creation, promote education and CVET for sustainability	

Source: TRACER-D6.2 (2022)

2.2 Prioritization of local workforce reskilling / retraining needs

The social challenges, up- and re-skilling needs and the region's labour market aspects were tackled in three important TRACER deliverables:

- Best practice report on labour markets, social issues and tourism (TRACER-D2.4, 2020);
- Report on social challenges and re-skilling needs of the workforce - solutions in the TRACER target regions (TRACER-D3.4, 2020);
- Report on the needs for workforce retraining in the TRACER target regions (TRACER-D6.3, 2022).

As mentioned in these documents, in order to generate sustainable employment and regain citizens' livelihood and stability, the specificity of Jiu Valley social-cultural heritage must be considered, together with the local labour market current and future needs.

Re-skilling needs targets set out, on the long term (2040/2050), in TRACER Report on the needs for workforce retraining (TRACER-D6.3, 2022) presented the potential of the RE industry (clean energy) and other sectors to absorb the existing coal industry jobs, recent layoffs and Jiu Valley unemployment. The table below presents the needed jobs vs. potential jobs creation in 3 energy transition scenarios.

Table 2: Jiu Valley micro-region re-skilling needs considering jobs creation scenarios

Jobs creation scenarios Investment projects deployed in						**Estimated re-skilled potential / needs[1]** (direct jobs)
Biomass	PV	Wind	Micro-hydro	Large-hydro	EE	
-	X	X	X	-	X	2000
X	X	X	X	-	X	5400
X	X	X	X	X	X	6400

Source: TRACER-D6.3 (2022)

[1] *At the level of the entire economy in Jiu Valley, other job-generating projects will be quantified, as in the tourism industry, social and health services, road and railway infrastructure, or other investments in existing SMEs (i.e. electricity, electronics, textiles, wood processing industries, automation and robotics) and new SMEs related to the circular economy.*

Considering the recommended path towards decarbonisation in the R&I Strategy in the field of energy for Jiu valley (TRACER-D6.2, 2022), the 2030-2050 forecasts for the energy mix were updated with two large HPPs (Bumbesti HPP-40.5 MW_e and Dumitra HPP-24.5 MW_e). The update was made according to the newest legislative act, approved by the Romanian Parliament, allowing the completion of the works on Jiu River Hydropower Development (Bumbești - Livezeni - Dumitra).

To this aim, in Figure 2 the estimated provisions of jobs potentially generated by the RE and EE industry (TRACER-D6.3, 2022) were updated and projected on a timeline following the energy mix evolution curve in Jiu Valley. It was hypothetically considered that part of the existing hard-coal industry employees will be involved in all post-mining projects and will also be up- and re-skilled, when necessary, for the new biomass based CHPP in Paroseni, the rest being able to re-skill for other RE technologies, as solar, wind or hydro.

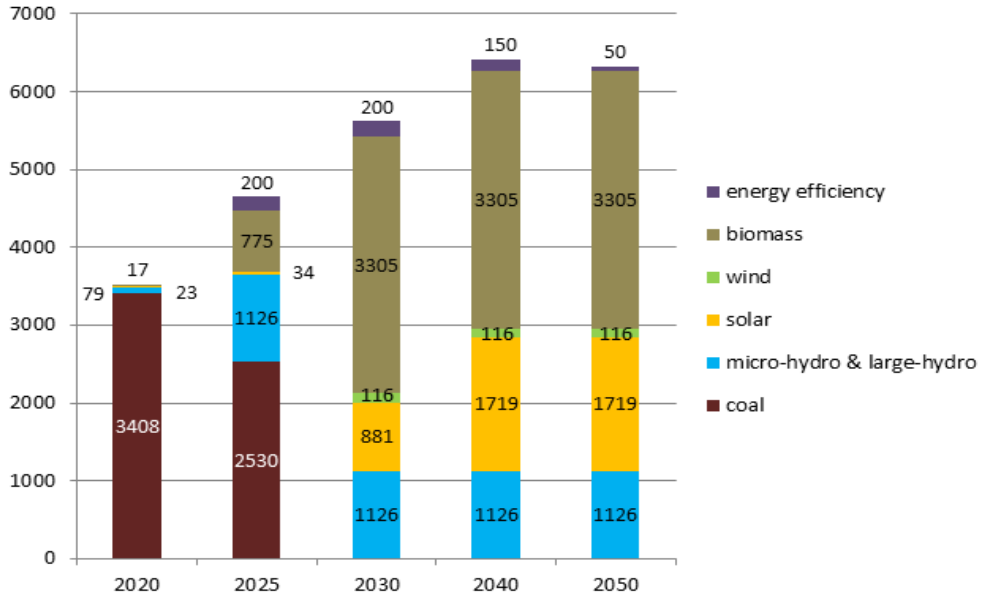

Figure 2: Evolution of estimated jobs potentially generated by RE and EE industry in Jiu Valley

Source: Data collect and update from TRACER-D6.3 (2022)

The main occupational profile in Jiu Valley's coal industry is the operation and service technicians, working as machine and constructions operators, mechanics, electricians, maintenance and repairs workers, equipment operators, locksmiths etc. In this respect, for the transformation of Jiu Valley workforce structure, the following activities/actions are recommended to be correlated with the re-skilling priorities for enhancing the labour market-oriented approach, so that all reforms and projects/programs to be deployed:

Table 3: Jiu Valley micro-region priorities of local workforce up- and re-skilling needs

Priority occupations and R&I areas	Priority activities/actions
1.1. **Technicians** (electricians, HVAC technicians, plumbers, drilling technicians, construction specialists, manufacturing processes operators, wind farm O&M technicians, PV modules installers, logistics operators, automation & control technicians, chemical laboratory assistants, etc.); 1.2. **Technical designers and consultants** (engineers from mechanical, electrical, civil, power systems and software back- grounds, process or manufacturing engineers, landscape architects, geotechnical engineers, measurement & control engineers, environmentalists, material scientists, biochemists, hydrologists, geologists, physicists, etc.); 1.3. **Advisors** (planning consultants, land development advisors,	1. All levels of education, whether it is about University of Petrosani, accredited trainers for up- and re-skilling courses, CVET units and apprenticeships in technical disciplines must cooperate in order to: i. be already prepared with a diverse, flexible and market-oriented

environmental legal consultants, policy developers/local development officers, teachers/trainers, energy officers, energy advisors, health & safety consultants, etc.); 1.4. **Business development executives** (business developers/analysts, marketing executives, financial, human resources and administration managers, technical sales representatives, public relations officers, etc.); 1.5. **Non-technical** (legal advisors, sales specialists, inspectors, and economists), in fields (R&I priority areas) as: ✓ Energy Efficiency (R&I.II, R&I.IV, R&I.V, R&I.VI) ✓ Urban regeneration, including environmental protection and post-mining restoration (R&I.II, R&I.IV, R&I.VI) ✓ Renewable and alternative energy industry (R&I.I, R&I.III, R&I.VI) ✓ Manufacturing and processing industries (R&I.V, R&I.VI) ✓ Technologies and services for consumers (R&I.VI)	curricula and training programs; ii. periodically assess the inventory of existing and future labour market needs (on short / long term) in the micro-region; iii. synchronise the labour market needs with the existing occupational profile in the coal industry and unemployment data base; iv. constantly promote their offer for up- and re-skilling courses.
2.1. **Advisors in priority fields** (RE and alternative, green infrastructure, manufacturing, tourism, urban regeneration, etc.) as: planning – local development officer, environmental legal consultants, policy developers officers, energy advisors, etc.; 2.2. **Administration development executives** (public administration managers, projects developers/managers, financial, HR, communication, etc.); 2.3. **Non-technical** (legal advisors, inspectors, and economists), in fields (R&I priority areas) like: ✓ Energy Efficiency (R&I.II, R&I.IV, R&I.V, R&I.VI) ✓ Urban regeneration, including environmental protection and post-mining restoration (R&I.II, R&I.IV, R&I.VI) ✓ Renewable and alternative energy industry (R&I.I, R&I.III, R&I.VI) ✓ Technologies and services for consumers (R&I.VI)	2. Institutional capacity building, abilities and competences rising programs for local authorities to: i. deploy identified projects (from projects preparation to financing and implementation management); ii. attract investors; iii. formulate and promote policy measures.

Source: TRACER-D6.3 (2022)

In Chapter 4 of the Roadmap, the priorities of the workforce re-skilling needs and of the R&I actions/activities will be correlated and placed on a timeline.

