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# Enhancing Mine Action Finance in Ukraine



## Feasibility Report

SEPTEMBER 2024

## Report Use & Acknowledgements

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This study report was authored by Chris Loughran and Camille Wallen. The project was overseen by Piper Hart and Naomi Konza, and conducted in dialogue with Ukraine's Ministry of Economy, and with input from Alexander Wiese. The project was made possible with generous funding from The Netherlands, Switzerland and the United Kingdom.

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# Key Abbreviations

APMBC	Anti-Personnel Mine Ban Convention
BOO	Build, Operate, Own
BOT	Build, Operate, Transfer
CLO	Collateralised Loan Obligation
DFI	Development Finance Institutions
EBRD	European Bank of Reconstruction and Development
EIB	European Investment Bank
ESG	Environmental, Social & Governance
EUR	Euros
GDP	Gross Domestic Product
GICHD	Geneva International Centre for Humanitarian Demining
GoU	Government of Ukraine
ha	Hectares
ICMA	International Capital Markets Association
IFFIm	International Finance Facility for Immunisation
IFC	International Finance Corporation
IFI	International Financial Institutions
IMAS	International Mine Action Standards
IMSMA	Information Management System for Mine Action
IRR	Internal Rate of Return
KPI	Key Performance Indicators
MDB	Multilateral Development Bank
MoE	Ministry of Economy of Ukraine
NGO	Non-Governmental Organisation
NTS	Non-Technical Survey
OB-PPP	Outcome Based Public Private Partnerships
ODA	Oversees Development Assistance
PPP	Public Private Partnership
RDNA	Rapid Development Needs Assessment
RoI	Return on Investment
SDG	Sustainable Development Goals
SESU	State Emergency Service of Ukraine
SLB	Sustainability-Linked Bond
SPT	Sustainability Performance Targets
UAH	Ukrainian Hryvnia
USD	United States Dollars

# Executive Summary



## 1. Context

The demining challenge in Ukraine following the full-scale invasion by Russia in 2022 is vast. The conflict has created the largest volume of new contamination since the mine action sector emerged in the late 1980s. Contamination comprises the full range of explosive ordnance, from landmines to rockets, projectiles, improvised explosive devices, drones and more.

The cost of surveying land that may be affected, and clearing that which is confirmed as contaminated, was estimated in Rapid Damage Needs Assessment 3 in February 2024 at U.S. \$34.6 billion.<sup>1</sup> While the true cost will likely be found to be lower following a more effective survey, the anticipated billions of additional funding required will far exceed current funding for mine action in Ukraine, and for the rest of an already under-resourced global sector.

The mine action sector agreed to pursue innovative financing in 2019 at the Fourth Review Conference to the Anti-Personnel Mine Ban Convention, with States Parties pledging to “Do their utmost to commit the resources needed to meet Convention obligations as soon as possible and explore all possible alternative and/or innovative sources of funding.”<sup>2</sup>

The full-scale invasion has further galvanised the desires of several major sector donors to accelerate progress on innovative financing for Ukraine, and at the global level. Meanwhile, the Government of Ukraine has been explicit in its desire to see the creation of a demining market that involves the private sector at the national and international levels.

## 2. Study purpose and aims

This study was commissioned by UNDP and conducted between April and September 2024. It was funded through the generous support of the governments of the Netherlands, Switzerland and the United Kingdom.

The study was conducted at the request of the Ministry of Economy of Ukraine to fulfill Task 3 of the Operational Plan for implementing activities in 2024–2026 aligned with the National Mine Action Strategy for the period up to 2033. Specifically, the study is to “ensure the stimulation of the mine action services market” by exploring innovative financing instruments for mine action.

The purpose of the research was to identify a broad range of innovative finance options for Ukraine, and earmark specific models that could reasonably be taken forward for potential application: The aim was to identify the products and mechanisms that could have the greatest potential to support mine action in Ukraine and contribute to the total funding needed to deliver the national mine action strategy.

The study used the following working definition of innovative finance, developed as part of a study launched in early 2024 by GICHD and Symbio Impact:

**“ Innovative finance for mine action refers to initiatives that make use of financial mechanisms to channel public and private funds towards mine action to help narrow the funding gap and complement existing funding arrangements in a way that fosters equity, sustainability, efficiency and effectiveness.”<sup>3</sup>**

<sup>1</sup> World Bank, Ukraine, European Union and UN, *Ukraine Rapid Damage and Needs Assessment (RDNA3) February 2022 – December 2023, 2024*, <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099184503212328877/p1801740d1177f03c0ab180057556615497>

<sup>2</sup> Action #42 of the Oslo Action Plan, adopted at the 2019 Fourth Review Conference of the Anti-Personnel Mine Ban Convention. <https://www.osloreviewconference.org/fileadmin/APMBC-RC4/Fourth-Review-Conference/Oslo-action-plan-en.pdf>

<sup>3</sup> [https://www.gichd.org/fileadmin/user\\_upload/INNOVATIVE\\_FINANCE\\_FOR\\_MINE\\_ACTION\\_NEEDS\\_AND\\_POTENTIAL\\_SOLUTIONS.pdf](https://www.gichd.org/fileadmin/user_upload/INNOVATIVE_FINANCE_FOR_MINE_ACTION_NEEDS_AND_POTENTIAL_SOLUTIONS.pdf)



### 3. Approach

The study's methodology involved a combination of desktop research, stakeholder consultation and in-person validation workshops in Ukraine. Having conducted an analysis of the mine action landscape in Ukraine, it considered a wide range of innovative finance products and derisking mechanisms, and examined the potential for their application.

Thirty-nine potential mechanisms were identified, ten of which were derisking mechanisms that could be applied as part of a wider product. Each of the other 29 mechanisms was scored against set criteria to produce a short-list of those most likely to succeed and have impact, and which warranted in-depth modelling and feasibility analysis.

Two products were taken forward to this stage:

- **Product 1:** A Sustainability-Linked Bond (SLB) to finance both demining and the transition to sustainable agriculture.
- **Product 2:** An Outcome-Based Public Private Partnership (OB-PPP) that combines finance, concessions and grants for demining and the development of renewable energy (solar).

Scoring also identified as options with significant potential and viability a global frontloading facility for mine action, and a system based on government loans to farmers. A loan-based system has, however, already been put in place to help small-holder farmers pay for the demining of their land. Work is ongoing to assess why there is an apparent lack of demand for these loans from agricultural landowners.

Meanwhile, the development of a global frontloading facility is already underway, and there is no demand from Ukraine or donors for a stand-alone Ukraine frontloading facility. These two models were not therefore pursued further in this study.

### 4. Product summaries

#### Product 1: Sustainability-Linked Bond (SLB)

This product proposes a bond issued by the government of Ukraine to cover mine action and sustainability enhancing activity. It is modelled on a transition to organic winter wheat and no-till agriculture. The financial model is based on a \$250 million bond where 50% of the proceeds from bond sales are allocated to mine action, and 50% to sustainability initiatives.

The bond, which would conform to International Capital Markets Association (ICMA) guidelines and principles, has a proposed duration of ten years, with agricultural transition taking place over the first three. Funds for demining would be made available in the early stages of the project, taking into account the scale and location of funding needs, and the potential operational rate of absorption of the funds.

The cost of transition for a 12,500 hectare site was calculated to be \$12.25 million over three years, taking into account investments in new equipment and also loss of productivity during the transition phase. Profit would then increase due to the higher market value of organic wheat and the other benefits of no-till farming.

The \$12.25 million component for sustainable agriculture could, in principle, fund transitions on ten 12,500 hectare sites, or more or fewer sites on an equivalent area. Over a 25-year period, application of a "Special Demining Charge" and corporation tax would yield \$290 million in government revenue. That does not include the significant additional economic and social benefits of demining, and the positive environmental impact of sustainable agriculture.



## Product 2: Outcome-Based Public Private Partnership (OB-PPP)

The proposed OB-PPP links mine action with private sector development activities that are also a priority for Ukraine's recovery and reconstruction – in this case the construction of a solar farm. The model involves the private sector investing in clearing the area for the solar farm and constructing it, while receiving concessions from the government of Ukraine and outcome-based payments as incentives from donors.

As with the SLB, to generate additional funding for demining, a share of the revenue from solar energy sales is recouped by the government of Ukraine through a "Special Demining Charge," in addition to corporation tax and VAT. The model shows how a pilot project sized 10 MW solar farm costing \$10 million to develop could bring in \$13 million in new private sector funding for mine action through revenue sharing.

For investors, a key benefit of the OB-PPP is in the concessions and outcome-payments provided to the private sector by the government of Ukraine and donors to cover development costs – these have more favourable terms than a commercially available loan.

The pilot project size proposed here could be scaled up or replicated tens to hundreds of times depending on the location of viable land, market demand and the availability of investment capital. Ukraine has been identified as a country that could provide significant solar power with a potential capacity gap for new solar power of up to 6 GW. If this model were to be replicated for the entirety of Ukraine's solar energy potential at a cost of \$5-6 billion, this could bring an additional \$7-8 billion for mine action.

Enhancing Ukraine's energy infrastructure and supply would have positive sustainability effects for the environment and the economy. At scale, it could also enhance energy security for Ukraine and its European neighbours.

## 5. Key findings

The feasibility study identified the following eight key findings:

- a. Appetite for innovative finance.** There is a strong and growing appetite for innovative finance in Ukraine, including a Sustainability-Linked Bond and Outcome-Based PPP. There is support for linking mine action, agriculture and energy along with acknowledgement that "stand-alone" mine action remains an inherently positive activity in its own right. This reflects the government's current mine action and sustainability strategies, as well as its desire for mine action and sustainability to be linked to the private sector to support economic recovery and reconstruction.
- b. Donor appetite.** There is similarly a strong desire by a group of supportive donors to advance innovative financing in Ukraine in addition to developing a global frontloading facility for mine action. Supportive donors are keen to see tangible and demonstrable next steps.
- c. Viability of models.** The two products proposed have the potential to attract additional funding for mine action, as well as raise revenues for the government of Ukraine. Cost parameters are broad, however, and the models are based on indicative rather than exact figures. Further development would require more detailed and sector-specific analysis.
- d. Geographic link between mine action and sustainability activities.** The products proposed in this study could see a sustainable agricultural transition or the construction of renewable infrastructure take place on land that needs to be or has already been cleared. This could, however, restrict the product's potential, particularly in the case of an SLB. A preferred approach would be for demining funding to be allocated primarily on the basis of where it will have the most positive impact.



- e. National ownership.** This is key for both models. In the case of an SLB, it is vital, given that it would involve a government-issued bond linked to government strategies, with a coupon value (interest) linked to performance. Meanwhile, PPPs rely on clear national ownership, as the Ukrainian government would issue a request to the private sector and would have to offer concessions to facilitate projects.
- f. Legislative and policy environment.** The legal and regulatory frameworks already exist for both products, but both are relatively new and have had limited implementation and testing. The major concern regarding the readiness of both models is the availability of capacity to develop and implement the models. The government of Ukraine would need to draw together multi-disciplinary teams and cross-ministerial working groups to make either model work effectively.
- g. Risk management.**
- For an SLB, effective diagnostics and structuring of the bond are key to mitigate the financial risks, including in setting Key Performance Indicators (KPIs). The government of Ukraine's appetite for taking on more debt, together with its credit status, must be considered. The implementation of the bond across more than one part of Ukraine allows the risk of loss or damage to project land/equipment to be mitigated at the macro level, while minimising the impact on the government of Ukraine's ability to meet the KPIs. Due to Ukraine's being in Selective Default, internationally issued bonds would need 100% guarantees from IFIs connected to the EU's Ukraine Facility.
  - For an OB-PPP, the main risk in starting an outcome-based PPP would be a lack of private sector interest and investment. In the operationalisation of the project, the risks are less impactful than for an SLB, as they can be managed through contracts like any other infrastructure PPP. Some risks are outside of the government's or private sector's ability to control, such as the risk of loss or damage to newly built infrastructure due to the conflict. For such a risk, war risk insurance would be required to satisfy investors. Small pilot programmes could play a valuable role in "proving the concept."
- h. Governance around funding disbursement.** Both products involve the disbursement of funds, including to mine action operators, and to the agricultural and renewable energy sectors. The government of Ukraine would need to identify how to transparently and accountably manage and disburse the funds for demining and sustainability activities.

## 6. Recommendations and key next steps

The following eight recommendations, incorporating feedback from the validation workshops, are provided:

- a. Recommendation 1:** A Sustainability-Linked Bond (SLB) combining support for demining and a transition to sustainable agriculture, and an Outcome-Based Public Private Partnership (OB-PPP) combining demining with solar energy infrastructure development, should be explored further, and in parallel.
- b. Recommendation 2:** The development of both models depends on leadership and commitment in principle to their pursuit. Ukraine's Ministries of Economy and Finance should consider their appetites for exploring initiatives that are based on increased debt and/or concessions.
- c. Recommendation 3:** Specific focus should be given to identifying options for derisking mechanisms. The government of Ukraine and the European Commission should also assess the application of the EU's Ukraine Facility "Pillar 2" to provide guarantees of up to 100% to mine action sector financial mechanisms. Donors and the Ministry of Economy should also explore options to enable donor funding to compensate concessions on PPPs.
- d. Recommendation 4:** The next step should involve a detailed sector diagnosis and design analysis using multi-disciplinary project teams, or a combined team to explore both. This would include further analysis of all sectors involved (solar, agriculture and demining), an analysis of the





capital markets, engagement with potential investors, including banks and International Financial Institutions (IFIs), as well as with representatives of the agricultural and renewable energy sectors. The output of the sector diagnosis would enable product design. This recommendation could be funded by donors, or a combination of donors and, where possible, be *pro bono* and use existing capacity.

- e. Recommendation 5:** The Ministry of Economy should work with national and international mine action operators, donors, and the international mine action community to model and predict any likely funding drops and patterns after 2026. This would enhance donor coordination, the effectiveness of operational planning, and inform when it would be best to introduce streams of funding from innovative finance.
- f. Recommendation 6:** Ukraine's Ministry of Economy, IFIs, international donors and supporters should assess how they can use the full range of international financial assistance, including aid, in a blended way to incentivise or subsidise market-based approaches such as SLB and OB-PPP.
- g. Recommendation 7:** The government of Ukraine should continue to consider the best governance model to oversee the effective distribution of funds from any new mechanism to mine action, including any funds received by Ukraine from a global frontloading mechanism.
- h. Recommendation 8:** The government of Ukraine, UNDP, donors, partners and the report's authors should raise awareness of the report's findings and recommendations. Key stakeholders would include government departments and bodies within Ukraine, government departments beyond mine action stakeholders in donor and partner countries, IFIs, and the private sector.



# 1. Introduction

## 1.1 Context

The demining challenge in Ukraine following the full-scale invasion by Russia in 2022 is vast. It has created the largest volume of new contamination since the mine action sector emerged in the late 1980s. Contamination comprises the full range of explosive ordnance, from landmines to rockets, projectiles, improvised explosive devices, drones and more.

Contamination at such a scale has human consequences for those physically or psychologically affected. It has also added to the economic impact of the conflict, not just by the damage it has caused to homes and infrastructure, but by putting agricultural land out of productive use.

The cost of surveying land that may potentially be affected, and clearing that which is confirmed as contaminated, was estimated in the World Bank's Rapid Damage Needs Assessment 3 in February 2024 at USD 34.6bn. While the true cost is likely to be lower following survey, an additional funding need in the billions far exceeds that available in an already under-resourced global sector.

The mine action sector agreed to pursue innovative finance in 2019 at the Fourth Review Conference to the Anti-Personnel Mine Ban Convention (APMBC), when States Parties committed to "Do their utmost to commit the resources needed to meet Convention obligations as soon as possible and explore all possible alternative and/or innovative sources of funding."<sup>4</sup>

The full-scale invasion of Ukraine has galvanised further the desire by several major sector donors to accelerate progress on innovative finance for Ukraine, and also at the global level. Meanwhile, the Government of Ukraine has been explicit in its desire to see the creation of a demining market in the country that involves the private sector at national and international levels.

## 1.2 Feasibility study purpose

This feasibility study was commissioned by UNDP, with the generous support of the governments of The Netherlands, Switzerland and The United Kingdom. The authors were engaged as consultants to implement a study between April and September 2024.

The overall purpose of the study was to identify a broad range of innovative finance options for Ukraine that could reasonably be taken forward for potential application. It aimed to identify products and mechanisms that could have the greatest potential to support mine action in Ukraine, and contribute to the total funding needed to deliver on the country's mine action strategy.

The donors' aspiration was that the study could be used to inform discussions with the Government of Ukraine, as well as engagement with donors, International Finance Institutions (IFIs) and potential investors to explore preferred options in depth.

<sup>4</sup> Action #42 of the Oslo Action Plan, adopted at the 2019 Fourth Review Conference of the Anti-Personnel Mine Ban Convention. <https://www.osloreviewconference.org/fileadmin/APMBC-RC4/Fourth-Review-Conference/Oslo-action-plan-en.pdf>



## 1.3 Defining innovative finance

There is no universally agreed definition of ‘innovative finance’ in the humanitarian and development sectors. However, a working definition was developed as part of a study launched in early 2024 by GICHD and Symbio Impact:

**“ Innovative finance for mine action refers to initiatives that make use of financial mechanisms to channel public and private funds towards mine action to help narrow the funding gap and complement existing funding arrangements in a way that fosters equity, sustainability, efficiency and effectiveness.”<sup>5</sup>**

This definition has been used as the basis for exploring innovative finance in Ukraine as part of this study. In exploring the range of innovative finance options that could, in principle, be implemented in Ukraine, the following guiding framework was applied:

- The mechanism could leverage additional funding beyond Overseas Development Assistance (ODA).
- It could contribute to providing both up-front and long-term stable funding.
- It could contribute to establishing mechanisms to ensure accountability in the context of large-scale capital investment and employment in the mine action sector.
- It could contribute to the creation of enabling finance for enhanced agricultural activities in parallel with clearance.

## 1.4 Project approach

The project was designed and implemented using a ‘cumulative approach’, with multiple consecutive deliverables building on each other. It involved the following process and deliverables:

1. Inception Report
2. Landscape analysis report
3. Identifying innovative financing mechanisms
4. Option refinement
5. Draft feasibility study and validation workshop
6. Final feasibility study
7. Dissemination

The final feasibility study incorporated feedback from an in-person validation workshop held in Kyiv on 5 September 2024, followed stakeholder consultation online and in Kyiv during September 2024.

## 1.5 Report structure

The structure of this report follows the overall structure of the project’s deliverables. The final section includes recommendations for next steps, following refinement of options to a final shortlist of two:

- **Product 1:** A Sustainability-Linked Bond SLB to finance both demining and transition to sustainable agriculture.
- **Product 2:** An Outcome-Based Public Private Partnership (OB-PPP) that combines finance, concessions and grants for demining and the development of renewable energy (solar).

<sup>5</sup> [https://www.gichd.org/fileadmin/user\\_upload/INNOVATIVE\\_FINANCE\\_FOR\\_MINE\\_ACTION\\_NEEDS\\_AND\\_POTENTIAL\\_SOLUTIONS.pdf](https://www.gichd.org/fileadmin/user_upload/INNOVATIVE_FINANCE_FOR_MINE_ACTION_NEEDS_AND_POTENTIAL_SOLUTIONS.pdf)



Section 2 outlines the methodology and approach, based on desktop analysis combined with stakeholders consultation, conducted remotely as well as in Ukraine. Section 3 (Landscape Analysis) outlines the current scale and need for mine action in Ukraine, in addition to the current governance and structure of the mine action sector itself.

Section 3 also summarises current challenges facing the mine action sector in Ukraine, including those relating to the ongoing conflict. It considers this in the context of broader mine action sector policy and practice. The final part of Section 3 reflects feedback on the current funding landscape for Ukraine, including increasing references during consultation to a likely funding 'drop off' from 2026.

Section 4 introduces a long list of innovative finance options that could, in principle, be applied. 39 potential mechanisms were considered, ten of which take the form of derisking measures. Summaries of each are provided in Annex A. The Section goes on to outline option refinement criteria, which were applied to the 29 products and mechanisms that did not relate to derisking. The final score for each is included alongside the product description in Annex A.

The option refinement identified three products for further consideration. In addition to Products 1 & 2 highlighted above, a third product was based on a 'Collateralised Loan Obligation'. Section 4 closes by explaining the rationale for not pursuing this option further following consultation with stakeholders. In summary, this is based on a deficit of understanding around the apparent lack of demand for current loan-based facilities. A study to understand this further is planned by the European Bank of Reconstruction and Development (EBRD).

Meanwhile, option refinement also identified a global frontloading mechanism for mine action as a model with high potential to support demining in Ukraine with additional sector funding. It confirmed, however, that there was not a desire by Ukraine or donors for a stand-alone Ukraine frontloading facility. The development of a global frontloading facility was noted as 'in progress', along with smallholder loans, and therefore not pursued further as part of the study.

Section 5 then explores and develops the two shortlisted products in detail. This includes a detailed summary of each product, including operational and financial models. Cost estimates are included for both the development and implementation of the models, including potential return for the private sector, investors and cost recovery by the Government of Ukraine.

The development and feasibility assessment of both models required working assumptions. Section 5 outlines the assumptions used to consider feasibility, so that they can be refined and adapted in any future product development. Models are therefore presented as indicative, rather than fully formed products.

Section 6 assess risk and potential mitigation measures for each of the two products, while Section 7 goes on to consider readiness. This provides a detailed summary of current appetite and engagement among key stakeholders, in addition to the legal, policy and legislative frameworks on which the further development of each model would depend.

Section 8 provides a comparative analysis of the two final products, noting that consideration of several key risk and readiness factors for both raise similar areas for further work. Finally, Section 9 outlines seven concrete recommendations for potential next steps, including areas for potential donor support in progressing innovative finance for sustainability-linked mine action in Ukraine.

# 2. Methodology & Approach



## Methodology

This feasibility study was undertaken by the authors between April and September 2024, under the overall direction of a UNDP Programme Manager and the Team Leader. It was developed incrementally against the following milestones:

- Inception report
- Landscape analysis report
- Identifying innovative financing mechanisms
- Option refinement
- Draft feasibility study and validation workshop
- Final feasibility study
- Dissemination

The methodology comprised two key approaches:

- **Desk review:** This involved an extensive review of publicly available information on mine action funding, national mine action strategies, potential innovative financing mechanisms, the current role of IFIs, investors and investment groups and donors in Ukraine.
- **Stakeholder engagement:** This took the form of in-depth semi-structured interviews with key stakeholders to gain information about demining challenges, ongoing efforts in demining and innovative finance, and understanding the roles, aims, opportunities and threats as perceived by key stakeholders. Consultations were undertaken throughout the project, culminating in in-person validation workshops and final consultations to consider the draft feasibility study and recommendations.

## Approach

The way in which the study was conducted aimed to complement other ongoing work on innovative finance for mine action, with the aim of ensuring the most efficient support to the Government of Ukraine, value for money to the project's donors and the goal of bringing additional benefit to the mine action sector. It sought to complement innovative finance engagement with the Ministry of Economy, provided as part of the Geneva International Centre for Humanitarian Demining's (GICHD) broader programme of strategic capacity support and the efforts of other actors supporting Ukraine's financial environment for mine action such as the European Bank of Reconstruction and Development (EBRD).



# 3. Landscape Analysis

## 3.1 Nature and impact of explosive ordnance contamination

### Nature and scale of contamination

The full-scale invasion of Ukraine has seen the country become one of the most explosive ordnance-contaminated countries in the world. Contamination in Ukraine encompasses the full range of explosive ordnance, from anti-personnel mines and anti-vehicle mines to cluster munition remnants, rockets, mortars, projectiles, missiles and improvised explosive devices.

While the full extent of contamination in parts of the country occupied by Russia is not known, there can be no doubt that Ukraine joins Afghanistan, Cambodia and Iraq as one of the most contaminated countries globally. With the war continuing intensely, contamination levels are only set to increase.

