

# Initiating a just transition in response to a low-carbon energy transition in coalfield communities, Western Ukraine

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## Abstract

*The overarching aim for the COP26 UN Climate Change Conference in Glasgow was to ‘keep 1.5 degrees alive’, meaning essentially the rapid phase-out of power production from coal and an end to coal mining. Although considerable investment is happening in renewable energy and hydrogen production, experience shows that coal communities will be adversely impacted, and long-term socio-economic effects will prevail if Just Transition considerations are not developed as a part of the closure planning process. Areas of eastern Europe still retain significant employment in coal mining. Ukraine has two principal coal mining regions: the Lviv-Volyn and Donetsk basins. Since 2014, the parts of the Donbas, where the Donetsk basin is located, have been occupied by separatist forces, while the Lviv-Volyn basin in the west of the country straddles the Polish border. Significant local impacts have been foreseen relating to coal mine closure and the development of stakeholder-led masterplans for repurposing and transition of mine sites to a new industry provides an example of how the potential impacts of the low-carbon energy transition can be mitigated. This paper provides details on the key issues associated with building and implementing this approach.*

**Keywords:** coal, just transition, stakeholder engagement, master planning, mining

## 1 Introduction

The UN Climate Change Conference in 2021 (COP26) was held with the aim of securing international agreements to protect the world and limit climate change to a 1.5 degree rise above pre-industrial levels, as detailed in the Intergovernmental Panel on Climate Change (IPCC) Special Report (IPCC 2018). COP26 sought agreements in four main areas:

- Secure global net zero by mid-century and keep 1.5 degrees within reach.
- Adapt to protect communities and natural habitats.
- Mobilise finance.
- Work together to deliver.

Prior to the conference, countries were asked to come forward with ambitious targets for 2030 emissions reductions that aligned with reaching net zero by the middle of the century. Key to delivering within these targets were a number of points, including the need for countries to accelerate the phase-out of coal.

Ukraine was in 2020 the third largest emitter of CO<sub>2</sub> from coal emissions in Europe, with 63 Mt CO<sub>2</sub> emitted, with coal representing 30% of the Ukrainian energy mix (IEA 2020). At COP26, Ukraine pledged to end coal-fired power generation by 2035, with the largest private producer DTEK pledging a phase-out by 2040. Ukraine’s energy minister, German Galuschenko, said in a statement that:

*“Ukraine is moving towards the decarbonization of the energy sector, in particular, complete decommissioning of coal-fired thermal power plants, as well as a significant increase in renewable generation” (S&P Global Commodity Insights 2021).*

However, ahead of this announcement, work has been underway for some time to consider the impacts of the transition away from coal generation, coal mining and the associated social challenges. A number of donor agencies, including the British and German governments, are funding this work.

## 2 Coal mining in Ukraine

Ukraine has two principal coalfields producing hard coal: the Lviv-Volyn basin in the west of the country and the Donetsk basin in the east (see Figure 1; Ogarenko 2010). Coal contributes 12% of the economic value in the Donetsk region, while in the west, the Volyn and Lviv regions are less dependent, with 1.5 and 5.8% of the economic activity being generated through coal.

As of 2014, 148 mines operated in Ukraine, with 46 of these being private operations (Extractive Industries Transparency Initiative 2018). However, only approximately 10% of Ukraine's coal production comes from state-owned mines, of which the majority are not profitable (state-owned coal mines register losses of up to EUR 230 per ton of coal extracted) and much of the equipment being used is beyond its operational life. Since the collapse of the Soviet Union and its transition to a market economy, the Ukrainian coal sector has been in a state of decline, with ca 800,000 people employed in 1995, but now around 40,000 people are employed (Cabinet of Ministers of Ukraine 2020).



Figure 1 Coalfield areas in Ukraine (from Ogarenko 2010)

## 3 Aims of a just transition

Coal mines provide essential work opportunities in many towns or regions. The loss of these jobs will be particularly hard felt and affect the economies of coal mining regions, which are already disadvantaged compared to Kyiv (see Table 1). Since the mid-1990s, closures of coal mining enterprises in Ukraine have negatively impacted local municipalities, as no comprehensive socio-economic strategies to support these regions were developed. As a result, strong union positions have developed, and there is a need to approach closure in a different way.