2.3 Barrier's analysis

After performing several SWOT and PESTLE analyses during the TRACER project, a set of the most relevant barriers identified are summarised and listed below, addressing Jiu Valley micro-region:

Policies – Governance – Legislation

- Reduced institutional capacity and competences, for both ADTIVJ and local authorities, to deploy identified projects (preparation, project financing, implementation management); not enough ability to take the most of the existing financing sources and mechanisms;
- Lack of commitment on behalf of ADTIVJ members, for an integrated cooperation and active engagement; inertia in taking decisions for the first steps in implementing Jiu Valley transition strategy;
- Inability of the local and regional (NUTS2 /NUTS3) authorities to attract investors;
- Insufficient ADTIVJ members lobbying to mitigate local authorities and SMEs co-financing incapacity (State Aid rules); high inertia at governmental level in solving such issues related to both Romanian coal regions in transition (HD and GJ);

- Absence of policy measures for:
  - ✓ a specific approach for State Aid rules, in all 6 Romanian just transition regions;
  - ✓ more flexibly managing post-mining assets (land / buildings) related to ownership transfer, reuse or repurpose; and no update mine-closure procedure to be R&I oriented, opened to safely make-use of the existing potential (i.e. Mine Methan Capture - MMC, Underground Coal Gasification - UCG, heat storage, mine waters heat pilot projects), from early stage of the closure process;
  - ✓ promoting fiscal incentives as an "transition fiscal regime" encouraging existing SMEs green & digital investments and attracting investors;
- Inertia in updating the regulatory framework, which is often lagging behind the funding programs' launch or the policy reforms approval;
- No geo-political context stability and predictability, in terms of energy and fuels price;
- Unstable political consensus.

Connectivity – Infrastructure – Utilities

- Inadequate connectivity infrastructure (roads, railways, digital);
- No guaranties of interest rising from mayoralties to retrofit and upgrade the centralised DHS or to reconnect to new zonal/districts micro-grids for district heating;
- Unequal accessibility to utilities (i.e. expand the water-sewer network and the natural gas supply network for cooking, integrated waste management, etc.) at local communities level.

Technologies and R&I

- Absence of local RE potential assessments through GIS;
- Hesitation in further developing public & private investments related to transition from coal (i.e. RES integration);
- Insufficient investments in the electricity distribution network readiness to take over the RES connection boom;
- No constant metering / monitoring of utility consumption, energy flows, air quality, etc.;
- Uncertainties related to the interest from public authorities and individuals to reconnecting to the retrofitted and upgraded centralised DHS (formerly abandoned by the local councils) or to new micro-grids for district heating;
- Local stakeholders' low interest in rising energy efficiency in constructions and industry;
- Reduced expertise in addressing issues related to urban regeneration;
- Delays in supply chains for various industries;
- Low active engagement of SMEs, research and academia representatives for connecting to national and European R&I HUBs, transnational value chains and business networks.

Environment and Social Aspects

- No R&I oriented management of post-mining assets for land and buildings reusing and repurposing;
- Outdated and rigid mine closure guide and procedures;
- Low level of local stakeholders' and citizens' interest to efficiently and responsible use of resources;
- High unemployment and energy poverty rates; continuous degradation of living standards;

- Poor citizens' willingness and interest to be pro-actively engaged and to co-create transition solutions;
- Lack of information-education, awareness rising and knowledge transfer campaigns on transition from coal;
- Deepened social stratification and lack of social inclusion programs;
- No social policies / measures to increase the economic attractiveness of the area for reducing youth migration and brain drainage.

Work force re-skilling

- Not enough market oriented re- and up-skilling programs and dual education or apprenticeship system developed;
- Less dynamic curricula updates for the RE and EE industry;
- Not enough cooperation between University of Petrosani, accredited trainers for up- and re-skilling courses, CVET units and apprenticeships in technical disciplines;
- Former miners lack of interest for re-skilling programs and re-employment or for taking advantage of local entrepreneurial opportunities, if they are early retired or at home with compensatory salaries;
- Reluctance of the public (i.e. inactive workforce, elderly) related to digitalisation; difficulties in sharing ideas and poor knowledge of an international language.

3 Recommendations for Measures

3.1 Major axes needed to accomplish the objectives of the R&I Strategy

For an effective energy transition from coal through R&I, in Jiu Valley micro-region, the correlation between - and complementarity of both - strategic documents, i.e. the "Transition Strategy" (MIPE, 2021) and the "R&I Strategy in the field of energy" (TRACER-D6.2, 2022), was performed and the following R&I objectives were set-up according to Table 4. In the same table the major axes of the measures needed, in order to accomplish the R&I Roadmap in the field of energy, as regard to the R&I priorities (Table 1), are presented.

Table 4: Jiu Valley micro-region R&I objectives and measures needed

R&I Strategy in the energy field	**R&I Roadmap**
R&I objectives	***Major axes of the measures needed***
Consolidating Jiu Valley micro-region R&I ecosystem by: a. Cultivating the culture of innovation by encouraging co-creation activities and developing knowledge hubs, living-labs etc. b. Enhancing the involvement of young people by promoting open science and increasing R&I activities attractiveness c. Creating opportunities for up-skilling / re-skilling programs in high-tech 4.0 industry and strengthen basic competences in ICT and foreign languages d. Encouraging the creativity and entrepreneurship in innovation by making the most of the natural and cultural heritage of Jiu Valley	1. Overcoming institutional barriers to secure financing and ensure the deployment of the R&I priority actions/activities; 2. Setting-up regional tailored policies to efficiently implement Jiu Valley R&I Roadmap, thus enhancing the economic attractiveness of the area and reducing youth migration and brain drainage;

e. Supporting the growth and competitiveness of the innovative business environment for high value-added production/ services diversification f. Improving access to R&I funding opportunities especially for SMEs for innovation through digitalisation and carbon-neutral processes and/or products g. Deepening the cooperation between R&I entities – businesses – public administrations for promoting ready to market R&I products/services h. Updating and opening access to the R&I infrastructure i. Supporting the connection and integration of Jiu Valley R&I key players in global value chains and business networks j. Addressing national and regional policies priorities and challenges in R&I	3. Enhancing cooperation between regional R&I key players (SMEs, research and academia representatives) and their integration in national and Europeans R&I HUBs, transnational value chains and business networks

In Annex 1 the correlation between the two following strategic pathways is performed:

- Measures major axes for energy - environment - workforce needs inside the R&I Roadmap for energy transition (current report).
- Development pillars and strategic directions/measures inside the Transition Action Plan for Jiu Valley (MIPE, 2021).

3.2 Major axes needed to fulfil the needs for workforce retraining

Starting from the priorities of the workforce analysed in Chapter 2.2 (Table 3), and after assessing the up- and re-skilling needs (TRACER-D6.3, 2022), in Table 5 the major axes of the measures needed in order to fulfil the objectives of Jiu Valley workforce structure transformation are presented.

Table 5: Jiu Valley micro-region measures for the workforce up- and re-skilling

Workforce up- and re-skilling needs	**R&I Roadmap in the energy field**
Priority activities/actions	***Major axes of the measures needed for the workforce structure transformation***
1. All levels of education, whether it is about University of Petrosani, accredited trainers for up- and re-skilling courses, CVET units and apprenticeships in technical disciplines must cooperate in order to: i. be already prepared with a diverse, flexible and market-oriented curricula and training programs; ii. periodically assess the inventory of existing and future labour market needs (on short and long term) in the micro-region; iii. synchronise the labour market needs with the existing occupational profile in the coal industry and unemployment data base; iv. constantly promote their offer for up- and re-skilling courses. 2. Institutional capacity building, abilities and competences rising programs for local authorities to: i. deploy identified projects (from projects preparation to financing and implementation management); ii. attract investors; iii. formulate and promote policy measures.	1. Diversifying the education offer for covering the workforce retraining needs, by immediate correlation with the labour market demand and with the R&I priorities; 2. Increasing the attractiveness of up and re-skilling programs in the RE and EE, by efficiently transfer to and certify/accredited the new occupations; 3. Improving collaboration between academia, accredited trainers, CVET units and apprenticeships in technical disciplines to avoid programs' structure overlaps, to ensure correlation with the labour market needs and eliminate basic competences barriers (i.e. enhanced language and digital knowledge).

For a corelated and unified approach of both pathways (R&I Roadmap in energy and the Transition Action Plan), the major axes for measures needed in energy – environment – workforce (Chapters 3.1 and 3.2) were synchronised in Annex 1.

3.3 Measures proposed under each one of main axes to overcome the barriers

In order to be prepared to overcome the most relevant barriers analysed above, in Chapter 2.3, in the following table a set of associated measures to the major axes were defined.