There have been several initiatives to quantify the extent of contamination in areas under the Government of Ukraine's control. Initial estimates of 174,000km<sup>2</sup> (30% of Ukraine's territory) have been revised down, primarily due to the application of non-technical survey (NTS, see further below). As of August 2024, Ukraine's Ministry of Economy assessed that 144,000km<sup>2</sup> of land is potentially contaminated by explosive ordnance and in need of some level of expert assessment or treatment.<sup>6</sup>

Between February 2022 and July 2024, Ukraine recorded mine explosions and incidents from other explosive hazards impacting civilians, resulting in 673 wounded casualties and 297 fatal casualties.<sup>7</sup> It is estimated that 15% of the population of Ukraine now live with the risk of landmines and unexploded ordnance.

A key challenge arises from initial contamination estimates having included all areas where fighting had taken place, and so where there might potentially be contamination. The true contamination level is likely to be much lower than the original estimate, possibly as low as 20%. Gaining a more accurate picture of contamination through NTS is key to achieving this, with survey being a priority for the Government of Ukraine.

### Explosive ordnance contamination and agriculture

An accurate contamination picture is linked to the government's priority of supporting rehabilitation of Ukraine's agricultural sector, which has declined substantially following the full-scale invasion. Prior to 2022, Ukraine was among the world's top ten producers and exporters of wheat and oilseeds, with agriculture constituting nearly 50% of the national exports. In June 2024, the Government of Ukraine announced that the annual loss to the country's gross domestic product from agricultural land alone as a result of explosive ordnance contamination amounted to USD 11bn.<sup>8</sup>

The environmental impact of explosive ordnance contamination is not currently known but is an evolving area of focus for much of the mine action sector and the national mine action strategy. Further research is required to fully understand and identify the scope of needs for decontamination from specific pollutants that may occur from explosive, metal or chemical contamination.

<sup>6</sup> Data from Ministry of Economic of Ukraine's National mine Action Platform 'Demine Ukraine' website <https://demine.gov.ua/en> accessed 20/08/2024

<sup>7</sup> Data from Ministry of Economic of Ukraine's National mine Action Platform 'Demine Ukraine' website <https://demine.gov.ua/en/mine-victims/rights-of-victims> accessed 20/08/2024

<sup>8</sup> Speech made by First Deputy Prime Minister and Minister of Economy Yulia Svyrydenko at the Berlin Ukraine Reconstruction Conference, June 2024



Restoring land may also prove equally, if not more, costly than demining. Consultation showed that the Government of Ukraine is considering the creation of new conservation areas as one method to address the long-term effect of pollutants on the productivity of soil and contaminated water sources.

Grain production in Ukraine has seen substantial reductions. According to the US Department for Agriculture's monitoring service, projected annual wheat production in 2024/25 is approximately 21.6m tons compared to 33m tons in 2021/22, a decrease of a third. Projections for barley are 46% lower than 2012/22 production figures at 5.3m tons, with corn production declining by just over a third to a projected 27.2m tons for 2024/25.<sup>9</sup>

In addition to the losses to Ukraine's economy, the impact of the war and explosive ordnance contamination on Ukraine's agricultural sector has affected global supply chains. Global wheat prices increased by 40-50% at the onset of the full-scale invasion, while the cost of commodities such as sunflower oil, wheat and fertilizer in Africa increased dramatically.<sup>10</sup> The Ministry of Economy estimates that land currently contaminated by explosive ordnance could produce food for 81m people.<sup>11</sup>

While NTS is vital and rightly prioritised by the Government of Ukraine, it is also clear that confirmed contamination will include densely patterned minefields in areas where the front line became entrenched, particularly in areas to the east of Kherson and the front lines in the Donbas region.

## 3.2 Demining operations and challenges

### Current demining operations

As of September 2024 there were 53 certified demining operators in Ukraine, including non-profit, commercial operators and major international demining NGOs. Further operators were in the process of certification. Danish Refugee Council (DRC), Fondation Suisse de Déminage (FSD) and The HALO Trust were present prior to the full-scale invasion, working in response to the 2014 conflict.

At a donor coordination conference in late Spring 2024, the Ministry of Economy recorded 4,261 demining operatives (sappers) working in Ukraine, an increase of 670 on January 2024, and making it one of largest demining capacities in the world. Ukraine's strategy is to further increase demining capacity to 10,000 deminers by the end of 2024, focussed especially on NTS activity.

The State Emergency Service of Ukraine (SESU) is responsible for 'spot task' emergency call outs, in addition to responding to the immediate emergency response to missile, drone and other longer-range strikes. SESU, which falls under Ukraine's Ministry of Interior, has numerous regional offices across Ukraine.

In 2023, and the first four months of 2024, 19,000km<sup>2</sup> of land were reported as having been cleared or released by other means and returned to productive use. In the first quarter of 2024, the government reported having already surveyed over 20% of the target of 512,000 hectares for survey to be completed within the year.

While progress in 2024 has been positive at these rates, some have estimated that demining all contaminated land in Ukraine could take over 700 years. This shows not only the importance of survey to identify the areas in need of full clearance, but also for innovation and use of mechanical tools to speed up clearance and technical survey where required.

There have been repeated calls by Ukrainian government demining entities, NGOs and commercial operators to increase the number of machines to speed up technical survey and clearance. Ukraine has therefore supported and promoted the development of Ukrainian manufactured demining equipment, and advocates strongly for operators and donors to buy Ukrainian equipment and support the economy.

<sup>9</sup> <https://ipad.fas.usda.gov/countrysummary/default.aspx?id=US>

<sup>10</sup> <https://www.wilsoncenter.org/blog-post/russia-ukraine-africa-food-security>

<sup>11</sup> Presentation by First Deputy Prime Minister and Minister of Economy at Ukraine Mine Action Donor Conference, April 2024



## Working in ongoing conflict

Working within the context of a wider ongoing conflict was identified as a further significant challenge for the Government of Ukraine and the mine action sector. Contemporary humanitarian demining has adapted to the complexities of modern conflict. Reflecting UN General Assembly Resolution A/C.4/72/L.12, the International Mine Action Standards (IMAS) make provision for when “clearance is undertaken for humanitarian purposes and in areas where active hostilities have ceased.”<sup>1</sup>

While many of the priority areas for survey and clearance are a considerable distance from active front lines, demining still takes place in a broader conflict where long-range air assaults remain the norm. Beyond the mine action policy considerations, this has practical implications, particularly for insurance. While the Ministry of Economy has established a national insurance system to encourage business and investment, most international demining activities require specialist, and costly, bespoke insurance.

Working within a wider active conflict also brings additional security and contingency costs for international and national actors. Meanwhile, conscription can remove operational and managerial demining expertise from existing capacity in support of Ukraine’s war effort. While some exemptions are in place, conscription adds uncertainty to mine action sector operators.

## Community & corporate strategies

With the need to restore economic productivity, many small-holder farmers have taken the decision to risk ploughing or using land where fighting has taken place. There have been numerous accidents as a result. Some large agricultural companies have established their own regulated demining units, in dialogue with the government.

Meanwhile, economic imperative has also seen the rise of an unregulated demining sector, operating outside of the oversight of national authorities. As well as bringing risk by not adhering to national standards, this adds to the already complex challenge of accurate information management for mine action activities. It also raises insurance, liability and cadastre (land registry) challenges for the Government of Ukraine at national and oblast levels.

## 3.3 National mine action governance

Ukraine’s mine action sector is guided by a law *On Mine Action in Ukraine*, adopted by parliament in September 2020 and signed by the President in December of the same year. Meanwhile, the Government of Ukraine has developed and adopted a National Mine Action Strategy and Operational Plan, approved in June 2024, that is fit for purpose to respond to the extent of contamination following the full-scale invasion (see further below).

In addition to SESU’s emergency response capacity under the Ministry of Interior, the following are key government actors and agencies within the oversight of Ukraine’s mine action sector:

- Overall government responsibility for mine action falls to the First Deputy Prime Minister and Minister for Economy, a post held at the time of writing by Yulia Svyrydenko and with accountability to the Council of Ministers.
- The Centre for Humanitarian Demining (CHD, which also operates as ‘Demine Ukraine’) reports to the Deputy Minister of Economy, a post held at the time of writing by Ihor Bezkaravainyi. The Centre for Humanitarian Demining was established in 2023 to complement the existing mine action architecture of government bodies and to fill gaps in national strategy and policy development, international coordination and cooperation. The Centre has led the development of the national mine action strategy and delivering the statutes to enshrine it in law. It has an Advisory Body which includes the Director of the GICHD and Japan’s Ambassador to Ukraine, who currently chairs the donor coordination group for mine action. Sector donor Howard G Buffet and the European Commission at senior level also sit on the Advisory Body as the two principal donors to the Centre.





- A National Mine Action Agency (NMAA) is currently led by the Ukrainian Ministry of Defence as stipulated in the law, and involves other ministries including education, health and economy. It is responsible for the coordination of state regulation and planning of mine action. The NMAA is responsible for ensuring comprehensive information management and maintaining the IMSMA<sup>12</sup> database, quality control, and certification and accreditation of operators.
- Two operational mine action centres have been established: the Humanitarian Demining Centre in Kharkiv, which is run by the Ministry of Internal Affairs to which SESU reports; and the Mine Action Centre in Chernihiv which sits under the Ministry of Defence and is run by the State Special Transport Services. Both entities are responsible to varying degrees for accreditation, operational planning and tasking, explosive ordnance disposal and IMSMA reporting. Some inconsistencies and lack of clarity remain in some of the roles and responsibilities between the two regional bodies and the NMAA.
- A mine action sub-cluster coordination group is led by UNDP and acts as an anchor for mine action activities within the UN cluster system.

## Ukraine National Mine Action Strategy

In 2023, Ukraine embarked on the development of a National Mine Action Strategy which establishes key objectives for implementation over a ten-year period. The initial draft of the strategy was launched in 2024, following a series of sectoral workshops and engagement in its development, and it was formally adopted by the Cabinet of Ministers in June 2024 along with an operational plan for its implementation for the first three years.

The strategy makes provision for a three-year update cycle, while setting the following three strategic objectives:

- Returning land to productive use
- Protecting people from explosive ordnance
- Strengthening the mine action management system

The operational plan for the strategy sets out concrete priorities for 2024:

- Release of the non-contaminated land and return to productive use
- Launching the state compensation programme
- Development of government mine action operators' capacity
- Automated prioritisation of tasking
- Launching the demining services market
- Local production of demining equipment

## 3.4 Demining needs & priorities

### Non-technical survey (NTS)

As outlined above, initial response to a substantial part of the current estimated contamination in Ukraine will involve NTS to reassess and cancel areas suspected of containing explosive ordnance, providing more accurate figures for Suspected Hazardous Areas (SHA) and Confirmed Hazardous Areas (CHA). The Ukrainian government anticipates that around 13,000km<sup>2</sup> (5-10% of the contaminated area) will need a technical survey, and about 9,000km<sup>2</sup> (2-8%) will require actual clearance operations.

<sup>12</sup> IMSMA is the Information Management System for Mine Action, used by most countries globally to manage contamination and land release (survey and clearance) in the mine action sector.



## Land release priorities

The National Mine Action Authority sets out the priority land use categories requiring survey and/or clearance to get back to productive use. These are:

- Life support infrastructure (electricity, water, gas and heat supply)
- Residential areas
- Transport infrastructure
- Critical infrastructure entities
- Agricultural land

In addition to these urgent priorities, the national mine action strategy recognises the need to address contamination in forested and underwater areas. The environmental impact of explosive ordnance is also recognised. While plans to address it will require more information as to the extent, type and impact of physical and pollutant effects, it is possible that some land may not be able to be returned to its original land use and may be better repurposed.

## Prioritisation methods

The workplan within the national strategy sets a target to automate land release tasking and prioritisation, using both contamination data and economic impact data. The Ministry of Economy plans to develop an economic prioritisation index tool, supported to date by the Tony Blair Institute for Global Change, that can be used to rank individual plots of land with their economic impact based on pre-war economic output.

Coupled with satellite imagery and AI mapping of explosive ordnance contamination, the intent is for data to feed into an automatic prioritisation system that combines multiple data streams. Consultation as part of this study identified some concerns over automation, and the need to retain judgement within the prioritisation process.

## 3.5 Stakeholders and capacity support

### Mine action stakeholders

Stakeholders in Ukraine can be considered broadly in eight groups:

- Government of Ukraine & arms-length bodies
- UN bodies in Ukraine
- Supportive & donor governments
- Multilateral Development Banks (MDBs) & International Financial Institutions (IFIs)
- Private sector financial institutions (FIs)
- Corporate entities
- Demining organisations (NGO and commercial)
- Other capacity support and research organisations

### Creating a national market

As detailed elsewhere in this report, a key aspiration of the Government of Ukraine's approach to demining involves the creation of a national sector market. This aims to balance immediate humanitarian



need with support to the reconstruction and rehabilitation of the economy. This includes the creation of a national market for the development and production of demining machinery, detection equipment and personal protective equipment.

This marks a departure from the *status quo* in most of the mine action sector, which has typically depended on importation of technical equipment. Domestic production has the potential to enhance the country's mine action sector if linked to national standards that reflect international good practice.

## Capacity support

The extent of new contamination since the full-scale invasion and rapid escalation of operational capacity to respond has put pressure on the national demining infrastructure. Consultation identified pressure points around information management, clarity on tasking and accreditation process and timelines. The new mine action strategy aims to address these.

Other key input and capacity support is provided by the GICHD), particularly in information management (including IMSMA), support to the development of the national mine action strategy and coordination architecture. The GICHD is also providing bespoke support to Ukraine's Centre for Humanitarian Demining, including with national and international diplomatic convening and representation, and the application of innovative finance models.

Meanwhile, the UNDP offers a range of institutional capacity support from within its country office, including in strategic development, institutional reform, explosive ordnance risk education (alongside UNICEF), victim assistance and further developing the range of innovative financing models that could be applied to Ukraine.

Also, within the UN family, the World Food Programme (WFP) and the Food and Agriculture Organisation (FAO) have developed a joint initiative with the Ministries of Economy and Agriculture. The project aims to link agricultural rehabilitation directly to mine action while harnessing innovations in agriculture to enhance rehabilitation and sustainability.

## 3.6 Funding and future needs

### Current funding commitments

The Ministry of Economy states that, as of May 2024, they had received funding commitments between 2022 and 2027 of over USD 700m. Of this, the 2023 Landmine Monitor reported that Ukraine received USD 162m in international mine action funding in 2022, accounting for 20% of global mine action funding that year. While official figures for 2023 are not yet available, data regarding donor's pledges made publicly show an increase in funding to Ukraine in 2023.

The International Donor Conference on Humanitarian Demining in October 2023, organised by the Government of Croatia, raised approximately EUR 500m in commitments from 34 different states. These figures match the World Bank's assessments of around USD 397m for 2023 alone. A follow-up donor conference planned in Switzerland in October 2024 is expected to see further commitments and streamlined processes of assistance.

#### Innovative finance initiatives

The Government of Ukraine has also launched a state compensation system for farmers to be able to receive a loan for 80% of the cost to clear their land. Following a pilot tender in 2023, 2024 saw the launch of the system at a larger scale, where the Government commits to match 20% of farmers' contribution to clearance with 80% of government funding. This is tendered out in a competitive market system through the online ProZorro state procurement service.



UAH 3bn has been allocated in the State Budget in 2024 to support this initiative. At the time of writing, it is unclear how much take up there has been of this initiative by farmers, something the consultants will investigate through stakeholder consultations to assess the demand for such loan structures. Meanwhile innovative finance scoping and capacity building forms part of the packages of support currently being provided to the Minister of Economy by the GICHD and UNDP.

## Current and future funding needs

The World Bank Rapid Damage Needs Assessment 3 (RDNA3), launched in March 2024, estimates the funding need for land release in Ukraine to be USD 34.6bn. This is a decrease from USD 37bn reported in 2022, primarily through the application of NTS, which reduced the areas estimated to require technical survey and clearance. This led to a reduction in cost of USD 3bn. The survey of these areas, costing approximately USD 20m, shows showing the cost effectiveness of rapid and accurate survey.

The RDNA3 proposes an indicative breakdown for the total cost estimate of land release as follows:

- NTS and mapping: Between USD 50-200m is needed for detailed surveys and mapping of contaminated areas.
- Technical survey: Requiring an estimated USD 8.95bn.
- Clearance: An estimated USD 25.5bn will be needed for comprehensive clearance.

These figures include costs for equipment, training, operational expenses and support for victims. The figures provided in the rapid assessment for the RDNA3 are understood to be broad estimates that could be refined based more detailed analysis of updated mine action data as well as through ongoing NTS. Additional cost drivers also mentioned in the rapid assessment include:

- Equipment and technology: Advanced demining equipment is essential, with costs running into the billions of dollars.
- Training and capacity building: Developing local expertise and institutional capacity involves substantial investment in training programs and ongoing professional development.
- Explosive ordnance risk education (EORE): Public awareness campaigns and educational programs require significant funding to be effective and widespread.
- Support for victims: Medical care, rehabilitation, and support services for victims necessitate a robust financial commitment.

## Current developments in funding landscape

As noted above, consultation with stakeholders has been an ongoing activity during the course of this feasibility study. Input, particularly from government donors and stakeholders, has evolved during the course of the project. At the time of writing, several stakeholders have reported strong indications of reductions in government grants for mine action in Ukraine from 2026.

At the same time, several operational stakeholders have noted challenges in recruiting, training and retaining operational staff, particularly men. Conscription has been a key factor, along with restrictions on flexibility in personnel being able to move to different locations around the country. Some stakeholders highlighted challenges in absorbing any large influx in funding while also planning for a potential downturn in donor contracts from 2026.



# 4. Innovative Finance Options & Refinement

## 4.1 Long-list of innovative finance options

This project explored a wide range of innovative finance mechanisms that could potentially form part of products to accelerate demining in Ukraine in the short, medium and long term. Research and consultation identified a wide range of potential mechanisms and instruments, and a similarly wide range of ways in which they can be used to structure bespoke products.

A long-list of 39 mechanisms were identified. In drawing up the long-list of 39, ten of which relate to de-risking of a potential marketable product, the following eligibility criteria were applied:

- The mechanism brings an element of innovative finance to mine action in Ukraine, in other words it is: not currently part of Overseas Development Assistance (ODA) to mine action sector in Ukraine; and is not part of current or anticipated philanthropic giving or public fundraising for mine action in Ukraine.
- The mechanism could operate on its own or play a key role in part of a wider product involving blended options and de-risking.
- There are reasonable grounds to consider that the mechanism could be adapted to the need and context in Ukraine.
- The mechanism is consistent with the National Mine Action Strategy.
- The mechanism could be consistent with the existing legal and regulatory framework in Ukraine.

The long list of mechanisms is presented in Annex A to this report.

### Mechanism categorisation

The 39 potential mechanisms were grouped into the following six categories:

- **Public Finance (9):** Mechanisms that depend in whole on government funding or security, or where that forms a core part of the viability of the product.
- **Private Finance (15):** Mechanisms that are driven primarily by private sector and investor markets, within the legal and regulatory frameworks of donors and the Government of Ukraine.
- **Blended Finance (4):** Mechanisms that comprise elements of public (government) funding and the private sector, incorporating return for investors that may be varied based on risk appetite and may include motive or incentive for investment in social and environmental impact.
- **Taxation & Levy (1):** Mechanisms based on an obligatory public tax or levy on specific good, transactions or services in Ukraine that is earmarked for public or social benefit, in this case demining.
- **Public Finance Derisking (1):** Mechanisms designed primarily to derisk products using government guarantees or concessions, including through multilateral mechanisms led by government decisions.
- **Private Finance Derisking (9):** Mechanisms designed primarily to de-risk products using non-government and commercial guarantees or concessions.

Mechanisms were categorised by 'status', namely the general extent to which the mechanism has been applied to mine action in Ukraine or globally, or a similar sector or context. The three categories are:



- **In Progress (5):** Initiatives that are already under development for mine action in Ukraine or globally for mine action or are at an advanced pilot stage or beyond in a similar sector or context.
- **Tested Elsewhere (32):** Mechanisms that have formed part of a successful project or product in a similar sector or context affected by conflict and fragility.
- **Untested (2):** Mechanisms that have not yet formed part of a comparable successful pilot or project in a comparable context yet have the potential to add value in Ukraine and could therefore warrant further investigation.

### Option refinement

Thirty of 39 options, excluding derisking mechanisms, were scored against the following criteria, with a maximum score of 40.

No	Name	Scale
1	Potential for impact on mine action in Ukraine	0 = No or insignificant impact 1 = Low impact or high uncertainty 2 = Moderate impact on mine action 3 = High impact on mine action 4 = Very high impact on mine action
2	Scale of financial opportunity	0 = Minimal scale of resources mobilized or saved compared to current needs 1 = Potential to mobilize a low amount of resource. Approximately under 1% of current needs 2 = Potential to mobilize or save a moderate amount of resource. Approximately between 1-5% of current needs 3 = Potential to mobilize or save a high amount of resource. Approximately between 5-15% of current financing needs 4 = Potential to mobilize or save a very high amount of resources, in excess of 15% of current need to achieve a significant impact on the mine action finance agenda
3	What is the timeline for solution implementation?	0 = Long, 5 years and more 2 = Medium, 1 to 5 years 4 = Short, up to 1 year
4	Is the solution backed by political will in Ukraine?	0 = None 1 = Low buy-in 2 = Moderate buy-in 3 = High buy-in 4 = Very high buy-in
5	Is buy-in among potential international government partners sufficiently strong?	0 = None 1 = Low buy-in 2 = Moderate buy-in 3 = High buy-in 4 = Very high buy-in
6	Is buy-in among potential private sector investors sufficiently strong?	0 = None 1 = Low buy-in 2 = Moderate buy-in 3 = High buy-in 4 = Very high buy-in
7	Is buy-in among MDBs and DFIs sufficiently strong?	0 = None 1 = Low buy-in 2 = Moderate buy-in 3 = High buy-in 4 = Very high buy-in
8	Are main financial risks adequately addressed (e.g. exchange rate, lack of investors)?	0 = No, high risks remain 2 = Moderate risks 4 = Yes, low residual risks



No	Name	Scale
9	Political feasibility and likelihood of success	<p>0 = Virtually no chance of success under current conditions. Commercially unviable (if relevant)</p> <p>2 = Low likelihood of success due to high political and social resistance or major operational or technical barriers. Limited commercial viability (if relevant)</p> <p>4 = Moderate likelihood of success due to limited political and social support or known operational or technical barriers. Limited commercial viability (if relevant). Limited record of success, replicability or scalability in comparable contexts</p> <p>6 = High likelihood of success. Sufficient political and social support. Commercially viable (if relevant). Operational challenges are manageable. Relevant record of success, replicability or scalability in comparable contexts</p> <p>8 = Very high likelihood of success. Broad political and social support and sound commercial viability (if relevant). No operational challenges known. Strong record or expectation of success, replicability or scalability in comparable contexts</p>

## Scoring outcomes

Scoring showed that while many mechanisms could potentially be applied to mine action in Ukraine, they vary in terms of likelihood of success, impact and scalability.

Eight of the ‘non-derisking’ mechanisms met or exceeded the ‘cut-off’ score of 20. Figure 1 below shows scores for each of the eight models, in ascending order of score and noting where these are already ‘in progress’ (see further below).

Financial Mechanism	Score	‘In Progress’
Collateralised Debt/Loan Obligation	23	No
Mine Action Lending	25	<b>Yes</b>
Redirection of Interest from Frozen Russian Assets	25	No
Government Private Land Owner Investment	26	<b>Yes</b>
Outcomes-Based Public Private Partnerships	29	No
Sustainability Linked Bonds	29	No
Sustainable Bonds	29	No
Frontloading Facility	30	<b>Yes</b>

**Figure 1:** Financial mechanisms scoring over 20.

The three mechanisms assessed as ‘in progress’ are already in development or implementation in Ukraine. These include the Government of Ukraine landowner compensation scheme, which is a hybrid of loan and government land investment mentioned above. Options for ‘Mine Action Lending’ and ‘Government Private Land Owner Investment’ were not therefore taken forward for further modelling under this project in the interests of avoiding duplication and pursuing innovation.