The closure of coal mines has tangible social consequences due to the often-strong mutual interdependence of regional economies and mining. It is concentrated in a limited number of regions and their economy is often centred around mining. Hence, mine closures tend to create an economic vacuum in mining-dependent regions. Large numbers of workers with similar skill sets face a regional labour market with limited opportunities. Thus, worker compensation in the form of welfare benefits and retraining, as well as a broader support package for the transformation of regional economies, needs to be considered.

**Table 1 Socio-economic picture of mining in the Ukrainian regions (State Statistics Service Ukraine, 2016 data only, including government-controlled territories)**

	Ukraine overall	Donetsk region	Lugansk region	Lviv region	Volyn region	Dnipropetrovsk
GDP per person USD	2,187.8	1,264.9	557.8	1,773.7	1,342.86	2,913.3
Share of coal industry of regional gross value added	0.78%	3.95%	0.30%	0.77%	0.25%	5.00%
Share of total labour force working in coal industry	0.78%	7.4%	8.4%	1.2%	0.5%	0.21%
Unemployment rate	9.3%	14.1%	16.0%	7.7%	11.5%	8.1%

The current program of mine closure in Ukraine aims to make the transition to a low-carbon economy by taking into account the complex environmental and social issues and commitments and creating a sustainable model of redevelopment/restoration to create new opportunities for tourism and employment in various areas of business. This project, as part of a long-term policy approach aimed at addressing the inevitable dramatic transformations caused by the phasing out of coal mining, is being implemented in stages, involving many stakeholders and identifying risks and opportunities around the process.

The pilot study aims to demonstrate how a strategic framework can be developed to address issues related to the closure of Ukrainian coal mines, maximising opportunities for social, economic and environmental progress and providing a bottom-up approach, starting with defining a strategic framework for a particular selected area or region, which in the future could take into account the national approach. The intention is to provide a proven real-world example of how coal-based transformation can be successfully managed on the basis of local needs and the pursuit of sustainability, which is based on the involvement of stakeholders and uses appropriate policies and investment opportunities. However, in the process, long-term social and structural changes will be encouraged, the success of which can be measured in accordance with the UN Sustainable Development Goals.

The benefits of this project are in line with the following objectives, which mitigate the negative effects of the transition to a carbon-neutral economy and ensure:

- Development of coal regions.
- Proactive and healthy labour market, with long-term human development.
- Diversification of local economies.
- Social security for former miners.
- Comfortable living/social environment and development of a 'bright' future for the regions.

Our approach looks to replicate a UK program for regeneration that has been developed through the lessons learnt following the decline through the later part of the 20th century of heavy industries and coal. One such site has been 'The Works' development in Ebbw Vale, south Wales, where closure of a steel works significantly threatened the future of the town that was heavily dependent upon the steelworks as a direct and indirect employer (Fletcher 2001). The Works regeneration is significant, as this multiple award-winning project provided a culmination of the local regional development agencies' experience, and provided a planning-led blueprint for large-scale regeneration in socially dependent areas (Blaenau Gwent 2013). These are the types of situations that can be expected in the Ukrainian coalfields and initiating this type of regeneration prior to closure provides a pathway to a Just Transition.

In transferring this regeneration approach, we have broken the master vision creation process down into a series of stages, which are defined below.

**Stage 1: Introductory stages:** A key factor in developing this is the choice of a pilot site with the right characteristics that can be used to illustrate a successful example of such a transformation but provides enough challenging features to demonstrate how obstacles can be overcome.

Selection of the pilot site and analysis of available information to review the key characteristics from an environmental, social, cultural, economic and safety perspective and the regional context in which they are located, as well as scoring to select an appropriate pilot study site.

**Stage 2: Regional/local framework plan for the pilot site:** Develop a high level of local structure, based on a number of factors, including security, environment, development potential, land ownership and availability of funding with an emphasis on SWOT analysis (strengths, weaknesses, opportunities and threats) of the pilot site. Defining program goals, objectives, and key performance indicators.

The structure should also be based on the principles of the Sustainable Development Goals, and includes:

- Regional/local baseline plan, including assessment of strengths, weaknesses, opportunities and threats.
- Defining key goals.
- Large-scale activities to define areas of research ('scoping exercise').
- Social context/influence.

**Stage 3: Basic vision/strategy for the implementation of transformation:** The pilot study will focus on a short intensive application of the local plan to develop a preliminary vision of the master plan for the restoration and reconstruction of production sites – including, but not limited to, funding mechanisms, stakeholder engagement strategies, policies and implementation strategy. The aim of the pilot project is to substantiate the truth of the strategic framework and to create a so-called outline of the strategic implementation plan, with an understanding of stakeholder aspirations, relevant opportunities and constraints/barriers and implementation strategy.