Table 6: Jiu Valley micro-region associated measures to overcome relevant barriers

Major axes of the measures needed	Associated measures to overcome relevant barriers
1. Overcoming institutional barriers to secure financing and ensure the deployment of the R&I priority actions/activities	1.1. Strengthen the institutional capacity and enhance competences, for both ADTIVJ and local mayoralties, to deploy identified projects (preparation, project financing, implementation management); 1.2. Identify and attract assistance services support to: - improve the ability to maximise the use of financing sources and mechanisms and attract investors; - develop pre-investment studies for future funding applications for actions/projects - perform, in GIS format, the landscaping and integrated urban planning documents; - map and assess local RES potential, in GIS format; 1.3. Rise the interest and commitment of ADTIVJ members, for an integrated cooperation and active engagement, thus accelerating the commencement of public and private investments in targeted areas; 1.4. Set-up several working groups coordinated by ADTIVJ (i.e. R&I, LLL, etc.); 1.5. Customisation of State Aid rules for SMEs and co-financing rates for local public administration, in coal intensive regions
2. Setting-up regional tailored policies to efficiently implement Jiu Valley R&I Roadmap, thus enhancing the economic attractiveness of the area and reducing youth migration and brain drainage	2.1. Customisation of eligibility rules in 2021-2027 programming period (FEDR, FSE+, FC and others) for coal regions in transition regions (Jiu Valley and Oltenia); 2.2. Ensure a flexible management of post-mining assets (land / buildings) related to ownership transfer, reuse or repurpose; 2.3. Update mine-closure procedure to be R&I oriented, opened to safely reuse the existing energy potential (i.e. MMC, UCG, heat storage, mine waters heat pilot projects), from early stage of the closure process; 2.4. Promote fiscal incentives as an “transition fiscal regime” for: - encouraging citizens’ and existing SMEs towards green & digital investments and attracting investors; - reducing youth migration and brain drainage.
3. Enhancing cooperation between regional R&I key players (SMEs, research and academia representatives) and their integration in national and Europeans R&I HUBs, transnational value chains and business networks	3.1. Rise the interest and commitment of the R&I actors, for an integrated cooperation and active engagement towards initiating and deploying R&I projects, together with launching new competitive SMEs in manufacturing and processing industry.

4. Diversifying the education offer for covering the workforce retraining needs, by immediate correlation with the labour market demand and with the R&I priorities	4.1. Perform periodic updates, based on the projected new economic profile of Jiu Valley, and prior to immediate workforce retraining needs, for: - the existing university curricula, - the up-& re-skilling courses' topics, considering the Transition Action Plan and R&I Roadmap with steps forward in their implementation; 4.2. Engage youth in the decision-making process, from early stage of the curricula updating process.
5. Increasing the attractiveness of up and re-skilling programs in the RE and EE, by efficiently transfer to and certify/accredit the new occupations	5.1. Enhance flexibility and dynamics of curricula updates for the RE and EE industry; 5.2. Strong European and international connections with accreditation bodies, at the level of the LLL working group, for an effective certification procedure of the up and re-skilling programs of interest.
6. Improving collaboration between academia, accredited trainers, CVET units and apprenticeships in technical disciplines to avoid programs' structure overlaps, to ensure correlation with the labour market needs and eliminate basic competences barriers (i.e. enhanced language and digital knowledge).	6.1. Enhance cooperation between academia, accredited trainers, CVET units and apprenticeships in technical disciplines, once the LLL working group has been set-up and communication channels established by: - initiating periodic meetings to correlate each curriculum and avoid overlaps; - engaging youth in the decision-making process from the start. 6.2. Increase former miners' interest in re-skilling programs and re-employment by presenting the advantages and future opportunities for the entire Jiu Valley.

The following horizontal measures are also recommended:

- Consumer's behaviour monitoring and public awareness rising campaigns related to:
  - nZEB concept, RE integration and EE measures in existing buildings renovation works;
  - positive energy districts, energy communities;
  - efficient and responsible use of resources (water, heat, electricity, fuels).
- Citizens' information and education (up- and re-skilling / dual education / apprenticeships programs) on:
  - transition from coal;
  - digitalisation and knowledge of an international language – dedicated to inactive workforce category and elderly people.
- Assess consumers interest to reconnect to the existing retrofitted centralised DHS or to new zonal/districts micro-grids for heating, considering the new energy market prices, as well as to prepare a tailored awareness campaign.
- Assess citizens' willingness and interest to be pro-actively engaged and to co-create transition solutions, as well as to raise their interest.

4 Action Plan of the Roadmap

4.1 Assessment and prioritization of the proposed measures

The associated measures of the defined major axes were defined to overcome relevant barriers and presented in Chapter 3.3. Further on, each measure will be evaluated and prioritised as having a High or Medium or Low contribution to reach Jiu Valley Transition

Strategy objectives, and to deploy R&I priority actions. The evaluation system consists of three dimensions leading to corresponding evaluation criteria, according to the schematic presentation below.

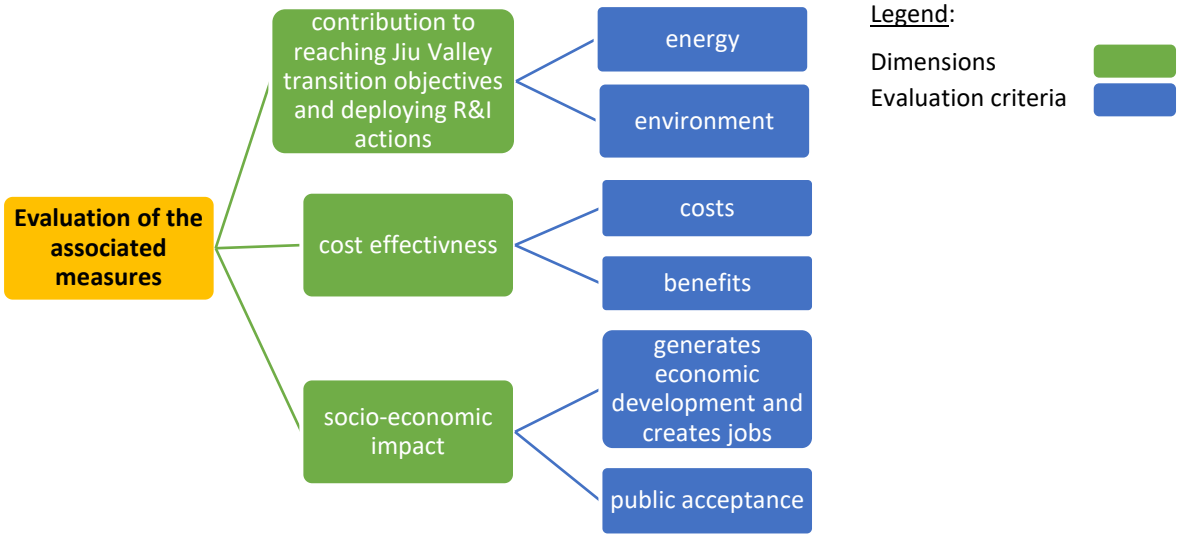

Figure 3: Evaluation system for Jiu Valley associated measures

The dimensions selected for the integrated evaluation of the recommended series of associated measures are:

- each measure contribution to reaching transition objectives and to deploying R&I actions;
- each measure cost effectiveness, referring to the total costs (CAPEX+OPEX) and the benefits obtained by implementing the measure;
- each measure impact at economic and social levels, referring to the positive impact generated by the development generated and jobs created.

The assigned scores for each associated measure, considering the set of evaluation criteria / per each dimension (Figure 3) can be attributed according to the following rating scale: (+) Low contribution (L); (++) Medium contribution (M); (+++) High contribution (H), and are presented in the table below.

Table 7: Evaluation of the contribution for each associated measure

Associated measures	Contribution to reaching transition objectives and to deploying R&I actions		Costs effectiveness		Impact at economic and social levels		Total score and final contribution per measure
	energy	environment	costs	benefits	economic development job creation	public acceptance	
1.1.	+++	+++	+++	+++	+++	+++	18 / v.H
1.2.	+++	+++	++	+++	+	+++	15 / M
1.3.	+++	+++	++	+++	+++	+++	17 / v.H
1.4.	+++	+++	+++	++	+	++	14 / M
1.5.	+++	+++	+++	+++	++	+++	17 / v.H
2.1.	+++	+++	+++	+++	++	+++	17 / v.H
2.2.	++	+++	++	+++	+++	+++	16 / H
2.3.	+++	+++	++	+++	++	++	15 / M
2.4.	+++	++	+++	+++	+++	+++	17 / v.H
2.5.	+	+	++	+++	+++	+++	13 / M
3.1.	+++	+++	+++	+++	+	+++	16 / H

Associated measures	Contribution to reaching transition objectives and to deploying R&I actions		Costs effectiveness		Impact at economic and social levels		Total score and final contribution per measure
	energy	environment	costs	benefits	economic development job creation	public acceptance	
4.1.	+++	+++	+++	+++	++	+++	17 / v.H
4.2.	+++	+++	++	+++	++	+++	17 / v.H
5.1.	+++	++	+++	+++	+++	+++	17 / v.H
5.2.	+++	+++	++	+++	+	+++	15 / M
6.1.	+++	+++	+++	++	+	+++	15 / M
6.2.	++	+	++	+++	+++	+++	14 / M

For each measure the evaluation rates were summed-up and the score-based prioritisation procedure (Table 7) considered the following rating ranges: score (16-18) ⇨ H, score (17-18) ⇨ very H; score (9-15) ⇨ M; score (6-9) ⇨ L. After performing the prioritisation procedure for the associated measures, the ranking of their contribution to reaching transition objectives and to deploying R&I actions is presented in Table 8 below.