Despite being ‘in progress’, stakeholder consultation showed a high level of uncertainty around demand for loan products from smallholder farmers. Research and consultation also identified that the European Bank of Reconstruction and Development (EBRD) is exploring a study to assess the feasibility of this particular option. This includes developing a greater understanding of the apparent lack of demand in the schemes from smallholder landowners.

Meanwhile, frontloading is being pursued through a global frontloading model. Ukraine’s desire to be part of, and play a leading role in, the development of a global frontloading facility was noted at a roundtable on the topic, held in May 2024. The meeting involved the Ukrainian Ministry of Economy at Deputy Ministerial level.



In June 2024, at the Ukraine Reconstruction Conference in Berlin, the First Deputy Prime Minister and Minister of Economy and expressed a desire for Ukraine to be part of the development of this global frontloading facility. It was clear from statements and wider consultation that the application of frontloading for mine action in Ukraine would need to be part of a wider global system. A stand-alone Ukraine model is not sought by Ukraine.

The 2024 report by GICHD and Symbio Impact referenced earlier in this report summarises how mine action could create a global frontloading model based on the International Finance Facility for Immunisation (IFFIm). Such a facility, in partnership with donors and the World Bank, could have the potential to raise and disburse up to USD 2bn per year in global funding for mine action, including response to new emergencies and ‘completion’ in countries that are not otherwise prioritised as recipients of donor funding.

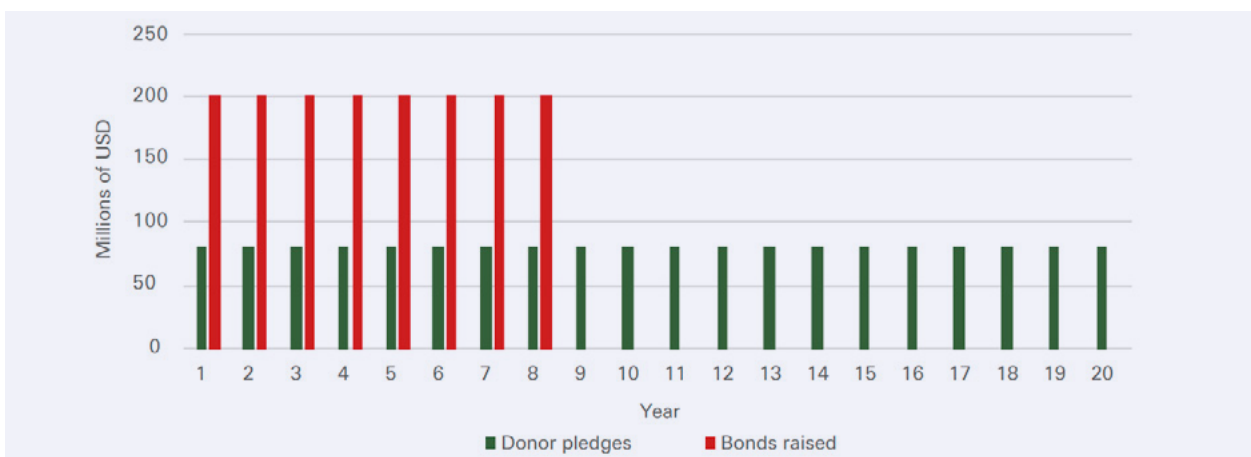
Figure 2 below summarises the IFFIm operating structure and financial flows as referenced in the report by GICHD and Symbio Impact.



**Figure 2:** IFFIm operating structure and financial flows.

Source: Gavi and IFFIm (2023)<sup>13</sup>

Meanwhile, the following diagram in Figure 3 illustrates how long term donor pledges over an example range of 20 years could leverage at least USD 200m per year over eight years. For the purposes of modelling, front-loaded funds were presented as flatlined across the eight years. In reality, the funding levels and bonds issued may fluctuate from year to year, but the end result should nonetheless be stable up-front funding that mine-affected countries can draw on and use to deliver land release sooner that they would otherwise. While the model shows how frontloading could bring approximately USD 200m per year of stable funding to the mine action sector, it also has the potential to be scaled up and is currently being explored at a scale of ten times that (at USD 2bn per year).



**Figure 3:** A front-loading model of innovative finance for land release. (GICHD/Symbio Impact).

<sup>13</sup> <https://iffim.org/document/iffim-resource-guide>





Symbio Impact continues to work with GICHD, the diplomatic community and other stakeholders on the development of a global frontloading facility for mine action. GICHD is also working with the Mine Action Finance Initiative (MAFI, the mine action finance initiative), to support the Government of Ukraine in its engagement with a global model as well as in-country governance systems to oversee the disbursements of funds generated for Ukraine as part of a global facility.

Meanwhile, several other models scored relatively highly in the analysis, but were not identified as viable to take forward. Figure 4 below provides a summary of those models and the rationale for excluding them for further, more detailed analysis and modelling as part of this study:

Rationale for exclusion from further analysis	
<b>Sovereign Wealth Funds</b>	A Ukraine Sovereign Wealth Fund is unlikely given Ukraine’s current economic position. It would be highly unlikely to be in a position to capitalise such a fund while taking on additional debt.
<b>Community Finance Funds</b>	As a form of catalytic revolving community finance, these have potential, but not at scale. They could still be helpful or replicable at a very local level or elsewhere or could potentially be a sub-component of an Outcome-Based Public Private Partnership (OB-PPP).
<b>Redirection of frozen Russian assets</b>	At the time of writing, the G7 have announced a plan to use the interest on frozen Russian assets to cover interest on a USD 50bn loan to Ukraine. This model is extremely complex and requires legal rulings in multiple jurisdictions in which the frozen assets are held. Research indicated that success is mostly dependent on international political will and legal effort outside Ukraine. It is therefore not possible to model for mine action in Ukraine as part of this project.

**Figure 4:** Model scoring under 20, but identified as ‘of potential future interest’.

## 4.2 Shortlisted financial mechanisms

The option refinement stage identified three mechanisms to take forward for more detailed analysis and modelling, where appropriate and possible. They comprised a combination of loan facility, a debt-based product based on sustainable and sustainability-linked bonds, and an Outcome-Based Public Private Partnership (OB-PPP). The rationale for further development was based on the following rationale at the time of selection:

Models taken forward	Potential application to mine action in Ukraine
1. <b>Loan facility:</b> Collateralised Debt/ Loan Obligation	The objective of the product is to provide a derisked loan portfolio provided through local banks to smallholder farmers for agriculture and demining activities via securitisation of the respective loan books. The assets are removed from the banks’ balance sheets and grouped into pools of assets. This process is beneficial for local banks as it allows the reduction of associated assets from its balance sheet, reducing liabilities and providing the ability to provide more loans than otherwise possible from a risk accounting perspective. This model could complement the loan facility already in progress for landowners in Ukraine.
2. <b>Debt based product:</b> Sustainability Linked Bond (SLB)	By combining ‘use of proceeds’ components of Sustainable Bonds with Sustainability-Linked Bonds, a Sustainability Linked Bond (SLB) could be developed to deliver demining alongside sustainable environmental outcomes. A government or MDB could issue a bond with interest rates linked to achieving specific demining and sustainability deliverables (social or environmental), such as improving land use through regenerative agriculture and more environmentally friendly demining practices. This approach could attract investors seeking both financial return and positive environmental and social impact.
3. <b>Outcome-Based Public Private Partnership (OB-PPP)</b>	An Outcomes-Based PPP (OB-PPP) has the potential to break down siloes between national government entities, donor agencies and organisations working within and outside the mine action sector (for example in energy or agriculture) by aligning interests and incentives. This model could be applied in Ukraine to adapt marginal land or land that is no longer fit for its original use, for example through the development of renewable energy infrastructure. Energy company investors might be willing to pay for mine action activities in exchange for land ownership and additional payments through grants, concessions and outcome-based payments.

**Figure 5:** Product summary and rationale for selection for further development.



# 5. Analysis & Modelling

## Approach

As outlined in Section 4, three models were identified for further analysis and modelling. These comprised a loan-based facility (Collateralised Loan Obligation), a debt-based product combining Sustainability and Sustainability-Linked Bonds into a Sustainability-Linked Bond SLB, and an Outcome-Based Public Private Partnership (OB-PPP).

Further and more detailed analysis aimed to identify and elaborate on the following areas:

- The extent to which further analysis and elaboration of the innovative finance mechanism is currently possible and/or worthwhile.
- Whether, and if so how, the mechanism could be turned into a product that could generate additional funds for demining in Ukraine, while also supporting wider Government of Ukraine strategies and priorities.
- Obstacles and opportunities to developing the mechanism.
- The financial model that could underpin the product, including timescales and scale of return on investment.
- The scalability and broader application of the product.
- Risks and readiness relevant to further product development.
- Policy recommendations for next steps.

Sections 5a and 5b below provide detailed analysis and modelling for the SLB (Product 1) and OB-PPP (Product 2). The remaining sections of this report consider risk, readiness, comparative analysis and recommendations.

## Collateralised Loan Obligation (CLO)

A product based on a CLO was shortlisted for further analysis. It scored above 20, but at 23 was the lowest of the qualifying mechanisms. It scored highly as it is based on models that have been tested elsewhere and it was assessed that it could, in principle, leverage additional funds from existing balance sheet assets.

The product is, however, based on additional loan facilities within Ukraine, primarily involving smallholder farmers. As outlined above, there remains considerable uncertainty around demand for existing loans to smallholder farmers, which is a planned area of further study by the European Bank for Reconstruction and Development (EBRD).

Consultation with stakeholders as part of this project indicated that there was little desire to embark scoping of a further loan-based model targeting smallholder farmers pending the outcome of broader planned work to understand the apparent lack of demand.

CLOs were not therefore modelled further, with resources focussed on considering the other two products to the full extent possible within the project's scope, resources and timeframe.



# 5a Sustainability-Linked Bond

## 5.1 Introduction & rationale

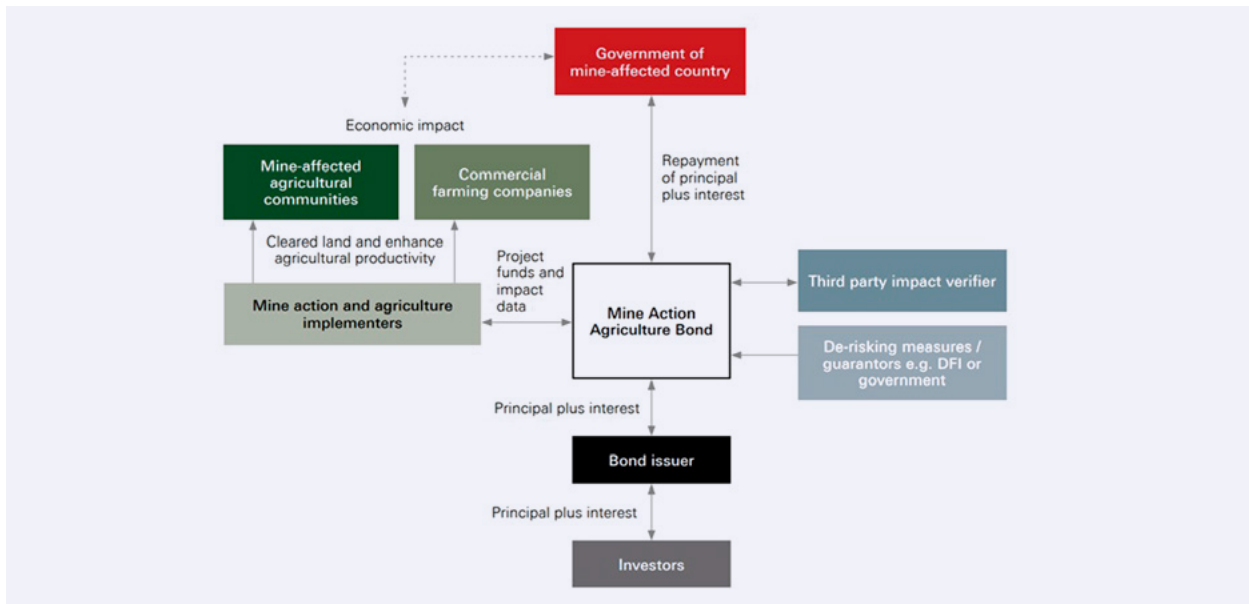
A bond is a form of debt security or financial instrument that amounts to a loan made by an investor to a borrower in pursuit of its objectives. Bonds are typically issued by governments or corporations. When investors buy bonds, they are essentially lending money to the borrower in exchange for interest at a rate typically lower than a bank-issued loan, without the borrower having to cede ownership or equity.

In a typical bond, a coupon (interest) is paid periodically against the investment's face value (the principal). When the bond matures, the principal is returned to the investor. Bond maturity periods can vary, as can coupon rates. For investors, bonds can provide regular interest payments and can offer less volatility than stocks.

Higher risk investments usually attract higher coupon values, while lower risk investments, such as government issued bonds, attract lower coupon rates. The costs of higher risk investments can also be mitigated by 'derisking' measures, such as guarantees which could offer up to 75% on average of the investor's principal in the event of borrower default.

Bonds can take multiple forms, including those which are discounted (in other words have a reduced coupon value) to achieve social or environmental ends. A study by GICHD and Symbio Impact, released in early 2024, outlined how bonds could be used to combine demining with agricultural outcomes in mine-affected countries.<sup>14</sup>

The following schematic outlined a potential structure for a mine action and agricultural bond:



**Figure 6:** Structure of a mine action and agricultural bond.

Source: GICHD/Symbio Impact Ltd.<sup>15</sup>

The financial product outlined here draws on the proposal for a mine action and agricultural bond developed by GICHD and Symbio Impact, but develops it into a 'Sustainability-Linked Bond' (SLB) issued by the Government of Ukraine or an IFI on behalf of Ukraine. This takes forward the potential identified during the 'option refinement' stage for both sustainable bonds and SLBs, with a sovereign-issued bond enabling a SLB to draw on the strengths of both.

<sup>14</sup> <https://www.gichd.org/publications-resources/publications/innovative-finance-for-mine-action-needs-and-potential-solutions>

<sup>15</sup> <https://www.gichd.org/publications-resources/publications/innovative-finance-for-mine-action-needs-and-potential-solutions>



Both sustainable bonds and SLBs are debt-based instruments with overlaps in their links to sustainability motivation, but with important distinctions in how they function, particularly in the way proceeds are used and in return for investors.

## Sustainable Bonds

Sustainable bonds are a fixed-income instrument which combine green, blue (those which have an environment/climate focus) and social projects. They are a 'use of proceeds' product, which means that what they are used for must meet certain eligibility criteria.

The eligible green component is not an exhaustive list, but can include projects linked to renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living natural resources and land use, terrestrial and aquatic biodiversity conservation, clean transportation, sustainable water and wastewater management, climate change adaptation, circular economy and/or eco-efficient projects and green buildings.

Meanwhile, the social component can focus on providing and/or promoting affordable infrastructure, access to essential services, affordable housing, employment generation, food security and socioeconomic advancement and empowerment. It is important to note that the social component is not the same as 'social impact bonds', which is essentially an outcome-linked 'payment by results' mechanism, as opposed to a debt-based financial product.

Sustainable bonds are issued on a 'fixed-income' basis, which means that the coupon (interest) received by the investor is predetermined as part of the structure, and set based on anticipated investor demand. Derisking components can also be included to incentivise investor appetite and/or offer lower rates of interest on the bond coupon.

Green or other sustainable bonds typically command a lower coupon/interest as they meet investor clients' increasing appetite for investment in environmental and social impact. This is often referred to as a green premium, or 'Greenium', which could be 0.1 base points (bps, a unit used in finance to describe changes in interest rates with one bps being equivalent to 0.01% of the bond's face value).

The bonds can be issued by corporate entities, international financial institutions or sovereigns. Good practice guidelines are provided by the International Capital Markets Association (ICMA).<sup>16</sup> While non-binding, they provide a framework of assurance, including in the use of external monitoring for verification.

An example is the Green and Sustainability Bond issued in July 2021 by Ukraine's Ministry of Finance and worth EUR 1.25bn. As a use of proceeds product, the funds raised from the bonds were earmarked for financing or refinancing projects aligned with Ukraine's Green and Sustainability Bond Framework. This included renewable energy projects, energy efficiency improvements, sustainable water and waste management, clean transportation and initiatives aimed at improving social infrastructure including healthcare and education.

## Sustainability-Linked Bonds (SLBs)

SLBs are similar in spirit to sustainable bonds insofar as they are linked to achieving improvement in environmental and social challenges. They differ from sustainable bonds in two key areas:

- First, they are not a 'use of proceeds' bonds. In other words, their issuance is not linked to specific and pre-defined activities, rather the sustainability goals of the issuer. In essence, they are debt taken on to meet or enhance the issuer's sustainability ambition (both green and social impact).
- Second, they are not a 'fixed-income' product for the investor. The value of the coupon can 'step-up' (higher coupon payments) or 'step-down' (lower payments), based on the issuer's performance against their sustainability targets (underperformance and performance respectively). In other words, the investor benefits from a penalty to the issuer for underperformance.

<sup>16</sup> <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-bond-guidelines-sbg>



Similar to sustainable bonds, ICMA has developed non-binding guidance around good practice for SLB issuance.<sup>17</sup> This includes setting, monitoring and validating key performance indicators (KPIs), which is especially key when coupon value is linked to performance.

SLBs can be issued by corporate entities, with performance linked to their corporate sustainability strategies and targets. For example, MHP (Myronivsky Hliboproduct), a major Ukrainian agricultural firm, issued a USD 350m bond in 2020. The bond is linked to corporate sustainability performance targets, including reducing greenhouse gas emissions, increasing renewable energy use and promoting sustainable agricultural practices. The coupon value is tied to corporate performance against the targets.

SLBs can also, however, be issued by sovereigns. When issued by a sovereign, a government can choose to earmark the use of proceeds to its national sustainability strategies, effectively making them a sustainability bond with a variable-rate of return for investors based on Key Performance Indicators (KPIs).

## SLB for mine action and agriculture

The key premise of the SLB proposed for mine action in Ukraine is that funds would be raised through issuance of a bond, the proceeds of which would be used for a combination of survey and clearance of explosive ordnance, and specific sustainability projects linked directly to Ukraine's national strategies.

The bond would have the features of a standard SLB, in other words the government's sustainability performance incentivises the bond's financial and/or structural characteristics. Meanwhile the application of appropriate KPIs would ensure it delivers on the desired mine action and defined sustainability activities.

Aligning the coupon to ICMA's Sustainability-Linked Bond Principles would create a 'performance based instrument' with objectives measured through predefined KPIs, and also assessed against predefined Sustainability Performance Targets (SPTs). Failing to achieve the targets would result in coupon 'step up' and, conversely, achieving the targets could result in a 'step down'.

In a similar way, alignment of the bond with ICMA's Guidelines for Green and Social Bonds and Principles for Sustainability Bond Guidelines referenced above would bring confidence to investors that funds would be earmarked for mine action and sustainability outcomes.

## 5.2 Scope & focus

### Mine action and relevant sectors for application of a SLB for mine action in Ukraine

Mine action achieves an inherent social impact by removing a threat to life and limb, by reducing fear of death or injury from explosive ordnance and by providing equitable employment. In the case of agricultural land, it can either return inaccessible land to productive use, or generate safe access for adaptive agriculture or repurposing of less productive agricultural land for other sustainable purposes. Mine action also has an inherently positive environmental impact by removing metal and explosive contamination from soil and enabling environmental protection to take place safely where necessary.

Mine action can also, however, have a negative impact on the environment by, for example, causing soil disturbance and degradation of soil structure, removal of 'cover vegetation' that promotes biodiversity, water retention and carbon sequestration, and removal of tree line structures which mitigate soil erosion.

Measures to address, balance or remediate the negative environmental components of mine action could fall within the parameters of a SLB. This could be achieved in a way that does not require existing funds for survey and clearance to be diverted to environmental remediation. This is not explored in greater detail as part of this feasibility study.

<sup>17</sup> <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slb/>



A further social element of mine action is its potential to provide sustainable and regular employment, including through the employment and skills development. Meanwhile, a SLB also has the potential to create significant funding for both mine action and sustainable agricultural activities, based on the shared goal of increasing safety, social impact, and the sustainability and economic productivity of land in Ukraine.

Sustainability initiatives for Ukraine that combine environmental complementarity to demining could include the following:

- i. Sustainable agriculture.** These could involve sustainable agricultural practices, including transition to organic farming, no-till farming, tree line regeneration to reduce erosion or the more efficient use of water resources.
- ii. Conservation and biodiversity protection.** Bonds could fund projects aimed at conserving Ukraine's natural landscapes and biodiversity. This includes reforestation efforts, protection of wetlands and protection of endangered species.
- iii. Renewable energy.** Several government strategies aim to increase the share of Ukraine's energy that derives from renewable sources, including solar, wind and biomass. Bonds have already been issued to finance large-scale solar power plants in the south of Ukraine, contributing to the country's renewable energy targets.
- iv. Energy efficiency in buildings.** Bonds could be used to improve energy efficiency in residential and public buildings. Projects could include the installation of energy-efficient windows, insulation, and modern heating systems which help reduce greenhouse gas emissions and lower energy costs.
- v. Urban reconstruction.** Bonds could be used to enable the reconstruction of energy-efficient affordable housing, as well as for more resilient and sustainable urban planning.
- vi. Sustainable urban infrastructure.** Bonds have also already been used to modernise urban infrastructure in Kyiv and Lviv. This includes the development of sustainable transport systems such as electric buses and trams, as well as upgrading water supply and waste management systems.
- vii. Waste-to-energy projects.** These involve the construction of facilities that convert waste into electricity and heat, reducing the reliance on fossil fuels and reducing landfill.
- viii. Recycling.** Projects could enhance recycling infrastructure and promote circular economy practices, such as the development of recovery facilities and programmes to reduce plastic waste.
- ix. Rural development.** Initiatives could support projects that focus on enhancing livelihoods, such as rural infrastructure or the development of localised renewable energy sources for rural areas.

## Focus areas for SLB feasibility assessment

Renewable energy, particularly solar and potentially in combination with other regeneration initiatives, presents as a viable option for a SLB. This could be a more applicable sustainability option on marginal land or land of limited agricultural value. This is, however, explored as part of the Outcome-Based Public Private Partnership (OB-PPP) in Product 2.

Meanwhile, mine action is inherently a sustainable activity. It prevents injury, provides employment, returns contaminated land to productive use and can empower women, minorities and marginalised communities, among other areas. It therefore fits multiple criteria within ICMA guidelines and can have simple KPIs attached to operational deliverables, most simply in the form of land that is returned to productive use through survey and clearance.

A SLB with an agricultural component could have KPIs linked to broad criteria for compliance around sustainable farming. For the purposes of this study the product is modelled solely on the specific application of a transition to organic winter wheat combined with a transition to 'no till' agricultural practice. It is recognised that other crops (such as other grains or tomatoes) could have been modelled, alongside other sustainable agricultural practices could be assessed such as mini-till, half-till, drip irrigation.



Overall, the rationale for focusing on organic transition and no till practice for winter wheat production as the basis for modelling this product is as follows:

- The current focus of most mine action activity is on agricultural land.
- At the June 2024 Ukraine Reconstruction Conference in Berlin, Ukraine's first Deputy Prime Minister and Minister of Economy stated that the cost of contamination on agricultural gross domestic product amounts to USD 11bn per year. Regaining and enhancing agricultural production and national revenue is a key component of Ukraine's economic strategy.
- Most current mine action activity is taking place in rural communities, many of which would benefit from increased profit and/or agricultural regeneration.
- Focusing on wheat production could, in principle, increase revenue for farmers and the government of Ukraine, while also contributing to food security and Ukraine's sustainability strategies.
- Enhancing productivity and revenue could offset loss of income from agricultural land that cannot be put back into productive use in the short to medium term.
- Organic and no till approaches have the ability to enhance revenue in the medium term, while also increasing agricultural resilience over longer term.
- Winter wheat accounts for 95% of Ukraine's total wheat production, as well as 70-80% of total grain exports.
- Given tilling and excavation practice in mine clearance are similar activities, the carbon sequestration benefits of no till practices over larger areas than demining operations could offset the carbon footprint generated by mine action activities in cases where there are no alternatives to soil disturbance for safe demining to international standards.