The focus will be on:

- Involvement of stakeholders.
- Development of a master vision ('Master Vision') for the transformation of the pilot site.
- Understanding the limitations: technical/environmental, social, economic.
- Reclamation and restoration plan of the site.
- Focus on sustainable development practices.
- Coordination with potential investors.
- Time frame and scale of activities aimed at social impact.

**Stage 4: Transition to a national vision and context:** Provide support for the integration of the pilot study approach into the national plan and context of Ukraine.

## 4 Initiating a just transition

It is important for the pilot project to act as a pathway and demonstrate what is possible, but to face a number of challenges that allow issues to be overcome and allow the project team to provide lessons learnt so that the project can be replicated at other sites. As such, the site selection process has been extremely important, and various candidate sites were assessed to determine their suitability. Selection criteria included a number of factors, such as socio-economic status, local dependency on coal mining, environmental setting, connectivity, and transferable opportunities to assess strengths, weaknesses, threats and opportunities of each candidate site. As a selection tool, the candidate sites were also mapped against the UN's Sustainable Development Goals (see Figure 2). This framework has been used as a baseline to provide a comparative base with the project outcomes and to help define success criteria, which can be embedded in the planning framework.



**Figure 2** Baseline mapping of the candidate sites against the UN's SDGs (abridged selection of sites shown only)

Two sites in the western Volyn region were ultimately selected, which were both close to the town of Novovolynsk (Figure 3). These sites provide some differences in scale (are disturbed/available for redevelopment) and proximity to critical infrastructure. Between the two mine sites, close to 900 people are employed and will be affected by the closures. The majority of these people live in Novovolynsk, a small town of some 60,000 inhabitants. The site's wider context is illustrated in Figure 4, which shows the connectivity between different towns on either side of the Poland–Ukraine border, and the principal assets that are present in the region.