Table 8: Ranking of the associated measures by their contribution to reaching transition objectives and to deploying R&I actions

Associated measures	Contribution ranking
1.1. Strengthen the institutional capacity and enhance competences, for both ADTIVJ and local mayoralties, to deploy identified projects (preparation, project financing, implementation management)	Very High
1.3. Rise the interest and commitment of ADTIVJ members, for an integrated cooperation and active engagement, thus accelerating the commencement of public and private investments in targeted areas	
1.5. Customisation of State Aid rules for SMEs and co-financing rates for local public administration, in coal regions in transition	
2.1. Customisation eligibility rules in 2021-2027 programming period (FEDR, FSE+, FC and others) for coal regions in transition regions (Jiu Valley and Oltenia)	
2.4. Promote fiscal incentives as an “transition fiscal regime” for: - encouraging citizens’ and existing SMEs towards green & digital investments and attracting investors; - reducing youth migration and brain drainage	
3.2. Rise the interest and commitment of the R&I actors, for an integrated cooperation and active engagement towards initiating and deploying R&I projects, together with launching new competitive SMEs in manufacturing and processing industry	
4.1. Perform periodic updates, based on the projected new economic profile of Jiu Valley, and prior to immediate workforce retraining needs, for: - the existing university curricula, - the up-& re-skilling courses’ topics, considering the Transition Action Plan and R&I Roadmap with steps forward in their implementation	
4.2. Engage youth in the decision-making process, from early stage of the curricula updating process	
5.1. Enhanced flexibility and dynamics of curricula updates for the RE and EE industry	
2.2. Ensure a flexible management of post-mining assets (land / buildings) related to ownership transfer, reuse or repurpose	High
1.2. Identify and attract assistance services support to: - improve the ability to maximise the use of financing sources and mechanisms and attract investors;	Medium

Associated measures	Contribution ranking
- develop pre-investment studies for future funding applications for actions/ projects - perform, in GIS format, the landscaping and integrated urban planning documents; - map and assess local RES potential, in GIS format.	
2.3. Update mine-closure procedure to be R&I oriented, opened to safely reuse the existing energy potential (i.e. MMC, UCG, heat storage, mine waters heat pilot projects), from early stage of the closure process	
5.2. Strong European and international connections with accreditation bodies, at the level of the LLL working group, for an effective certification procedure of the up and re-skilling programs of interest	
6.1. Enhanced cooperation between academia, accredited trainers, CVET units and apprenticeships in technical disciplines, once the LLL working group has been set-up and communication channels established by: - initiating periodic meetings to correlate each curriculum and avoid overlaps; - engaging youth in the decision-making process from the start.	
1.4. Set-up several working groups coordinated by ADTIVJ (i.e. R&I, LLL, etc.)	
6.2. Increase former miners' interest in re-skilling programs and re-employment by presenting the advantages and future opportunities for the entire Jiu Valley.	

4.2 Specification of the set of actions required to implement the Roadmap

In the Introduction section, it was stated that the main objective of the Jiu Valley's Roadmap is to correctly plan the energy transition and economic transformation, on a timeline (2022-2050), and with few indicative milestones. So, considering different allocation periods specific to several funding programs/mechanisms, two major stages were defined inside Jiu Valley R&I Roadmap for the energy transition:

STAGE I: Just transition from coal and economic transformation 2022-2030

- with an intermediary monitoring in 2025 and the following milestones -

2027 assessing how much Jiu Valley gained from the Recovery and Resilience National Plan - PNRR 2021-2026 (projects submitted vs. ongoing/finished contracts);

2028/29 evaluating how much Jiu Valley benefited from the Operational Programs (2021-2027) +2;

2030 assessing how much Jiu Valley gained from the Modernisation Fund 2021-2030; overall analysing if Jiu Valley just transition goals were achieved; how many actions / reforms / projects listed in both Transition Action Plan and R&I Roadmap, were deployed

STAGE II: Innovative growth and regeneration 2030-2040-2050

- with an intermediary monitoring each 5 years and milestones to be defined after 2030 assessment -

After evaluating the set of associated measures (as in section 4.1), these measures were analysed in detail and decomposed into specific actions. Considering STAGE I, a period with priority in the timeline of Jiu Valley R&I Roadmap for the energy transition, in Annex 2 the proposed actions for 2022-2030 are presented. For each proposed action recommendations are made for: a timeline, involved bodies, as well as the possible funding sources.

Making a step forward, and based on:

- the activity performed for the TRACER Project, in the frame of WP4 “Mobilization of EU funds and programmes”, and
- the collaboration with Ecorys – START consultant, during the elaboration of their final report (EC-CRIT, 2022),

a list of indicative projects proposals was debated and commonly validated together with Jiu Valley key R&I stakeholders, and is presented in Annex 3, in correlation with the “Action Plan of the Strategy for the economic, social and environmental development of Jiu Valley (2021-2030)” (MIPE, 2021).

As underlined by START assistance in their final report “From Strategy to Action. Delivering Just Transition in the Jiu Valley, today and tomorrow” (EC-CRIT, 2022). the next years are critical for achieving a Just transition for the Jiu Valley. Success will require the synchronisation of actions and resources by local, regional and national actors in a programmed manner.

The Report emphasises that the establishment of the Association for Integrated Territorial Development Valea Jiului (ADTIVJ) represents a significant organisational milestone for the transformation of the Jiu Valley. ADTIVJ is the main pillar and it has a difficult, but extremely important task, to align funding and resources and adopt a holistic approach to synchronise policy implementation at regional (NUTS2 and NUTS3) and local level, aiming to achieve Jiu Valley strategic common vision.

References

ADR Vest (2021). *Regiunea Vest - Strategia Regionala de Specializare Inteligenta 2021-2027.* Timisoara: ADR Vest. Retrieved from https://adrvest.ro/wp-content/uploads/2021/01/Strategia-Regionala-de-Specializare-Inteligenta-a-Regiunii-Vest-2021-2027-RIS3-.pdf

EC-CRIT (2022). *From Strategy to Action: Delivering a Just Transition in the Jiu Valley, today and tomorrow*. Bruxelles, European Comission. Retrieved from https://energy.ec.europa.eu/topics/oil-gas-and-coal/eu-coal-regions/secretariat-technical-assistance-regions-transition-start_en

IEA (2021). *Net Zero by 2050: A Roadmap for the Global Energy Sector.* Paris: International Energy Agency. Retrieved from https://www.iea.org/reports/net-zero-by-2050?msclkid=935443eac7af11ec8070931352552c0f

MIPE (2021). *Planul de acțiune pentru Strategia de dezvoltare economică, socială și de mediu a Văii Jiului (2021-2030), PwC, 2021 https://mfe.gov.ro/initiativa-valea-jiului/.* Bucuresti: Ministerul Investitiilor si Proiectelor Europene. Retrieved from https://mfe.gov.ro/initiativa-valea-jiului/

MIPE (2021). *Planul Național de Redresare și Reziliență al României.* Bucuresti: Ministerul Investitiilor si Proiectelor Europene. Retrieved from https://mfe.gov.ro/pnrr/

MIPE (2021). *Strategia de dezvoltare economică, socială și de mediu a Văii Jiului (2021-2030), PwC.* București: Ministerul Investitiilor si Proiectelor Europene. Retrieved from https://mfe.gov.ro/initiativa-valea-jiului/

PTTJ Hunedoara (2021). *PLANUL TERITORIAL PENTRU TRANZITIE JUSTA HUNEDOARA 2021-2027.* Deva: Consiliul Judetean Hunedoara. Retrieved from http://mfe.gov.ro/minister/perioade-de-programare/perioada-2021-2027/

TRACER-D2.4 (2020). *Best practice report on labour markets, social issues and tourism.* Bruxelles: TRACER project. Retrieved from https://tracer-h2020.eu/wp-content/uploads/2020/02/D2.4_TRACER_Deliverable_final.pdf

TRACER-D3.4 (2020). *Report on social challenges and re-skilling needs of the workforce solutions in the TRACER target regions.* Bruxelles: TRACER project. Retrieved from https://tracer-h2020.eu/wp-content/uploads/2020/09/TRACER_D3.4_31072020_public-rev.pdf

TRACER-D6.1 (2021). *Report "Projections for the transition to 2030 / 2050 in the target regions".* Bruxelles: TRACER. Retrieved from https://tracer-h2020.eu/wp-content/uploads/2021/06/TRACER-D61_Energy-Projections.pdf

TRACER-D6.2 (2022). *R&I Strategy in the field of energy for Jiu Valley / West (RO42) target region, Romania.* Bruxelles: TRACER. Retrieved from https://tracer-h2020.eu/wp-content/uploads/2021/09/TRACER-D6.2-6_RI-Strategy_RO-Jiu-Valley.pdf

TRACER-D6.3 (2022). *Report on the needs for workforce retraining.* Bruxelles: TRACER.