Organic farming is best known as an agricultural practice for its focus on production without the use of synthetic chemicals such as pesticides, herbicides, fungicides or fertilizers. For example, organic matter is used in place of synthetic chemicals to enrich the soil with nutrients, helping to maintain soil health, promote microbial biodiversity and enhance the soil's ability to retain water and nutrients.

Maintaining and improving soil health and promoting biodiversity are also, however, key components of organic farming. This can be achieved in combination with reduced tilling (see further below) or cover cropping, which help protect ecosystems, conserve water and reduce pollution.

The use of genetically modified seeds is prohibited in organic farming, and the 'organic' brand is linked to a regular certification process. Transition to organic typically takes three years, with organic practice having to be adopted for the first years without the ability to use the organic label.

Organic farming can result in lower yields and, depending on the practices involved, higher labour costs. Seeds are typically more expensive and there are fees associated with certification. However, organic wheat has a market premium, linked to increasing demand for organic produce. Organic farming practices can also prevent steady deterioration of agricultural land which, over time, reduces productivity.

'Tilling' refers to the farming practice of turning over the land prior to seed planting to manage weeds and prior year crop residue. This is damaging to soil structure and microbial biodiversity, can increase levels of soil erosion, reduces water retention and increase the extent to which both nutrients and pollutants are washed out of the soil and into waterways as 'run off'. Tilling also exposes carbon in the soil to oxygen in the atmosphere, which produces carbon dioxide and therefore increases greenhouse gas emissions.

Efforts to reduce negative effects of tillage with existing technology include 'mini-tilling' (minimum tillage farming). This reduced disturbance by reducing the number of 'passes' and soil disturbance, focusing tilling only where it is required.

Meanwhile 'no till' farming avoids tilling all together, for example by using technology such as seed drills. In addition to the positive effects of lower soil disturbance, technology can also be combined with spatial mapping to increase precision and reduce seed waste. To be effective, no till farming is often combined with crop rotation and 'cover cropping' or mulching as organic alternatives to the need to otherwise use greater volumes of herbicide to control weed increases.

Similar to organic transition, no till farming can lead to reduced yield in the initial years as the soil adapts to the new practices. It also involves up-front equipment costs, such as seed drills. Overall, however, increases in soil fertility and crop resilience, water management bring long-term benefits, with input costs like as fertilizer and fuel for agricultural plant being significantly lower. Importantly, they significantly reduce fuel consumption and cost.

**Figure 7:** Organic and no till farming as part of sustainable agriculture



## 5.3 Working assumptions and limitations of a SLB model

### Agricultural working assumptions

Consultation with a comprehensive set of agricultural end-users or communities was beyond the scope of this feasibility study. Similarly, agricultural feasibility was beyond its scope. Targeted consultation in line with the study's methodology has, however, confirmed the authors' assumptions that it would be wrong to simply assume that there would be a market for proceeds of a SLB linked to transition to organic and no till farming.

Consultation similarly confirmed that no till farming may not be an appropriate practice in some farming locations, and also that stakeholders may see benefit in pursuing one or both of the options, or other forms of sustainable agriculture. A key theme arising from stakeholder engagement was that solutions would be location specific, and would need to be tailored in partnership with land owners and agricultural businesses. It was also identified that the wrong application of such sustainable transition or in the wrong place could bring a number of disadvantages or added costs.

While this model does not propose that the transition to sustainable agriculture has to take place on mine affected land, the costs do not take into account the additional costs associated with helping land affected by the conflict to recover and be suitable for the transition, for example the need to level fields and remove craters or replace hedgerows. It is also acknowledged that there is a more complex set of cost drivers that can impact agricultural market trends and crop prices, particularly in an ongoing conflict.

Consultation with experts and stakeholders showed varying views in the scale of land needed for a viable regenerative agriculture project in Ukraine. Some experts consulted indicated that 25k hectares would be a viable area, while others advised that this would reduce the potential locations and number of companies that could be involved. The indicative product is modelled on 12.5k hectare sites for the purposes of considering the product's potential implementation.

### Mine action cost assumptions

The costs of clearance vary by location and task, particularly the levels, type and nature of contamination. However, an indicative cost of clearance is necessary to consider the potential application of a SLB. The Government of Ukraine has estimated that the average cost of clearance is between USD 1,000- 1,500/ha.<sup>18</sup>

For the purposes of assessing the SLB, the clearance is costed at the median point of USD 1,250/ha. As above, it is assumed that demining activities are not 'pegged' to the optimal locations for sustainable agricultural transition and could take place anywhere based on government priorities.

### Bond assumptions

Meanwhile, market analysis and consultation showed that a minimum scale for issuance of a SLB would be USD 250m. The model assesses a SLB at that value.

The impact of a switch to organic and no till farming is typically achieved over two to three years. To be prudent, modelling has assumed that transition would take three years. A bond maturity term of ten years has been applied, meaning that investors (bondholders) would require to be repaid their principal investment in full ten years from the date of issuance.

<sup>18</sup> Price is calculated according to the "Methodological recommendations for calculating the cost of humanitarian demining works (Order of the Ministry of Economy of April 12, 2024 No. 9180) or other exemplary methods of determining the expected cost of the procurement item, approved by the Authorized Body." Where Category 1 land is priced at 41,838UAH (approximately USD 1,000), Category 2 at 50,494 UAH (approx USD 1,200) and Category 3 is priced at 59,151 UAH (approx. USD 1,500). Data provided by the Ministry of Economy. Conversions based on August 2024 exchange rate.





## 5.4 Operational model

### Model summary

This model is based on a USD 250m bond over ten years, where 50% is allocated to sustainable agriculture transition and 50% to mine action and aligned with appropriate KPIs for each component. It focuses on dual transition to organic production and no till agriculture in winter wheat over a period of three years, with return on investment considered over a 25 year period (a comparable timeframe with OB-PPP).

As detailed below, many of the transition costs have wide ranging variables, with the cost of explosive ordnance clearance also varying significantly based on location and contamination type. The model is therefore presented as indicative, with a view to further exploration of its viability as well as refinement, which is explored further in Section 5.6.

### Linking/delinking locations for agricultural transition and mine action

In developing the model, consultation confirmed that it would not be viable to confine the agricultural sustainability component to land that was in need of clearance, or land that was in the process of being, or had recently been, cleared. Doing so could remove economies of scale required for sustainable agriculture to generate a viable return, while also delaying the impact of the transition to sustainable agriculture. It may also not be viable to find land of the right size that requires demining, is accessible and suitable for transition to sustainable agriculture.

The model therefore assumes that transition to sustainable agriculture and demining do not have to take place on the same plots or farms. It does not, however, rule out that this could take place, should the context be appropriate for both and if there is demand and potential for return on investment.

The product set out here should be considered in terms of how a SLB could generate funds for demining and sustainable agriculture in ways that benefit both, including through revenue generation and attracting private sector investment. It should not be taken as a concrete proposal for implementation in this form.

### Organic agriculture transition

As outlined above, the switch to organic wheat farming would take place over three years, involving up-front costs and transition costs, including a potential initial loss in yield. Consultation and research shows a wide range in potential transition cost, key elements of which are outline below:

- **Certification costs.** These relate to application, inspection and certification, followed by annual certification. Costs will depend on the certification body and size of area being certified. Estimations of cost range between USD 3k-15k over three years, which is incidental within the wider model.
- **Soil transition costs.** Soil preparation could cost between USD 50-USD150/ha. For a 12.5k hectare site, this creates a range of USD 625k-1.9m over three years.
- **Initial yield reduction.** Organic wheat is likely to have a lower yield during the first two to three years, potentially between 10-20%.
- **Seeds.** Organic seeds are typically more expensive than conventional seeds. Organic seeds are likely to bring an additional cost of between USD 10-15/ha.
- **Fertilizers and pest control.** Natural fertilizers and pest management can cost more than conventional methods, with an estimated range of USD 100-200/ha over three years when combined with organic seeds.
- **Training and equipment.** Farmers and staff are likely to require training in organic farming techniques. This could cost between USD 5k-25k for a 12.5k hectare site, depending on location and provider. Additional equipment may also be required.



Overall, initial adaptation and transition costs could range from USD 1.25m-4.5m over the first three years for a 12.5k hectare site.

## Potential increased income from organic transition

After the transition period, organic production costs would still be higher but should still, in principle, benefit from the higher market price for organic wheat. For example:

- Conventional wheat might yield 5 tons per hectare, while organic wheat is likely to have a 10%-20% lower yield, reducing yield by between 0.5-1 tons/ha to between 4-4.5 tons/hectare.
- The higher market price commanded by organic wheat could be between USD50 and USD 100/ton higher than the typical price of USD 250/ton for conventional wheat (based on domestic market price, with the export market potentially commanding a further premium).
- However, higher costs associated with organic production relating to certification, organic seeds and fertilizer/weed control could amount to between USD 100-200/ha.
- If conventional wheat were to yield 5 tons per hectare and sell at USD 250/ton, gross profit would equate to USD 1,250/ha. With an average production cost of US 500/ha, net profit would be USD 750/ha.
- Meanwhile, if organic wheat were to yield the lower 4.5 tons/ha, but with a higher market value of USD 350/ton, gross profit would be USD 1,575/ha. Applying a higher production cost of USD 650/ha, net profit would become USD 925/ha.
- When scaled to a 12.5k hectare production, annual net profit increases by USD2.2m after three years of transition to organic.

Type of wheat	Costs	Yield/ha (tons)	Price/ton (USD)	Net profit/ha (USD)	12.5k ha profit yr (USD)
Conventional wheat	500/ha	5.0	250/ton	750/ha	9.4m
Organic wheat	650/ha	4.5	350/ton	925/ha	11.6m
<b>Increased gross annual profit after 3 years through change to organic</b>					<b>2.2m</b>

In addition to the wide variables in cost above, there are also significant variables relating to wheat price as a commodity on the domestic and export markets, actual yield, inflation affecting cost of production and viability of export.

In principle, however, a switch to organic production after the initial transition period has the potential to create increased profit and taxable revenue and increase resilience in the supply chain, as well as achieve sustainability impact.

## No-till agriculture adaptation

Similarly to organic switch, no till adaptation will have potential yield drops in initial years during adaptation as well as training. It does not, however, attract the certification process and costs association with transition to organic production. No till can also be associated with input costs relating to cover crops or mulch but most significantly, equipment such as seed drills.

Cost factors would include the following:

- **Equipment and training costs.** No till switch would require up-front investment in new agricultural plant, which could range from USD 50k to USD 150k, with additional though comparatively incidental training costs.
- **Potential yield drops.** Assuming that the transition to no till occurs at the same time as a transition to organic which has already decreased yield by 15%, a further 15% drop in yield due to no till transition could cost a further USD 2.5m per year for the first three years (based on organic prices as above).



- **Cover crops and pest management.** Cover crop seeds and pest management costs would be greatest in the first year. The combined cost of cover crops and equipment and training is estimated at ranging between USD 1-3m.

Overall, the cost for transition to no till for a 12.5k hectare site, in conjunction with organic transition, could be between USD 3.5m-5.5m, with the largest outlay being in the first year for equipment.

## Potential increased profit factors following transition

Increased profit factors could include the following:

- **Labour costs.** A stand-alone switch to no till could lower labour costs due to the reduced personnel time involving with tilling and seeding. However, combining organic transition with no till might see no net change in labour due to organic fertilizer and weed management practices. This is therefore discounted from the modelling.
- **Fuel savings.** No till farming typically reduces fuel consumption by about 10-30%. If conventional fuel costs were to range between USD 50-100/ha annually, no-till could save approximately USD 7.5-22.5/ha against a median cost. This equates to between USD 94k-88k per year for a 12.5k hectare area.
- **Water retention.** No till can reduce irrigation costs by improving water retention. After the first three year transition, improved soil structure and fertility, erosion reduction and increased resilience could see an increase in yield of between 5-10%. A 7.5% increase on a yield of 4.5 tons of organic wheat per hectare at a market price of USD 350/ton could see an increase in yield value of USD 118/ha.

For a 12.5k hectare plot, this could amount to around USD 1.5m in additional annual gross income due to no till.

## Combined annual profit increase after organic and no till transition

As outlined above, there are a large number of variables and cost factors involved. The indicative cost model, using median points and a prudent assessment, indicates the following:

- Transition to organic and no till over a period of three years on a 12.5k hectare has an investment cost of USD 12.25m. This includes a projected reduction in yield during transition.
- After three years, there is an increase in profit of USD 1.32m per year.

## 5.5 Financial model

### Indicative model summary

As above, the indicative model is based on a 12.5k hectare winter wheat site that transitions to organic and no till over a three year period. The cost of transition, including estimated loss of yield for both forms of adaptation is USD 12.25m over the course of three years.

The first year of transition is the most costly, as it requires investment in new plant and cover crops. Training and certification will be a significant factors, though come at a comparatively lower cost.

After that period, profit increases by USD 1.32m per year, though could vary based on cost of equipment, labour and the wholesale grain market.



## Investment costs and recovery

Incentivising transition would require government subsidy to cover both equipment and reduced profit during the transition period. This could be achieved through a tax-free government investment scheme using the proceeds of the bonds, with the capital value of the assets written off at the point of transfer.

Verification would be essential to subsequent organic certification, but also to be consistent with the ICMA good practice associated with a SLB (addressed further below).

To recover costs of investment, a ‘Special Demining Charge’ could be applied to the additional profit at 20% after year three (a similar charge is also considered as part of the Outcome-Based Public Private Partnership in Product 2 below). Government revenue would also increase by levying corporation tax (at 18%) on additional profits, net of the Special Demining Charge. Together, these would raise an additional USD1.32m per year, per 12.5k hectare site.

Over 25 years, this model indicates that a 12.5k hectare site would generate an increase in profit of USD 84.5m, of which USD 29.1m would be remitted through a ‘Special Demining Charge’ and corporation tax. This is summarised in Figure 8. There would very likely be additional revenue through personal income tax, VAT and export revenue that is not included in this indicative analysis.

Per 12.5k Hectare Site	Yr 1	Yr 2	Yr 3	Yrs 4-10	Yrs 11-25	TOTAL
<b>Costs (USD '000,000)</b>						
Organic Transition Costs (Median)	0.92	0.92	0.92			<b>2.75</b>
No-Till Transition Costs (Median)	4.50	2.50	2.50			<b>9.50</b>
<b>TOTAL TRANSITION COST</b>	<b>5.42</b>	<b>3.42</b>	<b>3.42</b>			<b>12.25</b>
<b>Agricultural Income</b>						
Increased Net Profit for Organic Transition				15.40	33.00	<b>48.40</b>
Increased Net Profit from No Till Transition				11.49	24.62	<b>36.10</b>
<b>INCREASED NET PROFIT</b>				<b>26.89</b>	<b>57.62</b>	<b>84.50</b>
<b>Government Revenue Income</b>						
Demining Special Charge (20%)	0.00	0.00	0.00	5.38	11.52	16.90
Government Corporate Income Tax (18%)	0.00	0.00	0.00	3.87	8.30	12.17
<b>NET TOTAL GOVERNMENT REVENUE</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>9.25</b>	<b>19.82</b>	<b>29.07</b>

**Figure 8:** Estimated 25-year cost model for transition to organic and no till agriculture.

## Mine action cost model

50% of a USD 250m bond over three years could contribute USD 125m to demining in Ukraine, or USD 41.7m per year over three years.

Using the median cost of USD1,250/ha, based on Government of Ukraine figures, this would fund the clearance of 100k hectares over three years. By decoupling the direct link between the land on which demining takes place from that identified for sustainable agricultural transition, both could take place in locations optimal for each activity and its impact.

The direct economic impact of cleared land is hard to predict without more detailed data on potential land use and productivity. However, if this model were to assume that just 50% of the 100k hectares of cleared land were to be returned to agricultural productivity, and taking a conservative estimation of USD 500/ha per year in profit, the returned land could result in a profit to landowners of USD 25m per year. This equates to USD 250m over ten years. With corporation tax at 18% on profit, the government could recover USD 45m over ten years, without accounting for inflation.



## Viability and return on investment

A USD 250m bond split equally between demining and sustainable agriculture could fund and subsidise transition for ten 12.5k hectare plots. Over the ten years of the bond maturity, this would contribute USD 92.5m in government revenue, covering part of the bond's principle (discounting inflation), of which USD 38.7m is in corporation tax solely and the remainder allocated as a Special Demining Charge which would channel a further USD 53.8m into demining.

Combined with the conservative estimate of USD 45m recouped through corporation tax on cleared land, the quantified revenue would cover the repayment of one third of the principal during the ten years.

The benefit of a SLB does not, however, lie solely in direct cost recovery through corporation tax. Additional economic and sustainability benefits contribute to the economy, for example mine action has additional and currently unquantifiable benefits in returning land to productive use for a range of other purposes. For example, land could have alternative uses such as infrastructure development, housing, new industrial development and renewable energy, not to mention the reduction in loss to gross domestic product from reduced agricultural yields and exports.

The SLB is, an investment in future economic development and sustainability and therefore its economic and sustainable impact will continue year after year. A full financial model developed after in-depth sector analysis would be required to account for the full range of financial benefits from mine action and sustainability enhancing activities.

## Bond development & issuance costs

As with the development and issuance of any bond, there are associated costs. Aligning with the relevant ICMA good practice guidelines bring additional costs to developing a SLB. The table below (Figure 9) outlines the costs associated with technical development of a conventional bond and a SLB at face values of USD 250m. The overall bond development cost is USD 1.2m.

The model also incorporates 'Greenium' (outlined in Section 5.1) at 0.10%, in other words a lower coupon rate/interest value as the bond is an externally assessed 'sustainability' product, verified in line with international good practice and guidelines. This offsets the majority of additional costs associated with verification, structuring and certification.

Face Value	Fees (USD)		Conventional Bond (USD)		Sustainable Bond (USD)	
	250,000,000		250,000,000		250,000,000	
Syndicate Fees	0.15%		0.08%	375,000	0.15%	375,000
Advisory	225,000		0.05%	225,000	0.05%	225,000
Legal	250,000		0.05%	250,000	0.10%	250,000
Ratings	0.10%		0.05%	250,000	0.10%	250,000
Rating Advisory	40,000		0.01%	40,000	0.02%	40,000
Listing	35,000		0.01%	35,000	0.01%	35,000
Sustainability Advisory	225,000				0.09%	225,000
Second Party Opinion (SPO)	30,000				0.01%	25,000
Initial & Annual Reviews	45,000				0.02%	45,000
Sustainability Premium (Greenium)	-0.10%				-0.10%	-250,000
<b>Total Fees before Greenium</b>			<b>0.47%</b>	<b>1,175,000</b>	<b>0.59%</b>	<b>1,470,000</b>
<b>Total Fees after Greenium</b>			<b>0.47%</b>	<b>1,175,000</b>	<b>0.49%</b>	<b>1,220,000</b>

Figure 9: Indicative cost for SLB development.



## Investors and derisking

This product depends on many factors, but especially in engaging investors, and building and ensuring their confidence. While the mine action and agricultural sustainability components of the product are likely to resonate with the increasing demand for environmental, social and governance (ESG) investment, a key concern will lie in investment in a country that is current engaged in active conflict.

This is likely to either deter investors or drive up expected rate of return on investment and/or a reduced bond maturity period to mitigate perceived risk. Effective marketing and engage of the bond can play a role in mitigation, but supportive states and IFIs can also play a role in derisking the product, for example through guarantees.

Research and consultation has also identified that, due to Ukraine's current credit status as 'Selective Default', in order for the bonds to be buyable on the capital markets they would need to be backed up by 100% guarantees. This would require strong support by an IFI, primarily, such as European Investment Bank (EIB), which could draw down from the guarantee package proposed within the Ukraine Facility (see section 7.5 for more details). If an IFI was unable to provide 100% guarantee it may require a blended approach, backed up by donor states.

Donors could choose to provide guarantees or fund initial stages in developing the bond framework and issuance as outlined below. The bond could also be linked to large-scale existing assistance frameworks for Ukraine. This is explored further in relation to both Products 1 and 2 in Sections 7.5 and 7.6.

## 5.6 Progressing the design and implementation of a SLB

### Steps to issue a SLB

There are three key stages in the development of the SLB proposed in this study. These are consistent with ICMA good practice and guidelines and are outlined in Figure 10 below. A similar framework is used for the simplified design and implementation of an outcome-based PPP in Product 2.



Figure 10: Simplified model for developing a SLB.



## Sector diagnostic

The first step is that the Government of Ukraine decides to pursue a SLB involving demining and sustainable agriculture. Relevant ministries would include those involved in agriculture and mine action, notable the Ministry of Economy, Ministry of Defence, Ministry of Internal Affairs, Ministry of Agrarian Policy and Food, Ministry of Environment and the Ministry of the Occupied Territories. It would also require engagement at an oblast level in the context of national and devolved oversight to the oblast level.

As the SLB would be a sovereign-issued bond, the government could begin by establishing a working group and steering committee to provide drive and oversight to the development of the bond. Such a working group would benefit from finance, demining, agriculture, legal and regulatory expertise and may involve partnerships with different entities such as banks and IFIs to make use of their in-house expertise in the bond development. The cost of the advisory and technical assistance is included in the bond issuance cost in Figure 9 at USD 450k.

A key factor at this stage would involve in-depth engagement with the agricultural sector, including companies but also national industry bodies such as the Ukrainian Agribusiness Club (UCAB).

This stage would also need to ensure that any SLB was designed in line with relevant legal and regulatory frameworks. A robust legal and regulatory framework that demonstrates confidence, fairness efficiency and transparency will be essential to ensure the confidence of investors. It will also be essential for incentivising governments or international financial institutions that may derisk the bond by, for example, issuing guarantees.

In general, essential provisions for issuing and managing sustainable and sustainability linked securities defined in law include: borrowing principles and authority, issuance procedures and mechanisms, issuing institutions and institutional mechanisms, and clear KPIs and monitoring frameworks. and assurance. This is covered further in Section 7, which covers Products 1 and 2.

Building on consultation around the government compensation scheme and forthcoming EBRD analysis into demand for loans, it would be essential understand demand and appetite from agricultural stakeholders in SLB model. The proposed model should then be refined, based on feedback, to maximise potential uptake and success.

Meanwhile, it would also be critical to engage potential private sector investors, including banks, as well as governments and IFIs that could play a role in supporting the bond, including through derisking measures. Engagement with the mine action sector, both government and operators, would also be critical, particularly in the context of a potential funding drop-off in 2026 and a need to support operational continuity with an influx of funding from innovative finance.

To be consistent with ICMA principles and guidelines, a sovereign-issued SLB would need to be linked to relevant national sustainability strategies. These could include:

- **Sustainable Agriculture and Rural Development Strategy**,<sup>19</sup> which aims to promote sustainable agricultural practices and improve the livelihoods of rural communities, including by encouraging the adoption of regenerative agriculture practices.
- **National Mine Action Strategy (2024)**,<sup>20</sup> which is linked to Ukraine's aspirations to complete survey and clearance milestones and reduce explosive ordnance-related injury and fatality.
- **Sustainable Agriculture and Rural Development Strategy**,<sup>21</sup> which aims to promote sustainable agricultural practices and improve the livelihoods of rural communities, including by encouraging the adoption of regenerative agriculture practices.