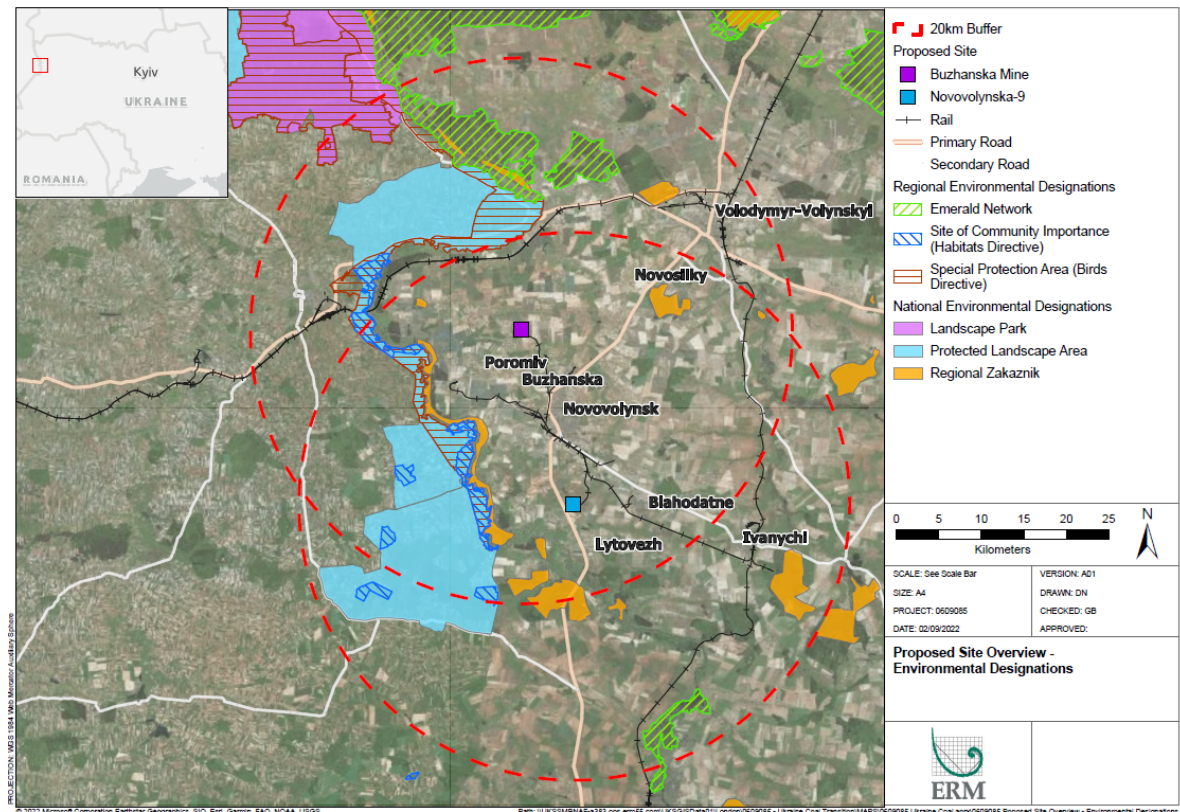


Figure 3 Location of the pilot sites in the Western Ukraine

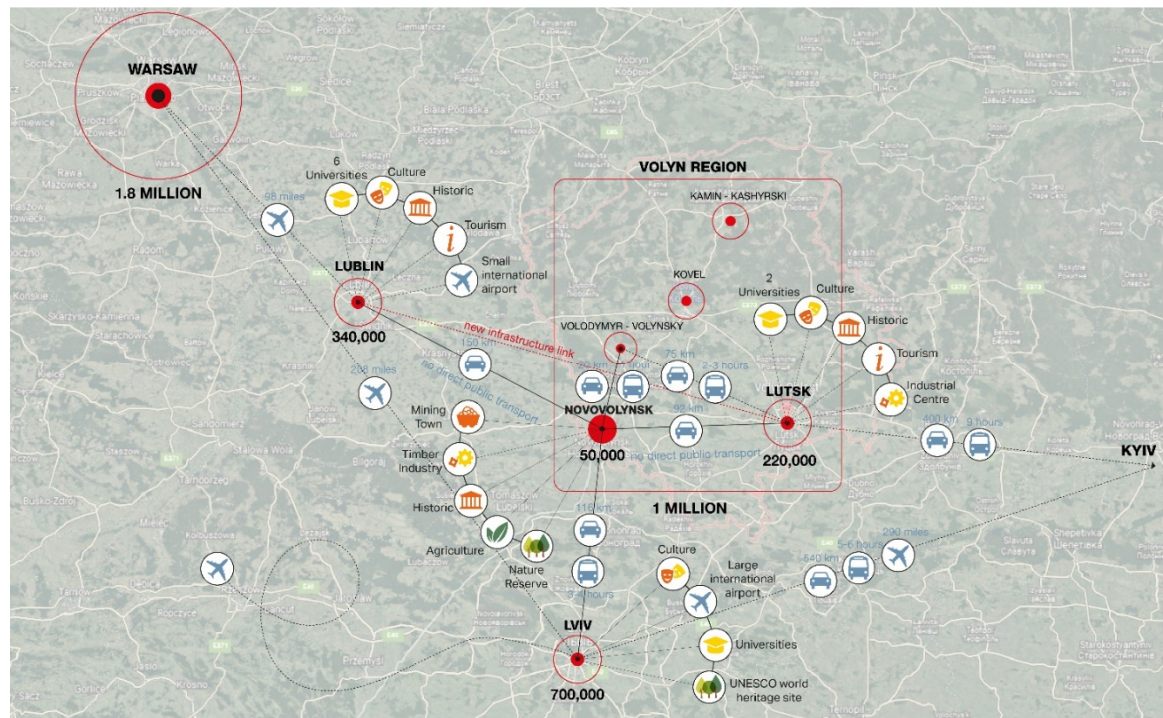


Figure 4 Regional connectivity and principal assets in the Poland/Western Ukraine border area (image supplied by Arup)

Stages 2 and 3 of the pilot project are iteratively interlinked. In order to drive change and facilitate the ability for the sites to be repurposed and create new economic activity, the pilot project needs to develop a local planning framework that supports the vision for the site. This vision is supported by what is possible and guided by local aspirations. The existing legislative and policy structure in Ukraine means that the relevant

ministers are responsible for strategy and execution of national politics inline with the laws adopted by the parliament. As a result, the proposed planning framework needs buy-in from a variety of ministries (including but not limited to the Ministry of Energy and the Ministry of Regional Development) and roll-out to the local mayoral offices and governors.