ANNEXES

Annex 1 – Measures to fulfil the energy-environment-workforce needs inside the R&I Roadmap correlated with the development pillars and strategic directions/measures inside the Transition Action Plan for Jiu Valley

Table 9: Integration of the measures' major axes for R&I in the field of energy and energy-workforce needs within the Transition Action Plan

Transition Action Plan 2021-2030			**R&I Roadmap energy & environment & workforce needs**	
Development pillars	**Main objective**	**Strategic directions** *of interest to be correlated*	**Major axes of the measures needed**	**Associated measures to overcome the barriers**
I. Increasing life quality and creating a healthy and sustainable environment for future generations	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	I.1 Calibrating local human potential to increase employment and combat social exclusion I.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); I.4 Supporting the transition to a green economy to protect the environment	1. Overcoming institutional barriers to secure financing and ensure the deployment of the R&I priority actions/activities; 2. Setting-up regional tailored policies to efficiently implement Jiu Valley R&I Roadmap, thus enhancing the economic attractiveness of the area and reducing youth migration and brain drainage; 3. Enhancing cooperation between regional R&I key players (SMEs, research and academia representatives) and their integration in national and Europeans R&I HUBs, transnational value	1.1. Strengthen the institutional capacity and enhance competences, for both ADTIVJ and local mayoralties, to deploy identified projects (preparation, project financing, implementation management); 1.2. Identify and attract assistance services support to: - improve the ability to maximise the use of financing sources and mechanisms and attract investors; - develop pre-investment studies for future funding applications for actions/projects - perform, in GIS format, the landscaping and integrated urban planning documents; - map and assess local RES potential, in GIS format; 1.3. Rise the interest and commitment of ADTIVJ members, for an integrated cooperation and active engagement, thus accelerating the commencement of public and private investments in targeted areas; 1.4. Set-up several working groups coordinated by ADTIVJ (i.e. R&I, LLL, etc.); 1.5. Customisation of State Aid rules for SMEs and co-financing rates for local public administration, in coal intensive regions; 2.1. Customisation of eligibility rules in 2021-2027 programming period (FEDR, FSE+, FC and others) for coal regions in transition regions (Jiu Valley and Oltenia); 2.2. Ensure a flexible management of post-mining assets (land
II. Economic diversification, innovation and entrepreneurship	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,	II.1 Reconfiguring the energy sector of the micro-region by capitalising the development potential, on various levels II.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		

Transition Action Plan 2021-2030			R&I Roadmap energy & environment & workforce needs	
Development pillars	**Main objective**	**Strategic directions** *of interest to be correlated*	**Major axes of the measures needed**	**Associated measures to overcome the barriers**
	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.	II.3 Supporting entrepreneurship by developing specific skills and competences; individual local businesses and new economic initiatives	chains and business networks; 4. Diversifying the education offer for covering the workforce retraining needs, by immediate correlation with the labour market demand and with the R&I priorities; 5. Increasing the attractiveness of up and re-skilling programs in the RE and EE, by efficiently transfer to and certify/accredited the new occupations; 6. Improving collaboration between academia, accredited trainers, CVET units and apprenticeships in technical disciplines to avoid programs' structure overlaps, to ensure correlation with the labour market needs and eliminate basic competences barriers (i.e. enhanced language and digital knowledge).	/ buildings) related to ownership transfer, reuse or repurpose; 2.3. Update mine-closure procedure to be R&I oriented, opened to safely reuse the existing energy potential (i.e. MMC, UCG, heat storage, mine waters heat pilot projects), from early stage of the closure process; 2.4. Promote fiscal incentives as an "transition fiscal regime" for: - encouraging citizens' and existing SMEs towards green & digital investments and attracting investors; - reducing youth migration and brain drainage; 3.1. Rise the interest and commitment of the R&I actors, for an integrated cooperation and active engagement towards initiating and deploying R&I projects, together with launching new competitive SMEs in manufacturing and processing industry; 4.1. Perform periodic updates, based on the projected new economic profile of Jiu Valley, and prior to immediate workforce retraining needs, for: - the existing university curricula, - the up-& re-skilling courses' topics, considering the Transition Action Plan and R&I Roadmap (present report) with steps forward in their implementation; 4.2. Engage youth in the decision-making process, from early stage of the curricula updating process. 5.1. Enhance flexibility and dynamics of curricula updates for the RE and EE industry; 5.2. Strong European and international connections with accreditation bodies, at the level of the LLL working group, for an effective certification procedure of the up and re-skilling programs of interest.
III. Sustainable capitalisation of the local specificity	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	III.2 Upgrading and diversifying the tourism infrastructure and services		
IV. Accessibility, mobility and connectivity	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.	IV.2 Developing an eco-efficient public transport system in an integrated, sustainable and intelligent manner IV.4 Development of utility networks, communications and street lighting networks		

Transition Action Plan 2021-2030			R&I Roadmap energy & environment & workforce needs	
Development pillars	**Main objective**	**Strategic directions** *of interest to be correlated*	**Major axes of the measures needed**	**Associated measures to overcome the barriers**
				6.1. Enhance cooperation between academia, accredited trainers, CVET units and apprenticeships in technical disciplines, once the LLL working group has been set-up and communication channels established by: - initiating periodic meetings to correlate each curriculum and avoid overlaps; - engaging youth in the decision-making process from the start. 6.2. Increase former miners' interest in re-skilling programs and re-employment by presenting the advantages and future opportunities for the entire Jiu Valley.

Annex 2 – Jiu Valley R&I Roadmap for the energy transition – Propose actions

Table 100: Proposed actions - Jiu Valley R&I Roadmap for the energy transition (2022-2030)

Specific actions and policies reform	Involved bodies	Possible funding mechanisms	Indicative timeline
Implementing LLL and capacity building programs in order to strengthen the institutional capacity and enhance competences, for both ADTIVJ and local mayoralties, to: - Accelerate the commencement of public and private investments in R&I priority areas; - Deploy identified projects (preparation, project financing, implementation management) in fields like EE, RES in energy generation – district heating & cooling – integrated in buildings, urban regeneration, Paroseni CHPP repowering from coal to biomass, etc.	ADTIVJ, academia, accredited trainers, CVET units Ministry of Energy Hunedoara Energy Holding	Operational Programs (POEO, POCIDIF, POTJ, POR Vest, PODD) PNRR Modernisation Fund Innovation Fund CINEA (Horizon Europe, LIFE+ CET) Free of charge technical assistance (TARGET) European City Facility EIB – InvestEU, EBRD Green City, EEA Grants etc.	2022-2027-2030
Identify and attract assistance/consulting services support to: - improve the ability to maximise the use of financing sources and mechanisms and attract investors; - develop pre-investment studies (i.e. Feasibility Study) for future funding applications for investments projects in RE and EE industry, urban regeneration, post-mining landscape management, etc.; - perform, in GIS format, the landscaping and integrated urban planning documents; - map and assess local RES potential, in GIS format; etc.	ADTIVJ SMEs NGOs R&I actors	Operational Programs (POCIDIF, POTJ, POR Vest, PODD) PNRR CINEA (Horizon Europe, LIFE+ CET) Free of charge technical assistance (TARGET) European City Facility EIB – InvestEU, EBRD Green City, EEA Grants etc.	2022-2024
Lobbying activity at governmental level to customise, for coal regions in transition regions, the State Aid rules for SMEs and co-financing rates for local public administration	ADTIVJ SMEs	INTERREG – Danube Transnational Program CINEA (Horizon Europe, LIFE+ CET)	2022-2023
Initiating legislative approach for customised eligibility rules in 2021-2027 programming period (FEDR, FSE+, FC and others) for coal regions in transition regions			
Adopting of a local fiscal incentive package as “transition fiscal regime” for: - encouraging citizens’ and existing SMEs towards green & digital investments and attracting investors; - reducing youth migration and brain drainage.	ADTIVJ SMEs, youth, 6 local councils	Local budgets	2022-2030
Establishing Jiu Valley R&I actors’ partnerships by:	ADTIVJ Jiu Valley R&I	Voluntary engagement (pro-bono)	2022-2023 for