<sup>19</sup> <https://minagro.gov.ua/npa/stratetiia-rozvytku-silskoho-hospodarstva-ta-silskykh-terytorii-v-ukraini-na-period-do-2030-roku>

<sup>20</sup> <https://demine.gov.ua/en/news/the-government-approves-the-national-mine-action-strategy-and-the-operational-plan-for-its-implementation-in-the-first-three-years>

<sup>21</sup>



- **Environmental Security and Adaptation to Climate Change Strategy**,<sup>22</sup> which aims to enhance resilience to climate change impacts and protect natural ecosystems. This includes restoring degraded ecosystems and promoting biodiversity conservation.
- **Energy Strategy of Ukraine (2035)**,<sup>23</sup> which aims to reduce dependence on fossil fuels, increase energy efficiency and expand the use of renewable energy sources.<sup>24</sup>
- **National Energy and Climate Plan**,<sup>25</sup> which seeks to align Ukraine with the EU's energy and climate policies to achieve a low-carbon and energy-efficient economy by 2030. Key targets include increasing the share of renewables to at least 25% by 2030 and reducing greenhouse gas emissions from 40% from 1990 levels by 2030.

## Project design

The project design phase would build on the detailed diagnostic. It would be framed around the establishment of a bond framework based, with confirming detailed goals that are eligible under a SLB. Site visits and selection would build on detailed stakeholder consultation within the diagnostic phase, and should include confirmation of land ownership and buy-in.

As outlined in the introduction to this product, KPIs would form a vital component of the sustainability-linked component of the SLB, in line with ICMA principles and guidelines. As these are linked to investors' coupon value and triggering of payments, determining the KPI and 'step-up/step-down' criteria and measures is absolutely integral to the design of the bond framework.

In line with ICMA good practice, the KPIs should be:

- Relevant, core and material to the issuer's overall objectives, and of high strategic significance to the issuer's current and/ or future ambitions.
- Measurable or quantifiable on a consistent methodological basis in order to be able to benchmark performance.
- Externally verifiable to ensure independence and transparency.
- Able to be benchmarked to ensure impact, using an external reference or definitions as far as possible to facilitate the assessment of the level of ambition.

In addition, the sustainability bond component of the SLB needs one or more Sustainability Performance Targets (SPT) per KPI within the structuring of the bond.

The SPTs should have the following characteristic:

- Represent a material improvement in the respective KPIs and be beyond a 'business as usual' approach, in this case achieved by combining the sustainability outcomes intrinsic to mine action with sustainable agricultural transition.
- Where possible, be benchmarked or compared to an external reference.
- Be consistent with the Government of Ukraine's overall sustainability strategies (as outlined above).
- Be based on a timeline which is prior to, or concurrent with, the issuance of the bond.

The target components of KPIs should also ideally have clear:

- Timelines, including the target observation dates, periods or frequency, and the trigger events.

<sup>22</sup> <https://www.kmu.gov.ua/en/news/uhvaleno-strategiyu-ekologichnoyi-bezpeki-ta-adaptaciyi-do-zmini-klimatu-do-2030-roku>

<sup>23</sup> <https://www.kmu.gov.ua/en/news/250210653>

<sup>24</sup> It should be noted that under ICMA guidelines and principles, the retention of nuclear within Ukraine's energy portfolio would not preclude the application of a sustainability bond approach.

<sup>25</sup> <https://me.gov.ua/News/Detail?lang=en-GB&id=479ea0f7-64b7-4f15-be37-537009be900d>





- Verified baseline or reference points for improvement of KPIs as well as the rationale for the baseline or reference point to be used.
- Assumptions for why and how recalculations or pro-forma adjustments of baselines will take place.
- Assumptions of other key factors beyond the issuer’s direct control that may affect the achievement of the SPTs.

As an example, there could be three KPIs, one reflecting demining targets in line with Ukraine’s national Mine Action Strategy, a second relating to sustainability and a third relevant to social impact, as outlined in Figure 11.

KPI	Focus Area	Description	Lower Threshold	Upper Threshold
KPI 1	Mine Action	To be determined	SPT 1.1	N/A
KPI 2	Environmental Sustainability	To be determined	SPT 2.1	SPT 2.2
KPI 3	Social Improvement	To be determined	SPT 3.1	SPT 3.2

**Figure 11:** Potential KPI framework for SLB linking mine action and sustainable agriculture.

Proposed KPIs for agricultural sustainability or social impact are not proposed in detail here, but could include, for example:

- Confirmation of transition to organic production
- Confirmation of switch to no till agriculture
- Completion of training and certification of x agricultural staff
- First harvest of no till wheat from organic seeds
- Certification of organic production after three years
- Recertification of plots as organic producers

For the demining component, ‘payment by results’ and efforts to improve efficiency are now an established part of the mine action sector. It is not, however, good practice to incentivise faster clearance with basic financial return, given the potential negative impact on the safety of demining personnel and civilians.

A mine action component within a KPI model could therefore be based solely on a ‘payment by result’ model that achieves demined land in line with Ukraine’s national mine action strategy and priorities, linked to international and national mine action standards. This would avoid the need for a ‘step-down’ coupon incentive for faster clearance by a mine action operator and focus on the delivery of quality demining to agreed standards.

Meanwhile, a ‘step up’ and ‘step down’ coupon adjustment for KPI 2 (agricultural sustainability) and KPI 3 (social impact) could be conditional on achieving KPI 1 (the core mine action component). If the mine action deliverable is not met, then the coupon will be increased by +75 basis points (bps, a unit of measurement used to describe the percentage change in the value or rate of a bond with 1bps being the equivalent of 0.01%). If SPT 1.1 is achieved, then the following matrix would be applied for coupon ‘step-up’ and ‘step-down’ for KPI 2 and KPI 3, which is applied in combination.

KPI Coupon Adjustment Framework		KPI 2 (Agricultural Sustainability)		
		Lower than SPT 2.1	Between SPT 2.1 and SPT 2.2	Higher than SPT 2.2
KPI 3 (Social Impact)	Lower than SPT 3.1	+75bps	+50bps	+25bps
	Between SPT 3.1 and SPT 3.2	+50bps	No Change	-50bps
	Higher than SPT 3.2	+25bps	-50bps	-75bps



The integrity of the bond and depends on independent and external verification, provision for which is also a key part of the ICMA guidance. An independent verification framework would need to be designed, ensuring consistency with legal and fiscal frameworks as well as the process for selecting a verifier.

At a minimum, verification should be aligned to any date/period relevant for assessing SPT performance that could lead to a potential adjustment of the SLB financial and/or structural characteristics, until after the last SPT trigger event of the bond has been reached. Reporting should also take place on an annual basis and align with public sustainability reporting by the Government of Ukraine as the bond issuer.

## Implementation

This stage involves the launch of the bond, including marketing to investors, and the implementation of the project. Technical details related to separation of proceeds and bond issuance methods are included at Annex B.

### 5.7 Product summary and scalability

The SLB proposed here links mine action to two other thematic sustainability areas: agriculture and social impact. As outlined in section 5.5, government revenue gathered from corporation tax from transition to sustainable agriculture and modest revenue from cleared agricultural land alone does not, on its own provide full cost recovery for the bond principle and interest. A full financial model would need to consider other forms elements of economic benefit from the projects in order to determine the best scale and timeframe for the bond issuance.

The potential benefits of the SLB are not, however, confined to return on investment bond itself. The SLB as outlined in this product also delivers on several of Ukraine's sustainability strategies, including those relevant to its relationship with the European Union.

In addition to enabling agricultural rehabilitation or enhanced sustainability, mine action also plays a critical role in safe demolition and/or reconstruction or urban areas. This is labour and time intensive and also costly, especially when urban conflict has led to damage to critical infrastructure as well as buildings.

The bond is, in principle easily scalable as long as there is sufficient appetite from the Government of Ukraine and investors. It is possible that a SLB could consider a wider range of sustainability enhancing measures than the agricultural shifts modelled in detail in this study. Sustainability areas could include green buildings, development of renewable energy infrastructure and storage capacity, improved water management or enhanced waste management and recycling.

The potential alignment of mine action and solar energy infrastructure is explored further under the outcome-based PPP in Product 2 (Section 5b).



# 5b Outcome –Based Public Private Partnership (PPP)

## 5.8 Introduction to PPPs and Outcome-Based PPPs

The term ‘Public-Private Partnership’ (PPP) describes a range of possible relationships among public and private entities in the context of infrastructure and other services. PPPs commonly involve the public sector providing incentives such as subsidies or concessions to the private sector to deliver a product or service that the public sector wants and needs such as construction or management of infrastructure or healthcare.<sup>26</sup>

An outcome-based PPP is a series of contracts between the public and private sectors where payment is contingent on predefined outcomes rather than simply activities completed, to achieve shared aims more efficiently. The use of outcomes-based payments, as opposed to simply payment for activities or outputs, also reduces the risk of misallocation of resources.

The product outlined in this section proposes an outcome-based PPP to fund the release of mine contaminated land and in parallel to incentivise private sector investment to enhance economic development.

While PPPs are common in Ukraine, particularly to develop new infrastructure, the addition of outcome-based payments is much less common. The focus of regular PPPs has been primarily on the construction of outputs or delivery of services such as health care. In these models, the private partner is usually responsible for delivering specific outputs, such as building a road, hospital, or power plant, and maintaining it according to predefined national or international standards.

Under traditional PPPs, the private partner usually receives payment through a combination of user fees and government payments on the basis of predetermined outputs, for example routine maintenance carried out on a road network. The government may also offer concessions to the private partner, such as fees or taxes that reduce construction or running costs. In PPPs, the construction, operational and financial risks are usually shared between the public and private parties based on who is best placed to manage them.

PPPs typically take various structures, with the following being most common:

- **Service agreements:** These usually occur when a government maintains control over the project or asset development and provides short to medium-term contracts to the private sector for the provision of technical assistance, management and service provision, or a lease contract.
- **Concessions:** The private sector operator takes full responsibility for delivery of the services, including construction, maintenance and management. The private sector operator is also entirely responsible for all capital investment. The public sector is responsible for ensuring standards and regulations meet the private operator’s needs, such as regulating price and quality of service. The assets remain publicly owned during the concession contract.
- **Build-Operate-Transfer (BOT):** The private sector designs, finances, builds and operates the project for a defined period before transferring ownership to the government. This could also be applied to infrastructure that needs rehabilitation rather than construction from scratch.
- **Build-Own-Operate (BOO):** The private sector retains ownership of the project indefinitely and operates it, generating direct revenue for the private entity and providing full risk transfer from the government to the private sector. This model tends to be more prominent over longer duration projects where the government also provides concessions to the private company.

<sup>26</sup> <https://www.adb.org/sites/default/files/institutional-document/31484/public-private-partnership.pdf>



- **Design-Build-Finance-Operate (DBFO):** The private sector is responsible for design, construction, financing and operation of the project, but the government maintains ownership of the asset.
- **Blended models:** Different PPP models can be combined to suit the specific project requirement, for example introducing performance or outcomes-based contracting to a DBFO model. Joint ventures could also feature here, where the public and private sector partners assume joint ownership of the asset and operating company. Blended models may also involve government concessions and incentives to the private sector such as co-financing. Blended models are becoming increasingly popular in infrastructure PPPs as they provide a tailored solution to the project. By its nature, an outcomes-based PPP is likely to take a blended model where there is a component of additional payment incentives to achieve the desired outcomes.

## 5.9 Outcome-Based PPP model

Outcome-Based PPPs (OB-PPS) are more suitable when the intention of the project is to achieve a certain public policy objective, while also encouraging private sector investment in a structure or service that will further economic development. Demining could easily form the basis of the public policy objective.

In an OB-PPP, the public sector sets out clear outcomes, provide regulatory oversight and incentivises the private sector to invest by, for example, transferring ownership of the asset for the duration of the contract or applying other forms of concessions depending on the specific contract requirements. The public sector, either the Government of Ukraine or a third-party donor, further subsidises the delivery of the project and incentivises the private sector through issuing payments to the private partner based on the achievement of pre-agreed outcomes.

Meanwhile, the private partner (or a consortium of partners) designs, finances, builds, operates and maintains the project. The private partner also owns the asset for the period set out by the contract. Outcomes are verified by a third party and payments to the private sector are contingent on the achievement of various milestones and outcomes.

The private sector will aim to recoup their investment through a combination of government funds, user fees and/or blended finance, for example support from a donors or development finance institutions. At the end of the contract period, and depending on the structure of the contract, the public sector could resume ownership of the asset and could chose to assume or re-award operating responsibility.

In a BOO model the private sector operator would retain ownership of the asset. Under a DBFO model the private sector operator would never assume ownership of the asset.

By using an OB-PPP, the Government of Ukraine would benefit from the expertise, technology, innovation and private capital resources of the private sector, while ensuring funds also contribute to the public policy outcomes of landmine clearance. While the private sector would undertake more risk with an outcome-based PPP than it would usually undertake through a traditional PPP, the private partner is able to share the financial cost and therefore risk with the public sector through the additional payments linked to outcomes which lowers the overall price of the project.

It could also access public resources and be supported by the legal and regulatory framework, which may be critical to the success of the project and could also lower costs through enabling more efficient processes such as construction and operations.

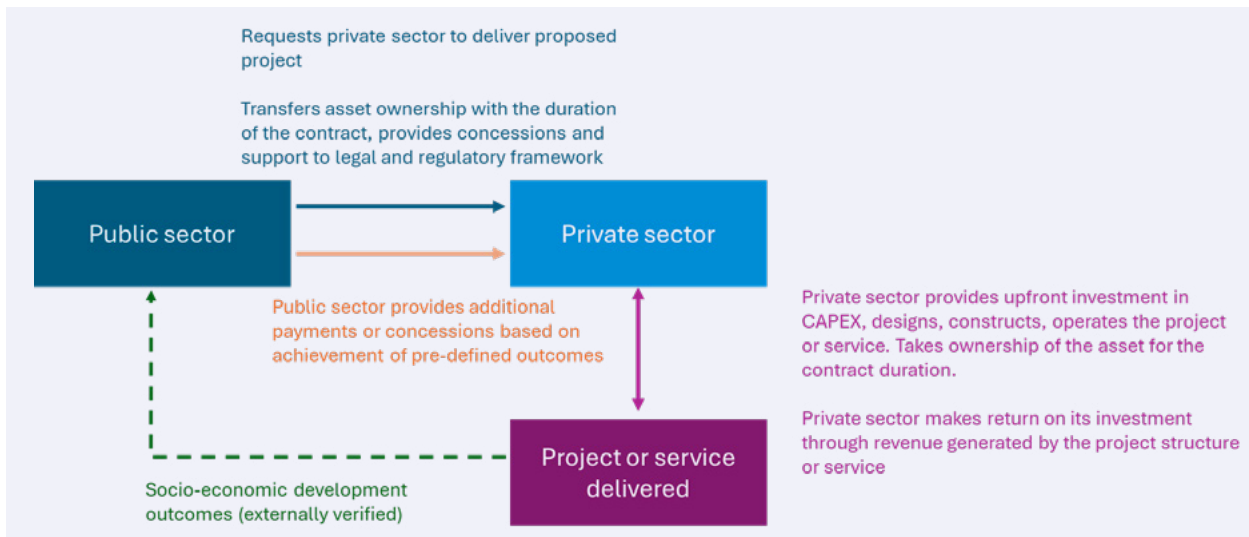


Figure 12: Simplified model of an Outcome-Based PPP.

## 5.10 Description of the proposed outcome-based PPP mechanism

Selecting the exact most appropriate PPP structure requires an in-depth assessment of the project context (detailed in section 5.14). For the purposes of this feasibility study, the following worked example of an OB-PPP is based on a blended BOT structure with outcome-based payments.

In this model, concessions, including land ownership transfer, are provided to the private sector from the Government of Ukraine for the duration of the contract. Further incentives are provided to the private sector through outcomes-based funding from donors to align the private sector interests with the Government of Ukraine's mine action needs and generate a new source of funding from the private sector for mine action.

### Land use

An OB-PPP incorporating demining could support a range of land uses, such as the development of infrastructure or health care. This study has therefore considered other significant needs and recent Ukrainian Government policies aiming to support the Ukrainian economy that require both safe land and private sector investment.

This study has identified a significant opportunity to combine demining with the significant need for investment in new energy infrastructure. This would also support the Government of Ukraine's strategy to diversify and stabilise the country's energy supply.<sup>27</sup>

This model therefore proposes an OB-PPP to finance the construction of a renewable energy source combined with demining. This combination also has the benefit of PPPs being established structures in the development of renewable energy infrastructure in Ukraine.<sup>28</sup>

Either solar or wind energy sources could be applied to a mine action OB-PPP, depending on the prevalence of sun or wind in a specific project area. While wind farms are a viable option, this proposed model will focus on solar energy. A key factor in choosing solar is that it has become more cost effective and has seen more technological innovation than wind energy in the last decade, for example in greater

<sup>27</sup> The Government of Ukraine's energy strategy aims for 25% of all energy supplied to come from renewable sources by 2035.

<sup>28</sup> Renewable energy companies Scatec and UDP Renewables both cite partnerships with the Government of Ukraine in the development of solar farms in Ukraine.



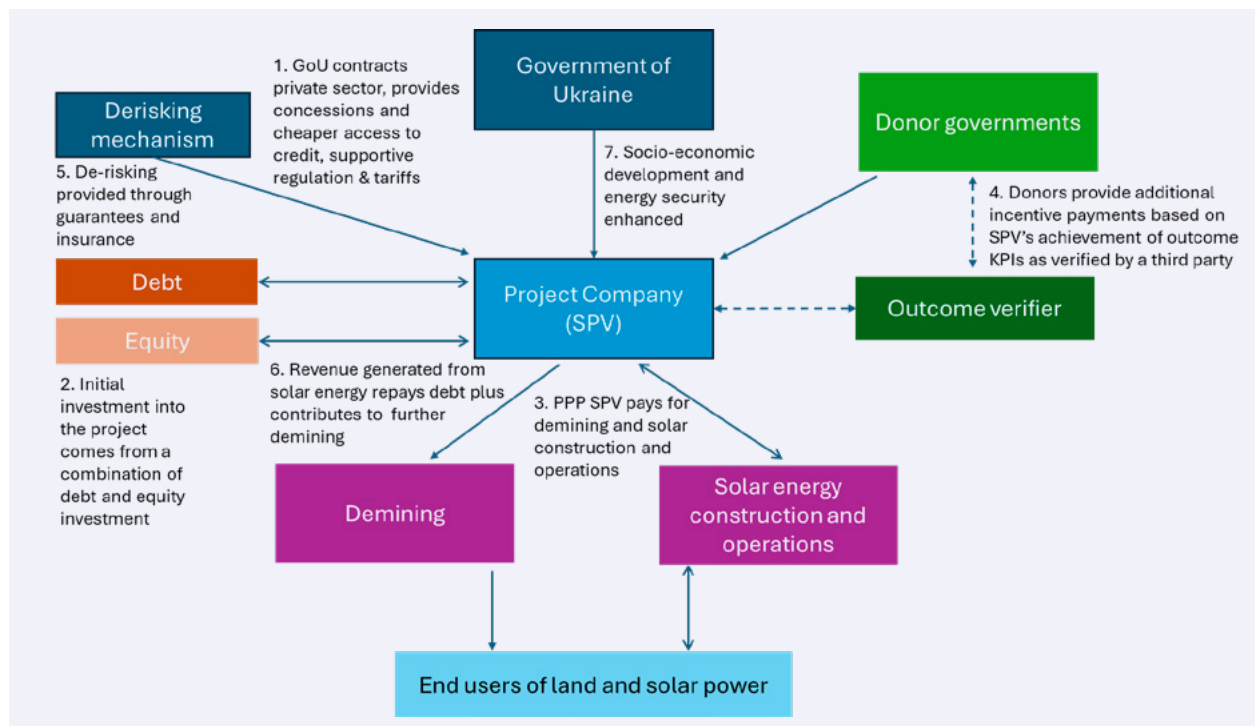
capacity and lower price per solar power generating cell. The solar energy sector also has a proven track record in attracting private sector investment as well as experience handling construction and operational risks in PPPs.

Ukraine’s potential solar power capacity has also been recognised recently, with a recent study by The Institute for Sustainable Futures has showing Ukraine’s potential to generate more solar power per year than that of France, Germany and Italy combined. The scale is such that there is potential for Ukraine to even export renewable energy if it’s capacity and transmission grid infrastructure were to be sufficient.<sup>29</sup>

Solar energy pairs well with mine action as solar farms can be built on marginal land, for example land that is not fit for agricultural purposes following conflict, or land that is not high yielding. New technologies such as agrivoltaics (where solar panels are installed over crops) could even be used to integrate solar production with agricultural production where both land uses are viable.

With PPPs already in use as a flexible instrument for infrastructure construction in Ukraine, an OB-PPP is an effective mechanism to align private sector investment and the income generating potential of energy infrastructure and two public sector goals of demining and energy diversification. It would also have the benefit of helping to mitigate against the risk of funding misappropriation or corruption due the model’s additional checks, balances and outcome-based payments set against Key Performance Indicators (KPIs).

## 5.11 Operational model



**Figure 13:** Structure and steps of a Ukraine Demining – Solar Outcome-Based PPP.

Following a blended BOT PPP structure assuming outcome-based payments are provided by a third-party donor, the structure outlined above could be used to deliver an outcome-based PPP that funds both demining and the production of solar energy. The figure also summarises the seven steps for initiation and contracting, financing, construction and operations, outcomes payments, derisking, revenue generation and economic development. The steps are explained in more detailed below.

<sup>29</sup> Bilek, P, Stubbe, R, Wesner, H, June 2024, A Solar Marshall Plan for Ukraine, Empowering Ukraine’s brighter future: bottlenecks and key policy reforms needed to boost solar PV deployment, Berlin Economics (commissioned by Greenpeace), <https://www.greenpeace.de/publikationen/20240607-greenpeace-report-BE-solar-marshallplan-ukraine-encv.pdf>



## Step 1: Project initiation and contracting

The Government of Ukraine decides it wants to engage the private sector in a PPP structure to deliver the model. Following detailed design and development (see further below), the Government of Ukraine's contracting authority issues a competitive tender or enters into discussion with private sector partners for the development of the model.

The government then issues a contract to a private sector entity, or consortium, which forms a special purpose vehicle (SPV) for the purposes of delivering the project. The SPV would be required to include within its wider group structure experience and a track record in delivering solar farms. The demining requirement would not have to form part of the SPV as this component could be sub-contracted to a registered and accredited third party demining organisation in Ukraine.

Following a detailed market analysis and financial modelling process the government agrees the concessions and support it can provide to the private sector SPV. This might include offering cheaper access to credit or grant subsidies to cover some of the capital expenditure, a supportive enabling environment such as reduced import levies on equipment, or tax breaks. Under a BOT model, such concessions would also include the transfer of ownership of the land on which the solar farm would be built to the SPV for the duration of the contract (this requires that suitable government owned land has been identified in the design phase).

The collection of concessions and support should reduce the project costs, providing an incentive to the private sector and enabling the project to be financially viable. Outcome-based payments and derisks also increase the financial attractiveness of the project (covered further in steps 4 and 5 below).

## Step 2: Project financing

As with most infrastructure projects, the construction of a solar plant combined with demining will require up-front financing. The most likely source of funds will be a combination of debt (loans) and equity investment. The Government of Ukraine concessions may reduce the cost of credit (in other words, the cost of borrowing the loan), either through subsidising the loan part with renewable energy grants or helping to provide access to loans with lower interest rates as governments can often borrow at lower rates than the private sector.

In this model, the Government of Ukraine may even choose to transfer international assistance received from donors or International Financial Institutions (IFIs) to develop national renewable energy capacity and energy security, for example through aligning with the EU's Ukraine Facility support package (described in section 7.5).

## Step 3: Construction and operations

In the first year of the project, the SPV pays for demining of all land required to enable to safe construction and connection of the solar farm. This can be directly contracted out by the SPV to either commercial, state or NGO demining operators, based on their ability to work in the project area and address the mine or UXO contamination present.