The current regional development plan for the Volyn Oblast envisages (Volyn Regional Administration 2020) five strategic goals:

- **Strategic Goal 1.** Improving the competitiveness of the regional economy.
- **Strategic Goal 2.** Development of human capital and improving the quality of life of the population.
- **Strategic Goal 3.** Development of an innovative economy (on the basis of smart specialisation).
  - Development of innovation and investment road transport logistics infrastructure of the region.
  - Stimulating the development of balanced, environmentally friendly food production; quality control.
- **Strategic Goal 4.** Development of cross-border cooperation.
- **Strategic Goal 5.** Rational use of natural resources and environmental safety.

These goals and the site's setting/context have provided an initial assessment of what master visions could be developed in a post-mining landscape. These initial economic concepts are designed to illustrate the type of opportunity that fits with regional policy and the nature of local economic activity. They provide a high-level overview of the concept that can then be examined further via comparative case studies illustrating what has worked elsewhere, and a more in-depth evolution (see Figure 5, which shows the opportunity around agricultural development) of the individual concepts that can be discussed with relevant stakeholders in order to gauge views on what the local area can support and would be backed by investors.



**Figure 5** Possible elements of the agricultural economic development concept (image supplied by Arup)

It is critical that the master planning process is perceived as credible, and stakeholders are both willing to participate and are invested in the outcome. There are four key steps to achieve this that will enable the project to be delivered locally in the pilot study while also being replicable in other areas:

- Rigorous planning – Detailed planning with input and scrutiny from strategic stakeholders prior to implementation.
- Engaging sequentially – Engaging comprehensively and inclusively, respecting the breadth of stakeholders and respective roles.
- Creating ownership – Ensuring stakeholders are integral to, and feel ownership of, the masterplan.
- Delivering locally – Creating a masterplan that respects and enhances a local sense of place and identity.

The stakeholder exercise follows detailed profiling of the pilot case area(s) to understand the socio-economic and environmental content, and to identify the relevant stakeholders, and build an initial picture of their importance, interaction with other stakeholders and position. Engagement follows a phased approach, engaging groups of stakeholders, and provides iterative engagement as the masterplan vision develops, with strong feedback loops to maintain dialogue. Development of the outline masterplan follows, being based on stakeholder feedback, which is subsequently evolved through ongoing consultation with stakeholders. The emerging masterplan is widely consulted, which allows collation of all stakeholders' voices.

While building the stakeholder plan, it is recognised that while the communities are within the same region, there are differences in the composition/demographics, socio-economic profile and level of dependency on the mine as a source of employment. There exists, however, a shared industrial legacy of mines operating in the region, which contributes to the sense of place. This legacy is important socio-economically and culturally to local people, particularly older generations and those who are still working in mines or are supported by employment within the mines. Engagement is, therefore, informed by the recognition of age/generational and socio-economic differences that may exist in local people's perceptions of the role and importance of mines.

The stakeholder plan also recognises the importance of engaging with those traditionally 'less heard', such as female and younger sections of the community, who have a key role to play in the transition and future of the communities and wider region.

While the outcome is a transition away from mining, engagement will be informed by a respect of the role which mines have and continue to assume to certain stakeholders (e.g. mining trade unions, miners and their communities). These stakeholders need to feel 'heard' and are integral to the future masterplan.

To be perceived as 'just', all stakeholders need to feel integral to the transition and feel that they have contributed to the process, but also that their feedback has meaningfully informed the masterplan. The stakeholder consultation process is staged in several phases in order to target different groups and iteratively build any feedback into the messaging and master vision development process. Groups are illustrated in Figure 6.





**Figure 6 Stakeholder groups**

In responding to the various stakeholders, it is critically important that an open dialogue is maintained and feedback is provided to stakeholders to ensure they remain engaged in the master planning process and vision. It is particularly important that local communities have an update on the master planning process, which may include:

- Non-technical summary of feedback presented.
- Presentation of this in various formats, potentially including newsletter, infographic or summary briefing.
- Option to update the website if developed.
- Briefing/update provided to local media.

In tandem with the master plan development and stakeholder consultation process, detailed information gathering has been undertaken to develop an understanding at a site level of the engineering and technical constraints and opportunities that each site provides, such as geotechnical considerations, presence of hazards and other environmental issues, along with an understanding of access, highway condition, and service infrastructure. It should be noted that the mine sites themselves are not in an optimal condition (see Figure 7).