Specific actions and policies reform	Involved bodies	Possible funding mechanisms	Indicative timeline
- creating a data base of Jiu Valley R&I environment; - setting-up a R&I committee/working group, under ADTIVJ coordination; - enabling constant communication channels and periodic meetings, in order to: - cooperate in an integrated manner; - correlate the participation in European and international projects; - intensify Jiu Valley presence in Europeans R&I HUBs, transnational value chains and business networks; - accelerate the deployment of R&I projects, together with launching new competitive SMEs in manufacturing and processing industry.	actors (academia, research institute and SMEs) Ministry of Research, Innovation and Digitalisation	University of Petrosani own budget National R&I Programs Operational Programs (POCIDIF, POTJ, PODD) CINEA (Horizon Europe, LIFE+ CET)	partnerships 2023-2030 for R&I projects deployment and new investments
Updating periodically and developing the LLL offer (existing university curricula, up-& re-skilling courses' topics) based on the projected new economic profile of Jiu Valley, and prior to immediate workforce retraining needs, by: - creating a data base of Jiu Valley LLL environment (educational units, including dual system, accredited trainers, CVET units and apprenticeships in technical disciplines); - setting-up a LLL committee/working group, under ADTIVJ coordination; - enabling constant communication channels and periodic meetings; - periodically assessing the labour market demand and synchronising with it, in order to - correlate the participation in European and international projects; - enhance cooperation between involved parties locally and avoid LLL programs overlaps; - rise LLL programs' curricula flexibility and dynamics with focus on R&I priority areas; - intensify Jiu Valley presence in Europeans R&I HUBs, transnational value chains and business networks; - eliminate basic competences barriers (i.e. enhanced language and digital knowledge).	ADTIVJ Specialised regional bodies (AJOFM, ITM) Academia, accredited trainers, CVET units, dual education systems, apprenticeships in technical disciplines, SMEs and NGOs Future beneficiaries of LLL programs (mining and energy industries) Ministry of Education	voluntary engagement (pro-bono) Operational Programs (POEO, POCIDIF, POTJ) CINEA (Horizon Europe, LIFE+ CET) EEA Grants	2023-2030 for updating and developing LLL programs 2022-2025 for eliminating basic competences barriers
Establishing strong European and international connections with accreditation bodies, at the level of the LLL working group, for an effective certification procedure of the up and re-skilling programs, thus raising the interest of the local human capital (inactive workforce) as former miners' and youth	ADTIVJ Academia, accredited trainers, CVET units	Local budgets Operational Programs (POEO, POCIDIF, POTJ) CINEA (Horizon Europe, LIFE+ CET) EEA Grants	2022-2025

Specific actions and policies reform	Involved bodies	Possible funding mechanisms	Indicative timeline
Develop special customised programs for youth engagement in the decision-making process, from early stage of the education and LLL curricula updating process, in order to reduce migration and increase youth employment.	ADTIVJ Academia, dual education systems, apprenticeships in technical disciplines NGOs Specialised regional bodies (AJOFM, ITM)	REACT-EU Operational Programs (POEO, POTJ) Own budgets EEA Grants	2022-2027
Lobbying activity aiming to update the legal and regulatory framework related to mine-closure procedure, in order to be - R&I oriented, opened to safely reuse the existing energy potential, from early stage of the closure process; - flexible in terms of ownership transfer, reuse and/or repurpose of post-mining assets (land / buildings), thus, boosting the deployment of identified R&I projects (i.e. MMC, UCG, heat storage, mine waters heat pilot projects) and investment projects to regenerate the post-mining perimeters, while preserving the industrial-cultural heritage	Regulatory body – ANRM Ministry of Energy Hunedoara Energy Holding ADTIVJ R&I actors (working group) SMEs NGOs	voluntary engagement National R&I Programs Operational Programs (POCIDIF, POTJ, POR Vest, PODD) Modernisation Fund CINEA (Horizon Europe, LIFE+ CET) Free of charge technical assistance (TARGET)	2023-2030
Identify and attract assistance/consulting services support to: - improve the ability to maximise the use of financing sources and mechanisms and attract investors; - develop pre-investment studies (i.e. Feasibility Study) for future funding applications for investments projects in RE and EE industry, urban regeneration, post-mining landscape management, etc.; - perform, in GIS format, the landscaping and integrated urban planning documents; - map and assess local RES potential, in GIS format; etc.	ADTIVJ SMEs NGOs R&I actors	Operational Programs (POCIDIF, POTJ, POR Vest, PODD) PNRR CINEA (Horizon Europe, LIFE+ CET) Free of charge technical assistance (TARGET) European City Facility EIB – InvestEU, EBRD Green City, EEA Grants etc.	2022-2024

Annex 3 – Jiu Valley R&I Roadmap for the energy transition – indicative list of projects

Table 11: Projects proposals (concept stage) - Jiu Valley R&I Roadmap for the energy transition (2022-2030)

No.	**Development pillar** *DG-Regio SRSS Jiu Valley Strategy*	**Strategic direction / Specific objective** *DG-Regio SRSS Jiu Valley Strategy*	**Project title**	**Promoter and other entities involved in supporting and implementing the project** *Sole promoter or Consortium*	**Brief Description**	**Replication potential or/and coverage area**	**Other considerations**
Project proposals – as results of several stakeholders' consultations under TRACER project							
1	I. Improving the quality of life and creating a healthy and sustainable environment for future generations II. Economic diversification, innovation and entrepreneurship	I.4. Supporting the transition to a green economy for environmental protection Promoting the area as a green micro-region with low carbon emissions and streamlining the waste management process II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. Increasing the energy performance of housing and public buildings.	Public-Private **Integrated Smart Green Energy District**	Petroșani Municipality UPET - Petrosani University ACIVJ (local SMEs Association) ISPE (consultant) AISVJ (NGO)	The project aims the development of an integrated RES based power and heat generation system, including a green and sustainable buildings renovation concept, residual heat recovery and a smart buildings monitoring system "Digital Hub" (utilities, carbon footprint, ambient parameters etc.). Former DHS thermal stations will be transformed into micro-CHP plants RES-based (roof-PV, green biomass and heat pump systems) and the existing heating distribution networks will be upgraded. The project includes also the development of eV - V2G charging infrastructure inside the predefined perimeter/contour.	Pre-defined layout inside Petrosani Municipality other districts other cities Integrated at Jiu Valley level replicable in Oltenia	*A lay-out map with additional details can be provided* *This project proposal was endorsed both by Petroșani municipality, UPET and ACIVJ*

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		II.2. Attracting investments in areas specific to the profile and needs of each city in the Jiu Valley, with potential for sustainable economic development of the area Supporting economic operators in developing and diversifying the offers of high value-added goods and services. Creating a stable and predictable environment that stimulates economic growth and diversification, as well as employment			Positive energy buildings owners will develop an energy community of prosumers.		
2	I. Improving the quality of life and creating a healthy and sustainable environment for future generations II. Economic diversification, innovation and entrepreneurship	I.4. Supporting the transition to a green economy for environmental protection Support the recovery, recycling and reuse of materials and products / waste (circular economy) II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the	**Pilot project "Innovative solution for ash & slag re-use"**	UPET Future Jiu Valley Energy Entity INSEMEX (National Institute for R&D)	The innovative solution will use the ash and slag as main ingredient (secondary raw material) to produce chemicals for industrial washing / cleaning for Services of General Interest (SGI) (e.g. sanitation, cars, road networks etc.). Project steps: 1. Planning stage (Feasibility Study and Environmental Risk Assessment); 2. Permitting for the pilot stage of the project; 3. EPC; 4. O&M and monitoring for next stage of development. If the pilot will prove its economic viability, financing sources will be attracted	Jiu Valley replicable in Oltenia and other regions/EU countries with existing ash-slag dumps	*efficiency proven at laboratory level* *endorsed by UPET*