Demining activities would include non-technical, technical survey and clearance to release all land required for the project. Once the land has been released, the SPV embarks on construction of the solar farm. The SPV continues to operate, maintain and manage the delivery of solar power from the farm for the lifespan of the solar farm (usually between 25 – 30 years) after which time the asset may be returned to Government ownership, PPP contracts renewed, or the solar infrastructure upgraded to extend its lifespan.



## Step 4: Outcome-based payments

For the first few years of the project, additional incentives can also be provided to achieve specific pre-defined outcomes. Key Performance indicators (KPIs) would be determined during the project design phase to enable the private sector to support additional public policy objectives. Payments could be used either to make sure the private sector achieves greater impact in the delivery of the project, minimises any potentially harmful impacts, or a combination of the two.

Such ‘outcome-payments’ could also be used to incentivise good practice delivery and efficiency to enhance the impact for example in conducting more mine clearance in the local hromada around the solar plant (smallest level of administrative area in Ukraine) or constructing and putting the solar farm into operation earlier than expected.

While the precise outcome payments would be determined based on the specific project location and local requirements, examples of outcome-based payment KPIs could be:

- Provision of solar energy supply to vulnerable households (for example, number of vulnerable households connected within years 1, 2 and 3).
- Environmental damage mitigation (for example the number of hectares of forest or hedgerow preserved/replanted, or number of water courses monitored).
- Support to local sustainable agriculture (for example the number of hectares converted to a more sustainable form of agriculture).

While the Government of Ukraine could provide the payment for these outcomes, this is also a suitable role for a donor who wants to facilitate the project outcomes and improve chances of success.

Achievement of outcomes would be verified by a third party. Once they have confirmed that the outcomes have been achieved based on pre-agreed targets, the outcome payer issues payment to the SPV.

## Step 5: Derisking

To reduce the financial risk taken by the project SPV to a tolerable level, a solar installation in Ukraine may require derisking through the provision of insurance such as war risk insurance and/or guarantees for investors. These could come from IFIs or private banks who already provide such services to reconstruction efforts in Ukraine. See section 7.6 for more detail on derisking.

## Step 6: Revenue generated from energy provision

The SPV would generate revenue from the cost of energy provided. Ukraine currently uses a special feed-in tariff (FiT) to set the price of renewable energy. The roll out of an auction-based system was announced in 2020 but has been postponed following the full-scale invasion.<sup>30</sup> The revenues generated by the SPV from the sale of renewable energy enable the entity to pay for operating costs and repay any debt incurred, as well as pay taxes and any additional charges.

To bring new funding to mine action from the private sector to address the mine action funding needs described earlier in this report, the Government of Ukraine could apply a ‘Special Demining Charge’ to the model. Such a charge would allocate a proportion of renewable energy revenues from the site to be programmed back into demining in other areas, creating a flow of new funding for demining enabling more land to be released.

Another way to design this charge would be a revenue share between the private party and the government for a specific objective. Should the outcome-based PPP be replicated or scaled up to other renewable energy sites and infrastructure, the ‘special demining charge’ could also be extended.

<sup>30</sup> <https://euea-energyagency.org/en/news/market-news/solar-energy-in-ukraine-current-state-and-forecasting/>





## Step 7: Economic development

Finally, the economy of Ukraine benefits from increased energy production and energy security (with the future potential to export renewable energy to the rest of Europe and reduce reliance on fossil fuels). The Ukrainian economy would also directly benefit from corporation tax (at 18 % that is levied on renewable energy providers) and VAT at 20% that is passed on by the energy provider to consumers.

### 5.12 Financial model

This section of the product description outlines the financial model and the assumptions used to develop it.

The financial model for the OB-PPP has been established based on a pilot project size which could be scaled up or replicated for other energy sources or other infrastructure. To prove concept, a solar farm of between 5-20 MW size would be large enough to demonstrate technical and financial viability, operational performance and the potential for scalability, while keeping the initial investment value low enough to attract first investors.

The financial model is developed based on a 10 MW solar farm, which would typically take up just 20 hectares of land.<sup>31</sup> A project of this size would benefit from economies of scale in procurement, construction and operations, improving cost-efficiency without the complexities of very large installations. On average, a 10 MW solar plant can generate about 14k-15k MWh per year, assuming an average solar capacity factor<sup>32</sup> of around 16-17% typical for Ukraine.<sup>33</sup>

#### Costs

The cost of developing of a 10 MW solar farm in Ukraine would generally range from USD 8m-12m, depending on the specific site, technology used and current market conditions. For the purposes of this model a median of USD 10m has been used for the cost of development of the solar farm including the cost to clear the required land (approximately 20 hectares).

The average cost of land release as estimated by the Ministry of Economy of Ukraine data between 2022 and 2023 was between USD 1k-1.5k/ha. Like product 1, this model will use a median of USD 1,250/ha.

To fund the capital expenditure (CAPEX) of USD 10m, the model assumes 30% equity and 70% in government or international loans or grants for the development of renewable energy and energy security and government concessions (such as land transfer).

The PPP may also link to other innovative finance for mine action, for example using proceeds from a Sustainability-Linked Bond as detailed in Product 1, could also be used to part-fund the CAPEX of the demining/solar project. The operating expenditure (OPEX) for a solar farm of this size is estimated at USD160k per year (roughly 1-2% of the CAPEX).

Meanwhile, the amount of land required for the solar project (approximately 20 hectares) is comparatively small for mine action operations. The level of funding required for the specific area of land is therefore also low. However, the inclusion of an 'demining special charge' within the outcome-based PPP structure. This aims to recoup more than its original investment to repay the initial investment by the Government of Ukraine and an additional 20% of the solar farm's revenue.

<sup>31</sup> Megawatts (MW) represent the maximum electrical power output that the solar farm can generate under optimal conditions. A 10MW solar farm has the capacity to produce 10 megawatts of electricity at any given moment when the sun is shining at full intensity.

<sup>32</sup> Solar capacity factor is a measure used to describe the efficiency or productivity of a solar power system. It is the ratio of the actual energy output per year to the maximum possible energy output if the system were operating at full capacity all the time during that period.

<sup>33</sup> Megawatt Hours (MWh) and Kilowatt Hours (KWh) are units of energy generated by the solar power system.



## Income & social impact

A solar farm of 10 MW operating at an average solar capacity of 16-17% for Ukraine is expected to produce 15,000 MWh. At the current solar consumer ‘Feed-In Tariff’ rate of USD 0.10 per kWh, the projected annual revenue from the solar power produced is USD 1.5m.

In terms of social impact, the estimated capacity of the solar farm could power approximately 5,600 households, 140 schools or nine hospitals.

The residual value of the CAPEX after 25 years is estimated to be USD 1m (10% of the initial cost), which is also incorporated in into the model presented here.

## Taxes & charges

The model includes an annual Demining Special Charge, as described above, which amounts to USD 7m (the same value as the initial CAPEX public sector contributions) and an additional 20% of revenue. Such a charge is not uncommon in infrastructure PPPs which have benefitted from concessions in grants and is a way for the public sector to direct revenue to a specific purpose.

This model builds in a fixed USD 7m in special demining charge over the first ten years, in addition to the proportion of revenue. This acts as a vehicle for the government to recoup initial investment provided through a range of means and earmark it for other public policy needs like demining that are unable to generate sufficient funding elsewhere. This fee could be also tax deductible, reducing the SPV’s corporate income tax.

In comparison, without the OB-PPP’s inclusion of outcome-based payments, renewable energy grants and concessions, a private company developing the same sized solar farm that required USD 7m in commercial credit could expect to pay over USD 9m in financing costs (based on a ten year loan at 5% interest).

The financial model includes Ukraine’s corporate income tax (at 18%) that is applicable to renewable energy production. This could leverage an additional USD 3.6m for the government of Ukraine over 25 years. VAT is also applied to sales of renewable energy and is passed on to consumers in energy pricing.

## Profit and Return

The estimated net profit for the private sector stands at over USD 21m even after USD 13m has been contributed to demining. With a residual value of USD 1m, the internal rate of return (IRR)<sup>34</sup> is calculated at 7%, which is within an average acceptable margin for investors in infrastructure projects.

Figure 14 shows a full estimated financial model for the OB-PPP over 25 years.

	Yr 0	Yr 1	Yr 2	Yr 3	Yrs 4-10	Yrs 11-24	Yrs 25	TOTAL
<b>Costs</b>								
Equity	3,000,000							<b>3,000,000</b>
Grants and concessions	7,000,000							<b>7,000,000</b>
OPEX		160,000	160,000	160,000	160,000	160,000	160,000	<b>4,000,000</b>
<b>Income</b>								
Revenue		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	<b>37,500,000</b>
Outcome based payments from donor as incentives linked to KPIS		500,000	500,000	500,000				<b>1,500,000</b>
Residual value of CAPEX after 25yrs							1,000,000	<b>1,000,000</b>
Demining Special Charge (20% + 7m repay)		860,000	860,000	860,000	860,000	300,000	300,000	<b>13,100,000</b>
Government Corporate Income Tax (18%)		86,400	86,400	86,400	86,400	187,200	187,200	<b>3,672,000</b>
<b>Net profit</b>		1,053,600	1,053,600	1,053,600	553,600	1,012,800	1,012,800	<b>21,674,400</b>
<b>IRR</b>		<b>7%</b>						

**Figure 14:** Estimated financial model for demining – solar Outcome-Based PPP.

<sup>34</sup> Internal Rate of Return (IRR) is one of the key metrics used to calculate an investment’s rate of return. The Internal Rate of Return (IRR) is the discount rate that makes the net present value (NPV) of a project zero, in other words it is the expected compound annual rate of return that will be earned on a project or investment.



## Offsetting challenges in securing up-front investment

In developing the proposed financial model and structure of an OB-PPP structure, efforts have been made to address some of the key factors and obstacles that typically affect the financial viability of infrastructure PPPs. These are outlined below in Figure 15.

Many of these focus around the challenges to finance projects requiring high up-front investment. The context of ongoing conflict in Ukraine exacerbates these factors, making access to affordable financing more difficult. The inclusion of a Special Demining Charge, direct and outcome-based public funding and land transfer within the financial model act as a financial incentive by offsetting the requirement for the private sector to acquire private financing. Instead of repaying debt service costs for example (such as a 5% interest rate on a ten year loan), the private entity is required to pay a special charge back to the Government of Ukraine to support wider demining efforts.

**Creditworthiness factors:** A project's bankability depends on factors such as commercially attractive design, appropriate tariff structures, strong off-take arrangements to reduce revenue risk, and clear regulatory settings that ensure predictable future cash flows.

**Challenges in infrastructure financing:** In addition to the costs associated with servicing debt, there are often additional challenges for infrastructure projects in securing finance:

- Long-term Debt Maturities: Aligning debt maturities with project cash flows is often challenging.
- Local Currency Debt: Limited availability of local currency financing to match revenue streams.
- High Leverage: Due to limited equity, projects often have to leverage high amounts of debt.
- Nonrecourse Financing: Financing is often secured only by project assets, with no other guarantees.
- Debt ratios: Lenders evaluate debt service cover ratios, loan life coverage ratios, and project life coverage ratios to determine the project's sustainable debt level.
- Due diligence: Thorough due diligence is conducted by lenders to ensure project assumptions and risks are reasonable.

**Credit enhancement:** To secure financing or better borrowing rates, operators may seek credit enhancements such as credit or political risk guarantees, which can come from governments or development finance institutions.

**Commercial viability:**

- Service standards and tariffs: The combination of service standards (costs) and tariffs (revenues) determines commercial viability.
- Efficiency: Private operators can enhance financial outcomes through efficient investment and operations.
- Internal Rate of Return (IRR) and Return on Equity (RoE): IRR and RoE are key measures for assessing financial attractiveness. Operators compare potential IRR against their cost of equity, adjusted for project risk. An acceptable IRR for an infrastructure PPP is often between 6-8%.

**Subsidies:** Various subsidies can be used to, including cash subsidies, risk-bearing by the government, cheap capital, in-kind grants, and tax exemptions, to address specific issues and enhance project viability.

**Environmental and social impact assessments:** These are necessary to identify and mitigate potential environmental or social risks associated with the project.

**Figure 15:** Key factors that impact the economic viability of a typical infrastructure PPP



## 5.13 Steps for Outcome-Based PPP development

The completion of this pilot project could establish the foundations for a wider sectoral approach of OB-PPPs that aligns demining and infrastructure development needs in Ukraine. However, to enable such a pilot project to be successful would require an in-depth analysis of the solar power sector and its ability to leverage funding for additional demining activities. Sector specific technical and legal knowledge would be required to prepare and design such a project.

The following figure from Asian Development Bank’s Public-Private Partnership Handbook shows the generic project sequence for a PPP which outlines the steps needed for the development of PPPs across a sector, including a sector road map.

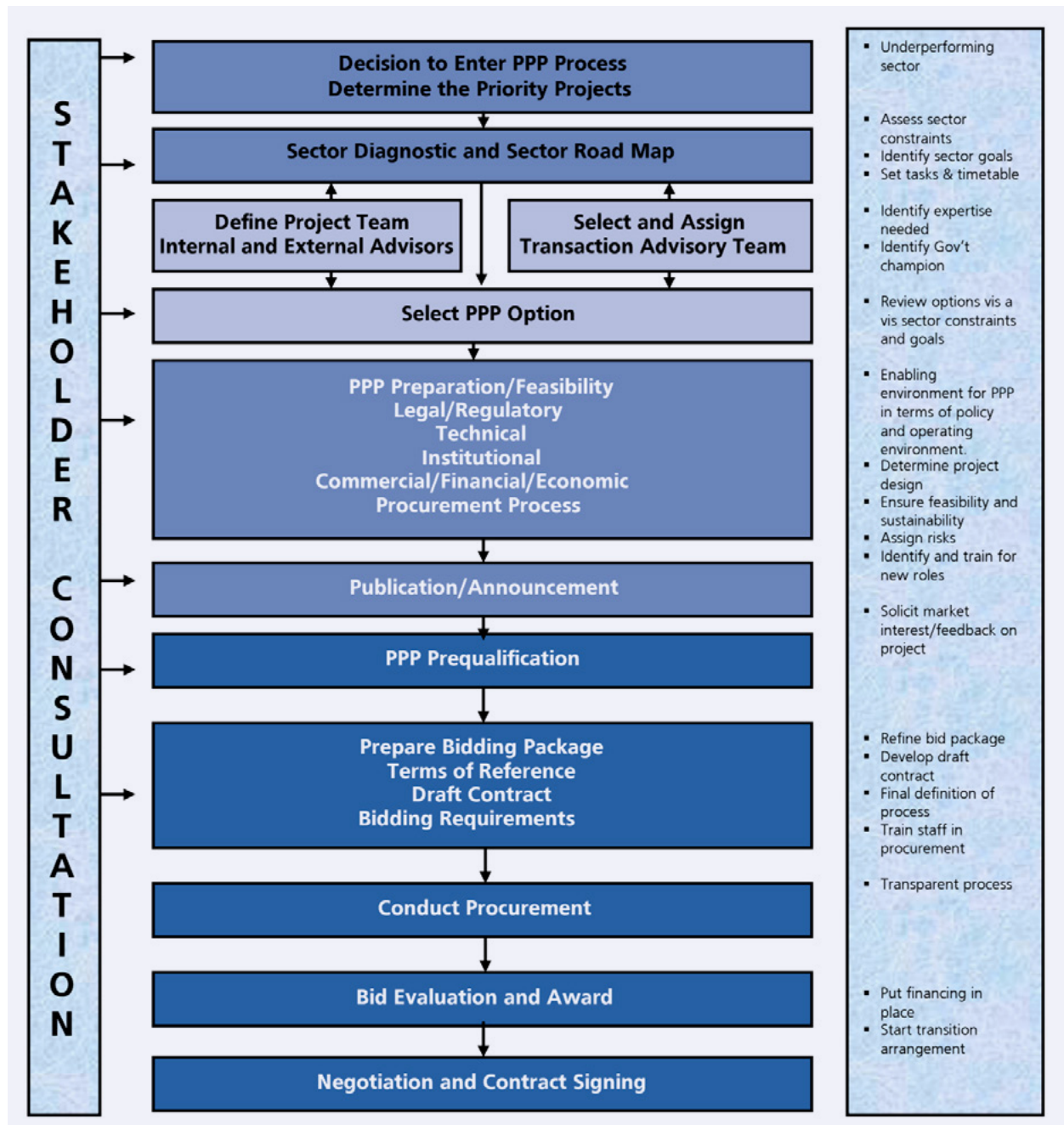
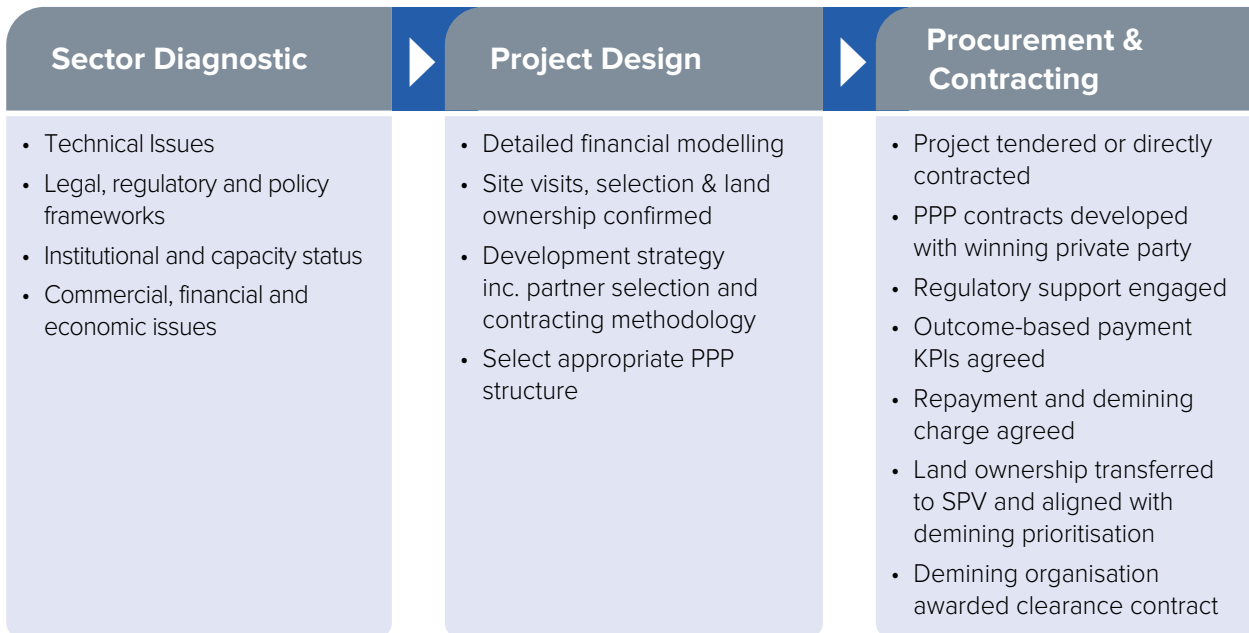


Figure 16: Generic PPP project sequence.

Source: Heather Skilling, 2007



This study proposes the following simplified version (Figure 17) of the project sequence outlined above as the required next steps for the mine action sector in Ukraine to develop outcome-based PPPs linked to infrastructure:



**Figure 17:** Simplified PPP development process.

These processes should all involve extensive stakeholder engagement, technical assessments, site visits and legal assessments. These steps in the preparation of a PPP typically involve a team of local and international engineers, lawyers, economists, financial analysts, and policy experts. Given the complexity of such an undertaking, the diagnostic and design process can span one to two years, depending on the sector's intricacies and the availability of data.

Important stakeholders to engage in this process should include:

- Government of Ukraine Ministry of Economy, Ministry of Investment, Ministry of Energy, State Agency for the Restoration and Infrastructure Development of Ukraine, Agency on Support to Public-Private Partnerships and National Investment Council.
- International donor governments and their development finance institutes.
- IFIs such as European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC) who have been involved in the development of renewable energy in Ukraine.
- Renewable energy companies with experience in PPPs in Ukraine such as Scatec and UDP Renewables.
- Mine action operators in Ukraine.

The following section provides further detail on each of the three stages of the project sequence.

## 5.14 Sector Diagnostic

This is a multi-faceted analysis that helps to identify the strengths and weaknesses of a sector, guiding governments in creating an enabling environment for successful PPPs. A sector diagnostic involves the following areas of analysis that in this case would be required of both the solar power and demining sectors: technical issues, legal, regulatory and policy frameworks, institutional capacity, and commercial, financial, and economic considerations.



## Technical issues

This analysis would identify the current technical constraints and inefficiencies within the solar power and demining sectors. This could include evaluating system efficiency, utility operations and customer responsiveness. It is crucial to establish an understanding of whether operational issues stem from underinvestment, poor investment planning, inadequate maintenance, ineffective management or lack of technical expertise.

A comprehensive catalogue of existing and planned investments, as well as current solar assets, should be developed. Additionally, the diagnostic should consider the interconnectivity and interdependencies of various infrastructure elements, such as transmission grid, electricity generation and distribution, as well as the impact of landmines and other explosive ordnance on the development of additional solar power infrastructure.

The technical analysis would form the foundation for identifying geographical areas where the interconnect solar power and demining PPP would be a priority.

## Legal, regulatory, and policy frameworks

A thorough review of the existing legal, regulatory, and policy frameworks is essential for understanding the environment in which PPPs will operate. This step involves analysing the applicable laws, regulations, and policies that govern the sector, including the regime for assigning authority and setting performance standards. Key aspects such as oversight arrangements, the role of regulatory bodies, and the existence of tariff and subsidy policies must be examined.

The diagnostic should also assess the presence and applicability of legally mandated service quality standards, environmental and health regulations, labour laws, and restrictions on foreign ownership or participation in the sector. The legal framework should minimize the risk of corruption and provide sufficient reliability to encourage private sector participation.

Investors must have confidence that laws and contracts will be respected and enforced through courts or arbitration if necessary. Clearly defined contract terms, including performance targets, tariff structures, and dispute resolution procedures would help reduce investor uncertainty and make PPP projects more attractive.

## Institutional structures and capacity

Institutional capacity plays a pivotal role in the successful implementation of PPP projects. The diagnostic should assess the readiness of existing institutions to take on new or enhanced roles required for implementation of a successful PPP.

Key questions to address include whether the relevant government institutions have the necessary funding, staff, training and equipment to perform their functions effectively. It is also important to ensure that each institution understands its role and has the procedures in place to fulfil its responsibilities. If legal or regulatory reform is needed, identifying a key stakeholder or 'champion' with the capacity and political will to lead and drive the reform agenda will be essential for maintaining momentum throughout the development and implementation of the PPP.

Institutional roles must be clearly defined by the time the PPP design process is complete. However, some flexibility should be maintained to allow for the refinement and updating of institutional roles as the sector evolves. In the context of Ukraine, the roles, responsibilities and capacity of regional and local authorities should also be assessed. Governments must be realistic about their ability to manage these aspects of the PPP process effectively. The diagnostic should also therefore assess the capacity to support bidding, negotiation, and contract compliance and monitoring.



## Commercial, financial, and economic issues

The final step in the sector diagnostic involves analysing the commercial, financial and economic aspects of the sector to provide insights into the current commercial arrangements and financial health of both the solar and mine action sectors. Understanding the business orientation of solar service providers that may become partners in the PPP is also essential.

Financial considerations in the diagnostic include designing realistic pricing strategies that balance affordability for users with revenue sufficiency for private partners. This may involve setting customer tariffs or other pricing mechanisms. Governments may also need to provide financial support through investment contributions, viability gap funding or ongoing subsidies to ensure the commercial viability of the PPP project, some of which have been explored in the proposed project model in Section 5.12.

In summary, the sector diagnostic lays the groundwork for successful PPP projects. By addressing technical issues, legal, regulatory, and policy frameworks, institutional capacity, and commercial, financial, and economic considerations, governments can create an enabling environment that attracts private investment and ensures the long-term sustainability of PPP initiatives.