**Figure 7 Mine site to south of Novovolynsk**

This workstream aims to build a comprehensive study-based implementation plan, and includes:

- Understanding of site features.
- Scoping exercise and work breakdown – for example:
  - Geotechnical investigations, including ground gas and groundwater and tip stability.
  - Waste inventories.
  - Building condition/presence of asbestos.
  - Site safety – shaft capping, etc.
  - Engineering appraisal – drainage, access, service infrastructure.
  - Ecology.
- Integration with the mine's 'liquidation plan'.
- Development of a master schedule and budget for the closure and site regeneration.

Attracting funding for future project phases beyond the initial pilot phase and engaging with delivery partners is a key concern of the ministries, and a detailed appraisal of the financial environment was undertaken to identify potential sources of funding (see Table 2). Bilateral development finance institutions/and emergent climate funds have been identified as the most aligned and likely sources of future funding. A series of interviews were held with a number of parties to confirm their interest, plans to assist decarbonisation, investment scale and risk-mitigation approach.

**Table 2 Funding sources' ability to manage conditions/overcome challenges**

Funding sources/financing conditions	Risk/return profile: bankability	Financing structure	Financing volume	Risk mitigation	Knowledge
Financial investors					
Strategic investors					
Thematic/impact first investors					
Philanthropy					
Private households					
Community ownership					
Public/governmental					
Export credit agencies					
Bilateral DFIs/(climate) funds					

The pie charts detailed in Table 2 represent a screening score for each attribute (full circle = high degree of alignment); this shows that bilateral development financial institutions are the most likely source of any future funding for the project. These institutions are seen as being able to provide seed funding that allows the initial development work to be conducted (e.g. initial infrastructure), which then allows future investors to see an achievable aligned vision and fund on the basis of a standard commercial arrangement.

## 5 Project status and considerations

Stages 3 and 4 have not yet been completed due to the current ongoing conflict in Ukraine, although the pilot study has recommenced following an initial stop. Much work remains but delivering successful regeneration in any context is very difficult. Due to the conflict, the landscape around the project has changed. Some of this brings opportunity to Western Ukraine. Since 24 February, nearly 12.8 million people are estimated to have been displaced in Ukraine, most of whom have not left the country. According to the most recent estimates, 7.7 million people are internally displaced as a result of the conflict, which is equivalent to 17.5% of the entire population. The damage to civilian infrastructure has been estimated at \$97.4 billion (Statista 2022). The near complete destruction of towns in the east and south means that emerging policy in Ukraine considers rebuilding industrial bases and rehoming displaced persons in the west.

One evident area of action is to understand how the project can be driven forwards once the implementation plan has been finalised; that is, engaging with the Ministry of Energy, who retain oversight of the project, and the implementors (the major and the mining company), who are concerned in relation to the day-to-day reality of regeneration in the local area.

A number of considerations are also relevant that are not specific to the mine sites but have a wider impact on the town of Novovolynsk and a need for the town to be engaged in a wider regeneration philosophy. These aspects include the development of training schemes for local enterprise/entrepreneurship, cultural heritage, a focus on youth and links with tertiary education.

## 6 Concluding remarks

In responding to the climate emergency, governments and energy companies are developing new energy streams that will drawdown and ultimately replace a reliance on fossil fuels. Extractive industries have provided many jobs, and these communities will be impacted. Providing pathways for coal mining communities to identify new futures in a post-mining landscape is key in developing a Just Transition.

Achieving a new future relies on the development of an implementable post-mining vision. Ensuring that this vision fits within the socio-economic context of the local area and is routed in the interests of the impacted communities is an important attribute of the project works that we have been carrying out in Ukraine. The master vision also requires buy-in at a political level, such that it can be embedded within local policies, setting out a clear framework for implementation of the master vision and providing a long-term commitment to it.

A sound understanding of the site constraints is needed, as this provides a basis for developing designs and understanding the costs of closure and regeneration of the site. In developing studies that provide a good level of information in this regard, a reasonable financial commitment is required.

A substantive skills training program is also required so that people can imagine their own futures. This skills training program should not just be confined to the mine site but should also include the wider community.

Continuity of funding needs to be developed to maintain momentum. Obtaining seed funding from bilateral development financial institutions is a likely requirement in Ukraine and this can be focused on developing infrastructure around the mine site, which then provides a springboard for future development allowing the Just Transition to happen.

## Acknowledgement

With thanks to staff at the British Embassy in Kyiv – Olena, Peter, Iryna – and to CDM Engineering Ukraine, who provided invaluable local content – Daniel, Illia, Tetiana, Iryna, Olga and Denys; plus, of course, the numerous people in the various ministries and in Novovolynsk.

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