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		mining sector. Development of pilot projects depending on the demonstrated techno-economic potential			in order to jump to the demonstration and commercial stages of the pilot project, and launch a START-UP in the chemical industry.		
		II.2. Attracting investments in areas specific to the profile and needs of each city in the Jiu Valley, with potential for sustainable economic development of the area Supporting the development of the business environment in the Jiu Valley by implementing projects with economic and social impact …					
		II.3. Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives Promote entrepreneurship and encourage entrepreneurial initiatives. Improve entrepreneurial skills and stimulate creativity Support and promote entrepreneurship in the Jiu Valley					

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3	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. Increasing the energy performance of housing and public buildings.	**Smart Green UPET Campus** Brownfield project	UPET - Petrosani University Petrosani Municipality ACIVJ (local SMEs Association) ISPE (consultant) AISVJ (NGO)	Assessing UPET campus in terms of buildings energy efficiency, utilities supply and carbon footprint in order to develop and implement (in several stages) the concept "Smart green UPET campus". The project will include also the development of the Digital Hub already presented in p.p.(4); new electricity storage chemical battery-based production facility (li-ion, sodium-sulfur, or hydrogen-storage by electrolysis)and eV - V2G charging infrastructure inside the campus.	University of Petrosani other university campus	*Endorsed by UPET*
4		II.2. Attract investments in areas specific to the profile and needs of each city in the Jiu Valley, with potential for the sustainable economic development of the area II.3. Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives	**Energy positive Multifunctional Business Campus** Greenfield project	UPET - Petrosani University Petrosani Municipality ACIVJ (local SMEs Association) ISPE (consultant) AISVJ (NGO)	The project is aiming the development of a multifunctional campus with state-of-the-art architecture and intelligent building automation, under the ownership of UPET. A new modern, energy positive business campus including: multiple spaces and activities with connections between them; business centre; meeting and workshops rooms for R&I activities; human resources placement centre; leisure area with accommodation, restaurants, small capacity multifunctional gym	Campul lui Neag	*Endorsed by UPET*

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					club and a concert hall. The campus will support business-oriented approach of the University and encourage labour mobility, international collaborations.		
5	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.3. Use of viable energy assets in the Jiu Valley for energy production based on a fuel other than coal in Paroșeni CHPP	**Paroseni coal-based CHPP transformation by conversion**	Ministry of Energy - Future Jiu Valley Energy Entity UPET ACIVJ (local SMEs Association) ISPE (private)	Comparison analysis of coal-based CHPP transformation by conversion to: A. n.g. CCGT-CHPP vs. B. to biomass-based CHPP A. CCGT-CHP reaches high efficiency rates of 62%, by comparison with existing 35-42% in Paroseni coal-based CHPP; Less CO_2 emissions; High flexibility accelerating to top capacity in less than 25 minutes and also turning down to 30% without major emission drawbacks. B. co-firing with full conversion until 2025-2026, based on biomass sources (biodegradable municipal wastes, wood and crop wastes) from Integrated Municipal Wastes Management at NUTS3 level and	Jiu Valley replicable in Oltenia	*Pending on Ministry of Energy validation*

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					the wood industry Documentation preparation for project financing = EPC		
6	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.3. Use of viable energy assets in the Jiu Valley for energy production based on a fuel other than coal in Paroșeni CHPP	Conversion of Paroseni coal-based CHPP into a **CLEAN Energy HUB**	Ministry of Energy - Future Jiu Valley Energy Entity UPET ACIVJ (local SMEs Association) ISPE (private)	Combining renewable energy production (solar power and heating, wind, heat pumps system) with processing (e.g. hydrogen electrolysers)	Paroseni CHPP replicable in Oltenia Energy Holding	*Pending on Ministry of Energy validation*
7	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.5. R&I projects to identify and start pilot projects for increasing the share of renewable and alternative	**Climate neutral decentralised DHC** (district heating and cooling) by retrofitting and upgrading former Thermal Stations (TS)	Jiu Valley mayoralties UPET ACIVJ (local SMEs Association) ISPE (consultant)	Former DHS thermal stations to be transformed into micro-CHP plants RES-based (roof-PV, green biomass and heat pump systems) and the existing heating distribution networks to be upgraded. These plants will be transformed into "living labs" live laboratories for both teaching and training business (production of thermal and / or electric energy).	Jiu Valley mayoralties replicable in other urban areas with abandoned DHS	*Pending on consumers' willingness to reconnect to centralised heating supply systems*

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		energy sources use, the development of electricity and heat storage capacities, integrated with smart solutions/technologies.					
8	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.5. R&I projects to identify and start pilot projects for increasing the share of renewable and alternative energy sources use, the development of electricity and heat storage capacities, integrated with smart solutions/technologies.	Sustainable use of the **mine water heat pilot**	Ministry of Energy - Future Jiu Valley Energy Entity Jiu Valley mayoralties UPET (?) ISPE (consultant)	Research drillings to be performed in closed/in conservation and flooded former underground mines in order to assess local potential of the mine water heat; feasibility analysis and pilot project development for heat supplying to nearest communities.	Closed/in conservation underground mines and flooded former underground mines in Jiu Valley	*Pending on Ministry of Energy validation*
9			Underground thermal energy **(Heat) storage pilot**	Ministry of Energy - Future Jiu Valley Energy Entity UPET INSEMEX (National Institute for R&D)	Assess the closed procedures already performed and future ones in order to analyse the technic-economic feasibility of developing an underground thermal energy (Heat) storage pilot		*Pending on Ministry of Energy validation*

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10	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.5. R&I projects to identify and start pilot projects for increasing the share of renewable and alternative energy sources use, the development of electricity and heat storage capacities, integrated with smart solutions/technologies.	Re-use of coal-based Paroseni CHPP as **thermal energy storage** facility, via feasibility analysis and pilot project development: Molten salts high-temperature energy storages (MSHTES)	Ministry of Energy - Future Jiu Valley Energy Entity UPET ISPE (consultant)	The proposed technical solution is to replace the facility with a thermal energy storage system consisting of molten salt electrical heaters that allows electric charge and discharge from the power network. Integration of energy storage systems within existing coal PPs has some major advantage and will help easer gaining time and necessary funds for building a new power facility; The project will include feasibility analysis in specific conditions at Paroseni CHPP, permitting and tender documents for next steps = EPC and commissioning	Jiu Valley Oltenia	*Pending on Ministry of Energy validation*

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11	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.5. R&I projects to identify and start pilot projects for increasing the share of renewable and alternative energy sources use, the development of electricity and heat storage capacities, integrated with smart solutions/technologies.	Re-use of coal-based Paroseni CHPP as **electrical energy storage** facility via comparative analysis (feasibility and ESIA) of 2 technical solutions: Pumped hydro energy storage Battery storage systems	Ministry of Energy - Future Jiu Valley Energy Entity UPET AEHR (Hydrogen Energy Association) (tbc) ISPE (consultant)	The project aim is to analyse and compare, in terms of techno-economic feasibility, environmental and social impact assessment, the re-use of Paroseni CHPP via 2 technological solutions for developing an electricity storage facility: - flooded underground mines used as future pumped hydro energy storage facility - comparison of 2-3 technologies adequate to Paroseni CHPP site (e.g. li-ion, sodium-sulfur, or hydrogen-storage by electrolysis)		*Pending on Ministry of Energy validation*
12	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. Increasing the energy performance of housing and public buildings.	**Smart green demo UPET (energy-positive) building**	UPET - Petrosani University Petrosani Municipality ACIVJ (local SMEs Association) ISPE (consultant) AISVJ (NGO)	Renovation of an existing isolated (not inside UPET campus) building owned by UPET, based on smart-innovative solutions and state-of-the-art insulating materials, to increase energy performance and implement RES for electricity and heat supply; transforming it into a smart energy-consuming building, including the possibility of energy storage. Ensuring the monitoring of energy consumption, water, etc. for intelligent building	UPET other public buildings in Jiu Valley replicable in Oltenia	*Can be included in position 3*

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					management. Providing the center for teaching purposes (retraining / development center but also laboratory for students and CVET participants)		
13	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.3. Use of viable energy assets in the Jiu Valley for energy production based on a fuel other than coal in Paroșeni CHPP II.1.5. R&I projects to identify and start pilot projects for increasing the share of renewable and alternative energy sources use, the development of electricity and heat storage capacities, integrated with smart solutions/technologies.	**Mine Methane Capture and Use**	Ministry of Energy - Future Jiu Valley Energy Entity UPET INSEMEX (National Institute for R&D)	Analysis of local former attempts to implement this solution and of the most advanced technologies for methane capture and use from underground mines; identifying ways to improve the efficiency of this methane using for various purposes (e.g. microCHP plants); comparative technic-economic and environmental impact analysis of proposed solutions; EPC for a future potential pilot project (including with monitoring)	only in Jiu Valley or other underground coal mines with high amounts of methane	*Pending on Ministry of Energy validation and support*
14			**Underground Coal Gasification - UCG** and use of syngas		Pilot research drillings in order to perform RA analysis and prove UCG technology feasibility in Jiu Valley specific conditions, for developing a future potential UCG pilot project.	to be decided after technic-economic feasibility was proven	*Pending on Ministry of Energy validation and support*
15	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of	**Sustainable utilities use for tourism infrastructure in Parang mountain**	ACIVJ	The aim of the project is to ensure, in a sustainable and smart way, the water, sewerage and heating infrastructure in Parâng Resort. Eventually the		*In 2020, Petroșani Local Council approved the project*