Each step in the diagnostic process contributes to a deeper understanding of the sector and guides the design of the project as outlined in Section 5.15 below.

### 5.15 Project Design

#### Detailed financial modelling

Providing a detailed financial model is a critical for analysing and balancing the project's financial viability, including the need for government support through investment contributions, viability gap funding or ongoing subsidies. The development of a financial model requires the collection and analysis of historical and sector-specific data, including financial, operational and technical information. Additionally, macroeconomic and demographic data are necessary to project key elements such as demand, tariffs, operating costs, revenues and debt servicing costs.

The model would include cash flow statements, profit and loss accounts and balance sheets. It would then be used to calculate key financial indicators such as Project Internal Rate of Return (IRR), Return on Equity (ROE), Annual Debt Service Coverage Ratio (ADSCR), Loan Life Coverage Ratio (LLCR), and Net Present Value (NPV) of subsidies. These indicators help assess the financial attractiveness of the project from various perspectives, including those of investors and lenders.

Throughout the PPP process, the financial model allows decision-makers to simulate various scenarios, such as changes in construction costs, operating expenses, demand fluctuations or economic conditions. Such a model would inform decision-making regarding project structure, pricing, level of subsidies and concessions required, and risk allocation. This ensures that the project remains financially sustainable and attractive to all stakeholders.

#### Site selection

The project design would need to include the identification of an effective piece of land for the project to take place, including an assessment of land ownership. Ideally, government-owned land suitable for solar power generation would be identified that also required mine action interventions. The site selection would include visits by engineers and mine action experts to assess the technical requirements for both mine action and solar construction.



## Development strategy, including partner selection and contracting methodology

Once the sector diagnostic, financial model and site selection have been completed, the government could then move towards a development strategy. This would detail not just the strategy for completing one pilot project, but a roadmap for assessment, scale-up or replication and other supporting activities required to develop the demining-infrastructure market further. This includes identification and engagement of key government and regional authorities, as well as regulatory or support unit offices that may be involved in the project development process.

At this point, the government may choose to select partners for the project and begin discussions directly, or alternatively choose a competitive bid contracting methodology, such as issuance of contracts through the ProZorro (government electronic procurement) platform. This stage leads on to Step 3, procurement and contracting that is not detailed further here as it would be specific to the PPP project structure identified.

Should the government of Ukraine wish to pursue an OB-PPP model to deliver both solar power infrastructure and demining, conducting the sector diagnostic and PPP design steps outlined to reach procurement stage would take between one to two years. It would need to involve a team of national and international experts. An indicative 12-month budget for such expert capacity and activities is outlined below. The sector diagnostic and design could also draw upon national expertise such as the PPP Agency (described in section 7.1) and expertise from IFIs such as EBRD, EIB or IFC.

Component	Details	Estimated cost (low) USD	Estimated cost (high) USD
Project Management	Project manager and support staff	140,000	200,000
Technical feasibility	Renewable energy experts, engineering assessments, demining assessment, Environmental Impact Assessment	400,000	500,000
Financial feasibility	Financial analysts to develop full financial modelling and risk assessment, analysis of market conditions and projections (energy and demining sectors), legal and regulatory assessment	250,000	350,000
PPP Structuring	Legal and financial advisors to structure agreements and draft contracts, stakeholder engagement with government agencies, private sector, mine action actors and communities	230,000	300,000
Risk analysis	Risk management, insurance and contingency planning	80,000	120,000
Travel and expenses	Site visits and logistics, stakeholder meetings, travel, document preparation, presentation and workshops	100,000	180,000
<b>Total estimated costs</b>		<b>1,200,000</b>	<b>1,650,000</b>

### 5.16 Scalability and replicability

As of 2022, Ukraine's solar power generation capacity was approximately around 8 GW. Since 2022, significant efforts have been made to expand the country's renewable energy sector despite the ongoing war. However, according to a recent study by Berlin Economics, this is only a fraction of Ukraine's solar power generating potential.<sup>35</sup>

As approximately 30% of Ukraine's solar photovoltaic (PV) capacity has been affected by the war and over 90% of wind capacity through either occupation, damage or destruction<sup>36</sup> and further destruction of

<sup>35</sup> Bilek, P, Stubbe, R, Wesner, H, June 2024, A Solar Marshall Plan for Ukraine, Empowering Ukraine's brighter future: bottlenecks and key policy reforms needed to boost solar PV deployment, Berlin Economics (commissioned by Greenpeace), <https://www.greenpeace.de/publikationen/20240607-greenpeace-report-BE-solar-marshallplan-ukraine-encv.pdf>

<sup>36</sup> Ibid.





traditional energy infrastructure, there is a strong push by the Government of Ukraine to further develop renewable energy, especially solar power.<sup>37</sup>

In the next ten years, Ukraine has the potential to dramatically increase its solar power capacity, according to the same study. By 2030, the country could reach up to 14 GW of solar capacity, which would be nearly double its current capacity. This expansion will require significant investment, estimated at around EUR 5 billion, to build new infrastructure and overcome existing technical and regulatory barriers.<sup>38</sup>

The Berlin Economics report shows that, by 2050, Ukraine's renewable energy could provide nearly 80% of its total energy needs if the necessary strategies and investments are implemented. This transformation is part of a broader vision to rebuild Ukraine's energy system to be more resilient, decentralised and reliant on clean energy sources.

The potential scale of renewable energy production in Ukraine demonstrates Ukraine's ability to not only meet domestic energy needs, but also export energy. This could contribute to broader European energy security as well as support EU member states' need to reduced dependency on fossil fuels and increasing energy independence.

A direct assessment of specific confirmed or suspected hazardous areas with land acceptable for solar generation in terms of topography, other land uses or solar capacity was beyond the scope of this study. However, it shows clearly that an OB-PPP has significant potential to scale-up to meet both mine action and renewable energy needs. The following model demonstrates in principle how mine action and solar infrastructure development could complement each other:

- Ukraine's total solar generation potential is estimated at 14 GW, of which there is 8 GW of existing capacity. That leaves a remaining potential capacity of 6 GW (or 6,000 MW).
- Using the estimated figure above of a land requirement of 20 hectares for a 10 MW pilot facility, the remaining national 6 GW potential require an additional 120 square kilometres of land for solar facilities. Additional land would be required for access, construction and infrastructure such as distribution grid or solar storage.
- If the entirety of Ukraine's 6 GW potential solar energy capacity were financed through such PPP models (costing between USD 5-6bn) following the same economic model above that incorporates the Special Demining Charge, they may generate up to USD 7-8bn for mine action over the lifetime of the solar farms.

Due to the high level of finance required to initiate projects at such a scale, they would benefit from alignment with other international assistance to renewable energy and mine action such as the Sustainability-Linked Bond detailed in Product 1.

While much of Ukraine's suspected contaminated land is agricultural, solar farms may be favoured on marginal land with limited agricultural potential. As mentioned earlier, land could also be dual purpose and agrivoltaics installed (where rows of solar panels sit above crops). Agrivoltaics have the added benefit of providing shade for crops which need it and reducing water usage.

The OB-PPP model could be replicated to align mine action with other land uses and particularly types of infrastructure, such as power distribution, water and sanitation, hospitals, education facilities, railways, roads and housing.

<sup>37</sup> <https://www.osw.waw.pl/en/publikacje/analyses/2024-04-17/russias-new-large-scale-attacks-ukraines-energy-infrastructure>

<sup>38</sup> Bilek, P, Stubbe, R, Wesner, H, June 2024, A Solar Marshall Plan for Ukraine, Empowering Ukraine's brighter future: bottlenecks and key policy reforms needed to boost solar PV deployment, Berlin Economics (commissioned by Greenpeace), <https://www.greenpeace.de/publikationen/20240607-greenpeace-report-BE-solar-marshallplan-ukraine-encv.pdf>



# 6. Risk Assessment

## 6.1 Sustainability Linked Bond (SLB) Risk Assessment

Risk category	Risk Description	Mitigation
Political	Lack of political support or change in political leadership negatively affect the project	<ul style="list-style-type: none"> <li>● Secure strong political support across government through coordinated planning and transparent communication between ministries and departments</li> <li>● Ensure cross-ministerial buy-in to project from the start through the nature of the cross-sectoral project</li> </ul>
Financial	Failure to meet the sustainability performance targets (SPTs) which triggers financial penalties or damages investor confidence to future SLB issuance	<ul style="list-style-type: none"> <li>● Set achievable and scientifically grounded SPTs based on detailed sector assessments that align with the Government of Ukraine's capabilities and sustainability strategy</li> <li>● Implement robust internal monitoring and reporting systems for tracking progress toward SPTs and ensure regular, transparent reporting to stakeholders</li> <li>● Identify an independent third-party to verify progress against SPTs and build credibility</li> </ul>
Financial	Commodity markets, inflation, export viability or other cost and income drivers fluctuate impacting the Government of Ukraine's ability to repay investors	<ul style="list-style-type: none"> <li>● Diversified range of SPTs and KPIs across project sustainability factors, including mine action</li> </ul>
Financial	Lack of investor interest in the bonds meaning bond value is not fully met	<ul style="list-style-type: none"> <li>● Bonds backed up by 100% guarantees from IFIs or governments</li> <li>● Clear financial modelling and derisking measures accurately and transparently communicated to investors</li> <li>● Develop strong marketing plan and prospectus for investors</li> </ul>
Financial	Government of Ukraine's creditworthiness may deteriorate if they fail to meet SPTs, leading to downgrades by credit rating agencies and affecting bond pricing	<ul style="list-style-type: none"> <li>● Engage with credit rating agencies to understand how SLBs and the associated risks will impact credit ratings</li> <li>● Maintain a diversified funding strategy e.g. through engaging donors to support or top-up to mitigate the impact of potential downgrades on the overall cost of capital</li> </ul>
Financial	Foreign exchange rate and interest fluctuations can affect the value of the bond and Government of Ukraine's ability to repay	<ul style="list-style-type: none"> <li>● Bonds are issued in a range of currencies or funds raised are swapped into USD or EUR to mitigate fluctuations and ensure consistency in fund management</li> </ul>
Legal	Changes in laws, national or international regulations negatively affect the project	<ul style="list-style-type: none"> <li>● Stay informed about evolving regulations and ensure full compliance with all relevant sovereign SLB disclosure and reporting requirements.</li> <li>● Conduct thorough legal reviews of all documentation and disclosures related to SLBs to minimize the risk of legal challenges.</li> <li>● Engage with regulators and international industry bodies to stay ahead of regulatory changes and advocate for clear, consistent standards. ▶</li> </ul>



Risk category	Risk Description	Mitigation
Force Majeure	Conflict, natural disasters or pandemics impact Government of Ukraine's ability to meet SPTs and recoup revenue	<ul style="list-style-type: none"> <li>● Set achievable and scientifically grounded SPTs</li> <li>● Bond proceed distribution structured correctly with flexibility to adjust to force majeure changes where possible</li> <li>● Insurance to cover potential damages including War risk insurance to insure against damage to assets under the project</li> <li>● Business continuity planning to ensure resilience against disruptions</li> </ul>
Operational	Lack of institutional capacity in relevant government and partner entities to develop, deliver, monitor and report on the SLB	<ul style="list-style-type: none"> <li>● Early engagement with IFIs and donors in product design to support through either funded or seconded capacity to develop and deliver bonds</li> <li>● Capacity building to support necessary infrastructure, technology and training for sovereign bond issuance</li> <li>● Build a working group of partners in sector analysis and design phase to lend capacity and expertise</li> </ul>
Social	Opposition from local society	<ul style="list-style-type: none"> <li>● Community consultation and clear communication planned into project development</li> <li>● Outcome based payments linked to environmental and social benefits communicated to local community</li> </ul>

## 6.2 Outcome-based Public Private Partnership Risk Assessment

Risk category	Risk Description	Mitigation
Political	Lack of political support or change in political leadership negatively affect the project	<ul style="list-style-type: none"> <li>● Secure strong political support across government through coordinated planning and transparent communication between ministries and departments</li> <li>● Ensure cross-ministerial buy-in to project from the start through the nature of the cross-sectoral project</li> </ul>
Financial	Cost overruns, and unanticipated increases in operating costs could lead to financial instability	<ul style="list-style-type: none"> <li>● Conduct comprehensive financial modelling and stress testing</li> <li>● Set aside contingency reserves to cover unforeseen costs</li> <li>● Define payment mechanisms, cost-sharing arrangements, and penalties for non-compliance clearly in contracts</li> <li>● Derisking such as insurance and guarantees</li> </ul>
Financial	Lack of access to credit or changes in government's ability to provide necessary concessions	<ul style="list-style-type: none"> <li>● Build in contingency options to cover credit or financing costs such as cost-sharing arrangements</li> <li>● Derisking such as guarantees from donor countries or IFIs</li> </ul>
Financial	Lack of private sector interest and investment	<ul style="list-style-type: none"> <li>● Marketing plan to educate companies on the opportunity, benefits and risks of engaging through an OB-PPP structure</li> </ul>
Financial	Demand for service or infrastructure is lower than expected leading to revenue shortfalls or change in energy feed-in tariff causes reduction in revenue	<ul style="list-style-type: none"> <li>● Detailed market analysis and financial modelling should include conservative estimates for demand</li> <li>● Consider minimum revenue guarantees or direct purchase of power</li> <li>● Include mechanisms to renegotiate terms including things like reduction in fees or special charges if revenue is insufficient to cover costs</li> </ul>



Risk category	Risk Description	Mitigation
Legal	Disputes over contract terms, legal challenges, or changes in legal frameworks could disrupt the project	<ul style="list-style-type: none"> <li>● Draft clear and detailed contracts that cover all potential legal issues.</li> <li>● Include provisions for arbitration or mediation to resolve disputes efficiently.</li> <li>● Ensure compliance with all relevant laws and regulations throughout the project lifecycle</li> </ul>
Legal	Changes in laws or regulations negatively affect the project	<ul style="list-style-type: none"> <li>● Include contractual safeguards to allow adjustments in contract terms if significant regulatory changes occur</li> </ul>
Force Majeure	Conflict, natural disasters or pandemics impact project	<ul style="list-style-type: none"> <li>● PPP structured correctly with flexibility on both sides, giving due consideration to complexities in the context and force majeure clauses</li> <li>● Insurance to cover potential damages including War risk insurance to insure against damage to assets under the project</li> <li>● Business continuity planning to ensure resilience against disruptions</li> </ul>
Operational	Selected private partner or demining organisation unable to deliver as expected leading to disruptions or quality issues	<ul style="list-style-type: none"> <li>● Performance-based contracts to incentivise proper operations, construction and maintenance</li> <li>● Outcome-based payments create additional incentives to deliver the project effectively</li> <li>● Ongoing monitoring of operations and construction to ensure compliance with standards</li> </ul>
Operational	Lack of institutional capacity in relevant government and partner entities to deliver project	<ul style="list-style-type: none"> <li>● Donor support to Government of Ukraine capacity to deliver PPPs, including Ministry of Economy and the PPP management office SPILNO within the Ministry of Infrastructure.</li> <li>● Engage IFIs to provide support and capacity building</li> </ul>
Operational	Damages or inadequate transmission infrastructure	<ul style="list-style-type: none"> <li>● Project design process clearly identifies transmission infrastructure in technical planning stage</li> <li>● Align with energy sector plans to diversify investments in storage and transmission infrastructure</li> </ul>
Operational	Poor quality demining or construction leads or lack of labour availability leads to project delays or cost overruns	<ul style="list-style-type: none"> <li>● Detailed robust project planning based on strong market analysis with clear timeframes, milestones and responsibilities</li> <li>● Outcome based payments incentivise project delivery to achieve results</li> <li>● Regular monitoring and quality assurance of activities by qualified experts or the responsible institution</li> </ul>
Environmental	Project harmful to environment	<ul style="list-style-type: none"> <li>● Environmental and Social Impact Assessments (ESIA) to identify and address potential risks.</li> <li>● Outcome based payments – linked to at least one environmental outcome</li> <li>● Other contractual standard sustainability measures</li> </ul>
Social	Opposition from local society	<ul style="list-style-type: none"> <li>● Community consultation and clear communication planned into project development</li> <li>● Outcome based payments linked to environmental and social benefits communicated to local community</li> </ul>

# 7. Readiness Assessment



## 7.1 Legal & Regulatory Framework: Outcome-Based PPP

The legal and regulatory framework for PPPs is critical to ensuring their effectiveness. The Government of Ukraine already has a comprehensive set of laws and regulations to ensure that PPPs are implemented in a manner that supports the country's economic development while aligning with international best practices. Ukraine's Agency on Support for Public-Private Partnerships (PPP Agency) provides a comprehensive list of laws, certifications, guidelines and international standards that support Ukraine's legal and regulatory framework, key components of which are summarised below.<sup>39</sup>

Key laws relevant to PPPs are:

- **Law on Public-Private Partnership (2010)**, last updated 9 March 2023:<sup>40</sup> This law is the cornerstone of Ukraine's PPP regulatory framework. It defines the principles, types, and procedures for PPP projects, outlining how these partnerships should be structured and managed. The law also details the conditions under which public entities can enter partnerships with private entities, ensuring that the public interest is safeguarded while promoting private sector involvement.
- **Law on Concessions (2019)**, last updated 31 March 2023:<sup>41</sup> This law updated the framework for concession agreements, bringing it in line with European Union standards. The Concession Law facilitates the streamlined implementation of PPP projects by simplifying procedures and removing barriers that previously hindered the development of such projects.
- **Law on Investment (1991)**, last updated 10 October 2022:<sup>42</sup> This law defined the general legal, economic and social conditions for investment activities in Ukraine to ensure rights, interests and property are protected in investment transactions, regardless of form of ownership. It aims to enable effective investment into the economy of Ukraine and develop international economic cooperation and integration through investment.

Key regulatory bodies that oversee PPPs are:

- **Ministry of Economy:** Oversees the development and implementation of economic policies, including those related to PPPs. The Ministry ensures that PPP projects are aligned with the broader economic goals of the country.
- **Ministry of Finance:** Under the EU Ukraine Facility Action Plan, the Ministry of Finance is responsible for implementing the roadmap to reform public investment management, which includes the design components of PPPs outlined in section X with the aim of preparing a single project pipeline in alignment with sectoral and/or regional strategies.<sup>43</sup>
- **National Investment Council:**<sup>44</sup> Coordinates major investment initiatives, including PPPs, and ensures that these projects receive the necessary governmental support.
- **Agency on Support to Public-Private Partnerships (PPP Agency):**<sup>45</sup> The PPP Agency was established in 2019 through and MoU between the Ministry of Economy and International Finance Corporation (IFC). The agency exists to support the development of PPP's in various economic sectors throughout the development of the process.

<sup>39</sup> <https://pppagey.gov.ua/knowledge-lab/>

<sup>40</sup> Law of Ukraine about Public-Private Partnership: <https://zakon.rada.gov.ua/laws/show/2404-17#n216>

<sup>41</sup> Law of Ukraine about the concession: <https://zakon.rada.gov.ua/laws/main/155-20#Text>

<sup>42</sup> Law of Ukraine about investment activity (Last modified 10/10/2022): <https://zakon.rada.gov.ua/laws/show/1560-12#Text>

<sup>43</sup> <https://www.ukrainefacility.me.gov.ua/en/>

<sup>44</sup> <https://denmark.mfa.gov.ua/en/ukraine-and-denmark/trade-and-economic-relations/why-invest-ukraine/national-investment-council-office>

<sup>45</sup> <https://pppagey.gov.ua/about/>



## 7.2 Application of the legal framework to OB-PPPs

The PPP Law applies to a wide range of sectors, including energy, transportation, and infrastructure. Notable areas include the production and supply of electricity, waste treatment, and the construction of roads, railways and ports. However, certain activities such as energy storage, are not explicitly covered under the current legislation, highlighting areas where legal amendments may be necessary to integrate emerging technologies such as battery storage.

According to the law, PPPs in Ukraine can take several forms as outlined in the model introduction on PPP structures. Importantly in the case of an outcome-based PPP the law allows mixed or blended structures, allowing for the required flexibility in how projects are structured. Notably, the law explicitly excludes production sharing agreements, which are governed by separate legislation. While production sharing is not proposed in this model it may be worth considering in a different structural arrangement or for different infrastructure purposes.

The legal framework provides various forms of state support for PPPs, including guarantees, budget financing and the development of ancillary infrastructure. The government can also provide land and other resources necessary for the successful implementation of PPP projects, suiting the concession and budgetary needs of this proposed project. The law also allows for additional payments that could be paid to the private party upon achievement of certain milestones, enabling the outcome-based payment structure. In order to recoup a proportion of revenue to pay for demining activities there are various ways to do this that are permitted by the legal framework, such as revenue-sharing arrangements.

A more in-depth analysis of the legal framework would need to be conducted during the sector assessment and design process to agree on the right structure for the OB PPP. This would include things like dispute resolution and arbitration mechanisms, public disclosure and anti-corruption laws. Design of implementation would need to align with sector specific regulations for mine action and solar energy production,<sup>46</sup> environmental and social impact assessments and procurement. The Agency on Support for PPPs website has a repository of tools, guidelines and international standards to draw upon in the design process.

Recent amendments to budget legislation have introduced mechanisms that allow state partners to make long-term commitments under PPP contracts.<sup>47</sup> Additionally, a law passed in August 2020 introduced an auction system for renewable energy projects, aimed at improving subsidy allocation and stimulating investment in this sector. While Ukraine remains committed to the transition to this market-based approach, the war has delayed the transition and necessitated adjustments to timelines. It is unclear when this transition to auction system will be complete, but this potential change should be taken into account in further detailed financial modelling of the any new PPP involving renewable energy.<sup>48</sup>

## 7.3 Legal & regulatory framework – Sustainability Linked Bond

The issuance of bonds, including sustainable and sustainability-linked bonds, is regulated under comprehensive legal frameworks that operate in Ukraine and internationally. These frameworks aim to ensure transparency, investor protection, and alignment with sustainability goals. While Ukraine is aligning its regulations with EU standards, the EU has established a detailed and evolving regulatory landscape for sustainable finance that is integrated with broader financial market regulations. An initial analysis shows that the current and evolving regulatory framework would enable the sovereign issuance of a sustainability linked bond in Ukraine in line with international good practice, however more detailed analysis would be required through a product design phase which should include alignment with relevant EU legislation.

<sup>46</sup> Law of Ukraine on Electricity Market (Last modified 15/06/2021) <https://zakon.rada.gov.ua/laws/show/2019-19?lang=en#Text>

<sup>47</sup>

<sup>48</sup> <https://pppagency.gov.ua/the-bill-on-long-term-liabilities-in-the-ppp-field-was-adopted-in-the-second-reading/>



In Ukraine, key legislation that exists to regulate the bond markets includes:

- **Law of Ukraine “On Securities and the Stock Market” (2006):**<sup>49</sup> This law regulates the issuance, circulation, and redemption of securities, including bonds. It establishes the framework for the securities market, including the powers of the National Securities and Stock Market Commission (NSSMC) in regulating bonds.
- **National Securities and Stock Market Commission (NSSMC) Regulations:**<sup>50</sup> The NSSMC issues specific regulations and guidelines regarding the issuance and trading of bonds in Ukraine, including those related to corporate governance, reporting, and disclosure requirements.

On Sustainable and Sustainability-Linked Bonds specifically:

- **Law of Ukraine “On Capital Markets and Organized Commodity Markets” (2020),** last updated 27 March 2024:<sup>51</sup> This law updates Ukrainian capital markets and to align them with EU regulation, laying the groundwork for modern financial instruments, including green bonds and other sustainable finance instruments.
- **NSSMC Green Bond Guidelines:**<sup>52</sup> In 2021, the NSSMC issued specific guidelines for the issuance of green bonds in Ukraine, aligning with international best practices, such as the International Capital Market Association (ICMA) Green Bond Principles.
- Order of the Cabinet of Ministers of Ukraine on **“Introducing and Developing the Green Bond Market in Ukraine”** (approved 2022) and the draft law on Green Bonds (still under consideration):<sup>53</sup> This concept and draft law aims to create a legal framework specifically for green bonds, detailing requirements for issuers, reporting obligations, and the use of proceeds.