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		local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector.	**resort**		development of an energy system that would make them independent of electricity and heat. Thus, the project will support: updating the feasibility study and construction of the drinking water supply and sewerage infrastructure; R&I and EPC for a sustainable and smart solution for electricity and heat supply in Parang resort based on RES.		*(Feasibility Study) and allocated the amount of 50,000 lei with no further steps*
	III. Sustainable capitalization of the local specificity	III.2. Modernization and diversification of tourism infrastructure and services					
	IV. Accessibility, mobility and connectivity	IV.4. Developing utilities infrastructure, telecommunication and public lighting					
16	I. Improving the quality of life and creating a healthy and sustainable environment for future generations	I.4. Supporting the transition to a green economy for environmental protection	**Informed and engaged**	AISVJ	Information - education - awareness campaigns Periodic information, education, awareness and involvement of stakeholders in areas of interest for the Jiu Valley micro-region, accompanied by before / after opinion polls for monitoring / evaluation. Topics can be: Prosumer legislation; Energy efficiency - energy saving; CO2 footprint of the micro-region - district heating vs. individual thermal power plants; Climatic changes; Circular economy; Certification and promotion of local products; Change of attitude - responsible and involved citizen, etc.	replicable in Oltenia	
	II. Economic diversification, innovation and entrepreneurship	II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.8					

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		II.3. Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives II.3.1					
17	II. Economic diversification, innovation and entrepreneurship	II.3 Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives II.3.1	**Identify - access - submit - win**	AISVJ	Capacity and competence development program at the level of public authorities, SMEs, large enterprises, professional associations and NGOs in order to identify and access financial sources; elaboration and submission of financing applications; obtaining financing for projects. The courses will include information on what are the sources of financing, mechanisms and fiscal instruments to attract investors; to attract young people back home. A new university curriculum for UPET will also be planned, developed and accredited for a future Master's program on this topic.	Replicable in Oltenia	

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18	I. Improving the quality of life and creating a healthy and sustainable environment for future generations II. Economic diversification, innovation and entrepreneurship	I.1. Calibrating local human potential to increase employment and combat social exclusion II.1. Reconfiguration of the energy sector by capitalizing on the development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. II.1.4, II.1.6	Energy - Environment - Climate change **INNOVATIVE CLUSTER**	ACIVJ	The project aims to establish and develop an innovative cluster in the fields of intelligent specialization: ENERGY - ENVIRONMENT - CLIMATE CHANGE. The cluster will bring together electricity producers and prosumers from Jiu Valley, regardless of the energy system they use (biomass, wind, photovoltaic, hydro, etc.), universities, research institutes, professional associations in the field.		
19	II. Economic diversification, innovation and entrepreneurship	II.3 Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives II.3.1	Integrated Centre for technological information, staff training and development	INSEMEX (National Institute for R&D)	The project aims to establish an Integrated Centre for technological information, staff training and development, within which there will be carried out the following main activities: - R&D results dissemination through conferences, seminaries, roundtables, workshops etc. - training of staff for rescue and intervention in toxic / explosive /		INSEMEX ensures the technical and scientific support for investigating the causes which led to explosion/fire type events, in the industry and in the

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					flammable atmospheres; - training of staff having responsibilities within activities for designing, manufacturing, maintenance of equipment and protective systems intended to be used in potentially explosive atmospheres; - training of staff operating with explosives for civil use and pyrotechnical articles; - staff training with regard to OHS issues within industries with explosion hazard; - exchange of best practices between researchers and experts working for state authorities involved in the investigation of causes which led to the occurrence of explosion / fire type events (industry and civilian areas): Labour Inspection, Romanian Police, General Inspectorate for Emergency Situations, Prosecutor's Office attached to the Courts, Tribunals or the High Court of Cassation and Justice.		civilian area, being recruited by state authorities involved in such investigations. INSEMEX performs INSEMEX disposes of a set of buildings with the rehabilitation project already completed.

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Project proposals – made by Jiu Valley TRACER partners, during their attendance in several stakeholders' consultations under START assistance (EC-CRIT initiative)							
1	II. Economic diversification, innovation and entrepreneurship	II.2. Attract investments in areas specific to the profile and needs of each city in the Jiu Valley, with potential for the sustainable economic development of the area Supporting the development of the business environment in the Jiu Valley by implementing projects with economic and social impact II.3. Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives Promote entrepreneurship and encourage entrepreneurial initiatives. Improve entrepreneurial skills and stimulate creativity Support and promote entrepreneurship in the Jiu Valley	Jiu Valley PCB Factory	ACIVJ	This project concept aims to develop a PCB factory (Printed Circuit Board), on the background of a major brake in the production of electronic modules, due to increased imports delivery duration and shipping prices, knowing that PCB production is mainly carried out in China (covering over 80% of EU's demand). The project includes several innovations, targeting a fully smart factory, with state-of-the-art technologies recently developed for mass PCBs production, such as: a "clean" technological process observing EU environmental standards; industry 4.0 concept in the quality control and manufacturing process; factory building to be renovated in a positive energy building; upskilling programs in high-tech industry, digitalisation.	Integrated at Jiu Valley level replicable in Oltenia Scale-up potential	This project proposal was endorsed both by mayoralties and ACIVJ
2	II. Economic diversification, innovation and	II.2. Attract investments in areas specific to the profile and needs of each city in the Jiu Valley, with potential for the sustainable	Jiu Valley Start-Up "Smart Energy Storage System" (SESS) ACIVJ		The START UP development will have the following stages: 1. Planning & permitting: for	Petrosani Municipality and other local mayoralties in	This project proposal was endorsed both by mayoralties

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	entrepreneurship	economic development of the area II.2.5. Supporting the development of the business environment in the Jiu Valley by implementing projects with economic and social impact … II.3. Supporting entrepreneurship by developing specific skills and supporting individual local businesses and new economic initiatives II.3.?. Promote entrepreneurship and encourage entrepreneurial initiatives. Improve entrepreneurial skills and stimulate creativity Support and promote entrepreneurship in the Jiu Valley			SESS; 2. EPC: of the new factory or a reconverted & renovated existing facility for deploying SESS technological process; 3. O&M & Development: extending the business at national level for public parking lots - SESS for charging e-buses, vehicles, bicycles and electric scooters; 4. Upscaling: increasing SESS capacity as backup system when the public electricity distribution network is overloaded. SESS will be a modular “stand alone” system based on lithium batteries, including a smart management system for charging & payment - a user friendly software application.	Jiu Valley and Oltenia, while the business is developing	and ACIVJ
3	I. Improving the quality of life and creating a healthy and sustainable environment for future generations II. Economic diversification,	I.4. Supporting the transition to a green economy for environmental protection Starting and running greening programs in the former mining perimeters, considering their economic recovery. II.1. Reconfiguration of the energy sector by capitalizing on the	Restoration and re-use of unproductive lands (mine tailings and other lands types) – ground PVP (PhotoVoltaic Plant) deployment in the benefit of	Jiu Valley mayoralties UPET ACIVJ (NGO) ISPE (private)	Restoring and re-using unproductive land and install ground based solar photovoltaic and deploy PVPs equipped with concentrated photovoltaic (CPV) system, with focus on the southern slopes of the mining tailings dumps with the maximum solar irradiation potential. 75%, out of about 20 ha - the total	Jiu Valley replicable in Oltenia	This project proposal was endorsed by mayoralties, UPET and ACIVJ

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	innovation and entrepreneurship	development potential on various levels / Identifying alternatives to mining that maximize the use of local natural resources, former mining and energy assets, and the experience of skilled workers in the mining sector. Investments, both private and public, in new capacities to produce electricity from RES	Jiu Valley local communities		estimated surface of the tailing's southern slopes, could be potentially available for the new PVPs. It is estimated that a future of 5-7 MW installed capacity in solar energy could be developed with a power generation of around 7-10 GWh/year. Other unproductive lands owned by local public authorities will be proposed for scaling-up the project. This public-private partnership can be further included in an existing energy community.		