European Union regulations:

- **Sustainable Finance Disclosure Regulation (SFDR) – Regulation (EU) 2019/2088:**<sup>54</sup> Requires financial market participants and advisers to disclose sustainability risks and impacts related to their investment products, including bonds.
- **Taxonomy Regulation (EU) 2020/852:**<sup>55</sup> Establishes a classification system for sustainable economic activities, which serves as a reference for green bond issuances and ensures that they contribute to the EU’s environmental objectives.

Additional Frameworks:

- **International Capital Market Association (ICMA) Sustainability Bond Guidelines (SBG)** (updated in 2021):<sup>56</sup> ICMA’s SBG is a voluntary best practice guideline which aims to enhance market transparency and alignment with ICMA’s Green Bond and Social Bond Principles.
- **EU Green Bond Standard (EUGBS):**<sup>57</sup> A voluntary standard for green bonds issued in the EU, still under discussion, intended to define the criteria for projects that can be financed with green bonds and ensure alignment with the EU’s sustainability goals.
- **EU regulation on Climate Transition Benchmarks, EU Paris-aligned Benchmarks and sustainability-related disclosures for benchmarks (EU) 2019/2089:**<sup>58</sup> Establishes minimum standards for climate-related benchmarks and disclosures, which are relevant for the pricing and transparency of sustainable bonds.

<sup>49</sup> <https://www.nssmc.gov.ua/en/for-market-participants/other-participants/securities-issue/>

<sup>50</sup> <https://www.nssmc.gov.ua/en/about-us/about-us/>

<sup>51</sup> <https://resourcehub.bakermckenzie.com/en/resources/global-public-ma-guide/europe-middle-east-and-africa/ukraine/topics/general-legal-framework>

<sup>52</sup> <https://www.nssmc.gov.ua/en/komisiiia-skhvalyla-rekomendatsii-shchodo-rozvytku-zelenykh-oblihtsii-v-ukraini/>

<sup>53</sup> <https://zakon.rada.gov.ua/laws/show/175-2022-%D1%80#Text>

<sup>54</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R2088>

<sup>55</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0852&qid=1723707128712>

<sup>56</sup> <https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Sustainability-Bond-Guidelines-June-2021-140621.pdf>

<sup>57</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32023R2631>

<sup>58</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019R2089>



Key regulatory bodies on bonds in Ukraine:

- **Ministry of Finance:** The ministry is responsible for issuing government bonds, which would include sovereign issued sustainability-linked bonds. It would oversee the bond's structure and ensure alignment with national economic policies.
- **National Securities and Stock Market Commission (NSSMC):** as mentioned above, the NSSMC is the primary regulatory body overseeing the securities market in Ukraine, including bonds. It sets regulatory standards, approves bond issuances, monitors compliance and enforces law related to securities including governance, disclosure and investor protection.
- **National Bank of Ukraine (NBU):** While primarily responsible for banking regulation, the bank also plays a role in the regulation of government issued bonds and the overall stability of the financial system.

Other regulatory bodies:

- **European Central Bank (ECB):** As part of Ukraine's EU Association Agreement the ECB may also have a role to play. For EU member states the ECB plays a role in regulating government bonds and supports the regulation of financial markets in the EU.
- **European Securities and Markets Authority (ESMA):** ESMA is the EU's independent authority responsible for safeguarding the stability of the EU's financial system, ensuring investors are protected. It oversees the activities of national competent authorities in each member state concerning bonds.

The influence of Ukraine's EU Association Agreement must also be taken into account in any product design process. As Ukraine makes strides to harmonize with EU standards, this may result in changes to current Ukrainian legislation that is not already aligned with EU standards, or if any changes in EU legislation occurs. Other areas of EU law that may require attention include public procurement, competition law, environmental protection, digitalization and public access to information. While planned amendments in Ukraine's legislation may create speed bumps in the development of new financial products, by aligning with EU legislation in the design process would help to mitigate this.

As Ukraine aligns with EU standards it may also bring benefits such as eligibility of new forms of support or EU funding. The Ukraine Facility (detailed in Figure 18 below) is a clear example of this, which aims to develop Ukraine's capital markets and ability to attract public private investment to support reconstruction.

## 7.4 In-country capacity

As noted in section 82 of this readiness assessment, Ukraine already has several institutions with the remit to advise, oversee and implement both PPPs and SLBs. In terms of PPPs in addition to the Ministry of Economy and the PPP Agency highlighted above, support and guidance in the development of PPPs is also available from the PPP Management office SPILNO.<sup>59</sup> SPILNO was established by the Ministry of Infrastructure to support the development of a PPP mechanism in Ukraine, including influencing legislation and preparation of pilot projects in infrastructure.

International financial institutions like EBRD, EIB and IFC have previously aided the Ukrainian government in the development of both bonds and PPPs. The development of both the OB PPP and the SLB would require cross-ministerial working between all relevant groups highlighted already. Working groups to develop and design both models would also need to draw upon third party technical, legal and operational expertise such as agri-businesses, solar energy companies, mine action expertise and financial market and structuring advice.

An important consideration in the design process of any model would be the method for procurement or distribution of funds. Mechanisms should be encouraged and open market-based system than is inclusive and accessible to the full range of national and international expertise to enable a fully competitive and energetic market. This would also ensure greater cohesion in the distribution of mine action funding

<sup>59</sup> <https://mtu.gov.ua/en/timeline/Spilno.html>





and allow for smoother transitions between grant and aid funding to these new financial mechanisms, preventing the operational inefficiencies brought about by funding spikes and falls.

The Government of Ukraine already has an electronic procurement system designed to ensure transparent, efficient and fair procurement for publicly funded services called the ProZorro system. At present only commercial (domestic and international) companies, legal entities and Ukrainian public sector entities are eligible to register for the ProZorro platform.<sup>60</sup> The platform has been recommended by the World Bank for all procurement for reconstruction needs and was adapted in 2023 to fully meet World Bank and international donor rules.<sup>61</sup>

Stakeholder engagement revealed one restriction of the system for international NGOs and companies is that they must have been registered as more than a 'representative office' in Ukraine. Such a process could bring additional costs and bureaucracy but is feasible and has been done by some international NGOs in the mine action sector already. If international operators were unable or unwilling to secure the necessary registration status to be eligible for funds through ProZorro it would limit access to new forms of finance that may use the ProZorro platform to approximately 50% of the capacity of Ukraine's mine action sector (based on mid-2024 figures) and could create inefficiencies in the way Ukraine's mine action sector is able to make use of its full resources.

The posting of certain tenders only in Ukrainian has also been recognised as a challenge to participation of foreign companies.<sup>62</sup> Any online procurement platform is only as good as the instructions and tender design that are fed into it, so while the procurement system may be appropriate, the governance and design of effective tenders is crucial to make the use of funds not just competitive but also efficient, cost effective, accountable and transparent.

Ukraine contains the right building blocks to plan, design and implement both OB PPPs and SLBs for mine action and integrated sectors like agriculture and renewable energy. As both models highlighted, the steps to take them forward require first in depth sector analyses of all sectors involved which can inform the detailed financial modelling and investment cases. To do this, Ukraine will need to draw upon a wide range of available resource, technical, legal and financial expertise in this process and ensure cross-government buy in between the different ministries that will all have roles to play.

## 7.5 Access to capital and investor interest

The development of both products will depend on a combination of up front capital to fund the sector analysis and design phases, and both public capital and investment to support the projects to reach their potential. Stakeholder feedback on the SLB showed that, due to Ukraine's status of 'Selective Default' the bonds would need to be 100% guaranteed, likely by an IFI such as EIB to be sold on the international capital markets. It is difficult to say at this stage exactly what investor interest would be linked in both the SLB and private sector engagement in the OB PPP as products have not yet been socialised with the private sector, however a variety of platforms exist and are in development to support public and private investment particularly in the agri-food sector, environmental sustainability, and infrastructure reconstruction including new renewable energy production.

Funding for sector analysis, design and product development would amount USD 2.4–2.6m for both models. As elements of sector analysis could be shared across both models, this could begin as a joint process that then splits into the detailed development of the different products if they are assessed to be viable. A combined sector analysis may also reduce the cost of this process, as could engagement of legal, financial or technical expertise on a *pro-bono* basis.

Additional support for capital expenditure or the blended project concessions mentioned in both models could be come through international loans and grants aimed to advance these sectors: mine action,

<sup>60</sup> <https://prozorro.gov.ua/en/about>

<sup>61</sup> <https://www.kmu.gov.ua/en/news/prozorro-rozrobylo-protseduru-zakupivel-za-pravylamy-mizhnarodnykh-donoriv>

<sup>62</sup> [https://www.tradecommissioner.gc.ca/ukraine/procurement-marches-publics.aspx?lang=eng#a6\\_1](https://www.tradecommissioner.gc.ca/ukraine/procurement-marches-publics.aspx?lang=eng#a6_1)



agri-food and renewable energy in Ukraine and to support market-based approaches that are designed to attract private investment into the country. The financial support through the EU's Ukraine Facility presents a significant opportunity as both models align with the Facility's objectives and would support Ukraine to realise its targets in line with the Ukraine Facility implementation plan.<sup>63,64</sup>

The Ukraine Facility's investment framework could provide the requisite support to both initiate and engage investors in both proposed models. Other investment catalysts could include engagement with Ukraine Invest and making use of their connections with various international chambers of commerce. Mine action donors could also support in marketing the products to investors in their countries once designed and investment portfolios are drawn up. Once some key anchor investors are secured then marketing the products to other private investors could include a range of activities including investment road shows and socialisation of the products at relevant sectoral events where investors may be present.

As both models highlighted, investors are likely to need incentives to enter the market in these new products in a country with ongoing conflict. Incentives such as public and private guarantees and war risk insurance will be necessary to build into both models.

The Ukraine Facility is a package of support provided by the EU to support Ukraine's recovery, reconstruction and modernisation. Between 2024 and 2027 the Ukraine Facility aims to provide up to EUR 50bn in financial assistance to Ukraine. The key benefits of the facility are to:

- Support Ukraine's recovery, reconstruction and modernisation.
- Support Ukraine's financing needs to allow the government to deliver uninterrupted public services.
- Mobilise investments in Ukraine's private sector for fast economic recovery and reconstruction.
- Support Ukraine to make the reforms needed on its path to EU accession.
- Support the broader Ukrainian society by helping to address the social consequences of the war.

The facility used three pillars to direct the assistance to Ukraine. These are:

### **1. Direct financial support to Ukraine (EUR 38.27bn)**

To deliver on the Ukraine Plan that sets out its vision for the recovery, reconstruction and modernisation of the country, as well as the reforms it intends to take as part of the EU accession process.

If the conditions set out in this plan are deemed to be fulfilled on a quarterly basis, the EU will provide financial support of over EUR 38bn to Ukraine during the period 2024 to 2027 through a combination of loans (up to EUR 33bn) and grants (EUR 5.27bn).

### **2. Special investment framework (EUR 6.97bn)**

The Facility will establish a specific framework to scale up investment for Ukraine's recovery and reconstruction.

To achieve this, the framework will enable investors to take advantage of EU budget guarantees and a blend of grants and loans from public and private institutions which will make investing in Ukraine more attractive.

The Ukraine Investment Framework is equipped with EUR 9.3bn in guarantees (EUR 7.8bn) and blended finance (EUR 1.51bn). It is expected to mobilise up to EUR 40bn in public and private investments in Ukraine over the coming years. Expertise and structures in EBRD, EIB and other international institutions will support the investment instrument.

### **3. Technical and administrative assistance for accession (EUR 4.76bn)**

Assistance measures to help Ukraine align with EU laws and carry out the reforms necessary on its EU accession path. Technical assistance will be provided to authorities at national, regional, and local level, as well as to civil society organisations.

**Figure 18:** Ukraine Facility

## **7.6 Derisking**

A survey conducted by Ukraine Invest showed that 89% of investors surveyed said they would be more favourable to investing in Ukraine if they were given guarantees and investment insurance. Both derisking mechanisms have started to develop in response to Ukraine's reconstruction and investment needs but the market is still nascent, and costs can be high.

<sup>63</sup> [https://neighbourhood-enlargement.ec.europa.eu/document/download/d122882f-599b-4158-8a6b-583f5cfd77\\_en?filename=Ukraine-facility-march2024.pdf](https://neighbourhood-enlargement.ec.europa.eu/document/download/d122882f-599b-4158-8a6b-583f5cfd77_en?filename=Ukraine-facility-march2024.pdf)

<sup>64</sup> <https://www.ukrainefacility.me.gov.ua/en/>



## War Risk insurance

War risk insurance in Ukraine has so far proven expensive due to the ongoing conflict. Research found that premiums typically range from 1%-4% of the investment value, depending on the specific risks involved and the insurer though stakeholder feedback identified that higher premiums may also be present in the market, though specific percentages were not given<sup>65</sup>. The high costs are driven by the volatility and uncertainty of the war, which makes these premiums unstable and often out of reach for many private investors without support.

War risk insurance providers in Ukraine include:

- **Multilateral Investment Guarantee Agency (MIGA):** MIGA, part of the World Bank Group, is one of the largest providers of political risk insurance, which includes coverage for war-related risks. MIGA offers insurance to protect investors against risks such as conflict and political instability. In 2022 they initiated a pilot project of USD 30m to provide war risk insurance in specifically for Ukraine, with plans to expand coverage as part of broader reconstruction efforts. MIGA acknowledges the need to blend financial support with donors to provide sufficient support to Ukraine's potential investors.
- **Private insurance companies:** Many insurance companies have yet to provide war risk insurance as premiums can be prohibitively high due to the extreme risks associated with operating in a conflict zone like Ukraine. Lloyd's of London and Marsh have begun to provide war risk insurance for example to ships transporting grain and raw materials out of Ukraine<sup>66</sup>. These insurers often work with blended funding with international organizations or governments to offer more affordable rates.

To address the challenges encountered, the Ukraine's Financial Stability Council, supported by the World Bank, is working with several governments to establish a Donor Trust Fund, to provide USD 17 billion in financial support to reconstruction through subsidised war risk insurance<sup>67</sup>. This state-backed insurance mechanism would lower costs and encourage private investment in the country's reconstruction. This initiative is expected to become operational by the end of 2024.

## Guarantees

Guarantees have been mentioned several times in the report already and the Ukraine Investment Facility's EUR 7.8bn guarantee facility present a significant option for the development of both products if they meet the Ukraine Investment Facility's criteria.

Other providers of public guarantees to Ukraine's recovery include:

- World Bank Group (including MIGA)
- European Investment Bank (EIB)
- European Bank for Reconstruction and Development (EBRD)
- Government DFIs, for example. UK Export Finance, Netherlands Development Finance Company (FMO) and USAID

The percentage of investment guaranteed can vary by programme depending on the specific conditions and level of risk but can cover up to between 50-100% of the investment. Stakeholder engagement with EBRD for example showed that their current guarantees in Ukraine cover a maximum of 75% though this may increase depending on supplier appetite from European state donors, while EIB may be able to guarantee up to 100% of publicly financed products such as the proposed SLB backed up by the Ukraine Facility.

So far there have been few examples of private sector guarantees, including from banks or private businesses. In some cases private sector supports by spread the risk with public funders for example offering partial guarantees for loans and investments in sectors like infrastructure and energy.

<sup>65</sup> <https://www.politico.eu/article/ukraine-war-insurance-attract-private-investors-volodymyr-zelenskyy/>

<sup>66</sup> <https://www.reuters.com/markets/europe/ukraine-expands-ship-war-insurance-with-marsh-lloyds-iron-ore-steel-2024-03-01/>

<sup>67</sup> <https://kennedyslaw.com/en/thought-leadership/article/2024/the-insurance-market-continues-to-struggle-with-ukraine-risk-coverage/>



# 8. Comparative Analysis

	Sustainability Linked Bond	Outcome-Based PPP
<b>Project Recap</b>	The SLB model proposes a bond issued by the government of Ukraine to cover mine action and sustainability enhancing activity such as a shift to more sustainable agriculture. 50% of the proceeds of the bond to mine action and 50% to the sustainability activities, which could recoup more funding for demining through a special demining charge.	An outcome-based PPP is proposed that links mine action with private sector development activities that are also a priority for Ukraine's recovery and reconstruction. Construction of a solar farm is proposed. The private sector invests in the clearance of the area for the solar farm and construction of the solar plant while receiving concessions from the Government of Ukraine and outcome-based payments as incentives from donors. A share of revenue generated by the private company solar energy sales is recouped by the Government of Ukraine through a special demining charge to fund additional mine action.
<b>Scalability</b>	<ul style="list-style-type: none"> <li>The proposed project starts at a large scale given the complexity of bond issuance.</li> <li>The project is modelled on a scale of USD 250m bond, but could operate at a much larger scale. 50% of bond proceeds go to the mine action and 50% to sustainability activities.</li> </ul>	<ul style="list-style-type: none"> <li>The proposed model costs a pilot project size that could be scaled up or replicated.</li> <li>A 10 MW solar farm at USD 10m cost could bring in USD 13m into mine action.</li> <li>This could be scaled up to 10, 20, 30 times, up to a max 6 GW to meet the total solar capacity gap in Ukraine, costing USD 5-6bn and bringing an additional USD 7-8bn into mine action.</li> </ul>
<b>Sustainability (Funding &amp; Impact)</b>	<ul style="list-style-type: none"> <li>Combining the release of land for productivity and enhancing the sustainability of agricultural land has a significant impact on sustainability for an area of approximately 125k ha for a USD 250m bond. In addition to directly funding transformation of agricultural practices, it but could provide positive examples for similar shifts to happen elsewhere if the expected improvements in yields and income are realised (estimated USD 1.32m/year per 12.5k ha site).</li> <li>While the initial funding stream is a relatively short, a special charge on agricultural revenue from increased agricultural income post-transition could create a new, more sustainable funding stream for demining.</li> </ul>	<ul style="list-style-type: none"> <li>Enhancing Ukraine's energy infrastructure and supply would have positive sustainability effects in environmental and economic terms. At scale it could also support greater energy security for Ukraine and European.</li> <li>The special demining charge from solar power revenue would create a new source of funding linked to the energy market (in constant demand). The stability of this source of funding would depend on the income of the solar power company and costs, so any dramatic changes in tariff, demand, ability to supply or significant change in operating costs could affect the follow-on funding to demining.</li> <li>The model could be applied to other forms of infrastructure including other sources of renewables.</li> <li>To enhance the sustainability of the project further investment in grid connections and energy storage would be beneficial.</li> </ul>
<b>National Ownership</b>	<ul style="list-style-type: none"> <li>National ownership is key for this model as it would be a government issued bond.</li> <li>The Government of Ukraine would need to identify how to manage and disburse the funds for demining and sustainability activities.</li> </ul>	<ul style="list-style-type: none"> <li>PPP's rely on clear national ownership as the Government of Ukraine would issue the request to the private sector and would have to offer concessions to facilitate the project.</li> <li>The Government of Ukraine would also need to plan for how to manage and disburse the additional funding for demining received from the revenue share charge.</li> </ul>



	Sustainability Linked Bond	Outcome-Based PPP
<b>Readiness</b>	<ul style="list-style-type: none"> <li>● The legal and regulatory frameworks already exist for both models, but both are relatively new and have had limited implementation and testing.</li> <li>● The major readiness concern for both models is in capacity to develop and implement the models. The Government of Ukraine would need to draw together multi-disciplinary teams and cross-ministerial working groups to get either model working effectively.</li> <li>● Significant international support in terms of funding and expertise could be drawn upon.</li> </ul>	
<b>Risks</b>	<ul style="list-style-type: none"> <li>● Effective diagnostics and structuring of the bond are key to mitigate the financial risks of the bond, such as missing KPIs.</li> <li>● The impact on the Government of Ukraine’s credit status needs to be considered in this bond give it amounts to taking on any additional debt with terms attached.</li> <li>● The implementation of the bond across more than one part of Ukraine allows the risk of loss of damage to project land / equipment to be mitigated at the macro level and minimising the impact on the Government of Ukraine’s ability to meet the KPIs.</li> </ul>	<ul style="list-style-type: none"> <li>● The main risk in starting an outcome-based PPP is in a lack of private sector interest and investment.</li> <li>● In the operationalisation of the project the risks are more small scale than the SLB as they can be managed through contracts like any other infrastructure PPP.</li> <li>● Some risks are outside the Government of Ukraine or private sector’s ability to control such as the risk of loss or damage to the newly built infrastructure due to the conflict. For such a risk war risk insurance would be required to satisfy investors.</li> </ul>
<b>Design and Development Costs</b>	Sector diagnostic and SLB bond structuring (1-2 years) estimated costs: USD 1.2m. Additional agricultural or other advice may be required for the sector diagnostic phase	Sector diagnostic and PPP design phase (12 months) estimated costs: USD 1.2-1.6m



# 9. Recommendations

Both of the models that were brought forward for detailed analysis and feasibility assessment have significant potential to bring new sources of funding to demining in Ukraine. They would also support the Government of Ukraine's wider sustainability, energy security and agricultural strategies.

The models could complement each other, and, in principle, are interoperable. For example, a Sustainability-Linked Bond (SLB) could be applied for renewable energy, while an Outcome-Based PPP (OB-PPP) could be considered for transition to sustainable agriculture.

In addition, both a SLB and an OB-PPP have the potential to generate revenue for private sector and investors. Further and more detailed modelling would be required, but the indicative models proposed also show that both options could increase government revenue including through application of a 'Special Demining Charge', corporation tax, VAT and increased income tax. The social and economic impacts of both models could also have a significant impact on broader socio-economic development, recovery and reconstruction in Ukraine.

The readiness assessment in Section 7 shows that, in principle, there are viable legislative and policy frameworks for both products. Further work is necessary to explore precisely how legislative, policy and statutory frameworks would be applied in principle. In a similar vein, wider consultation with end users for both products, which lay beyond the scope of this study, would need to form a key part of further sector diagnostic and product design.

The following eight recommendations are provided, incorporating feedback from the validation workshops and final stakeholder feedback:

- a. Recommendation 1:** A Sustainability-Linked Bond (SLB) combining support to demining and transition to sustainable agriculture, and an Outcome-Based Public Private Partnership (OB-PPP) combining demining with solar energy infrastructure development, should be explored further, and in parallel.
- b. Recommendation 2:** The development of both models depends on leadership and commitment in principle to their pursuit. Ukraine's Ministries of Economy and Finance should consider its appetite for exploring initiatives based on increased debt and/or concessions.
- c. Recommendation 3:** Specific focus should be given to identifying options for derisking mechanisms. The Government of Ukraine and European Commission should also assess the application of EU's Ukraine Facility 'Pillar 2' to provide guarantees to mine action sector financial mechanisms of up to 100%. Donors and the Ministry of Economy should also explore options to enable donor funding to compensate concessions on PPP.
- d. Recommendation 4:** The next step should involve a detailed sector diagnostic and design using multi-disciplinary project teams, or a combined team to explore both. This would include further analysis of all sectors involved (solar, agriculture and demining), analysis of capital markets, engagement with potential investors, including banks and International Finance Institutions (IFIs), as well as the agricultural and renewable energy sectors. The output of the sector diagnostic would enable product design. This recommendation could be funded by donors, or a combination of donors and, where possible, *pro bono* and existing capacity.
- e. Recommendation 5:** The Ministry of Economy should work with national and international mine action operators, donors and the international mine action community to model and predict any likely funding drops and patterns after 2026. This would enhance donor coordination, the effectiveness of operational planning, and inform when streams of funding from innovative finance would be best introduced.



- f. Recommendation 6:** Ukraine's Ministry of Economy, IFIs, international donors and supporters should assess how they can use the full range of international financial assistance including aid in a blended way to incentivise or subsidise market based approaches such as SLB and OB-PPP.
- g. Recommendation 7:** The Government of Ukraine should continue to consider the best governance model to oversee the effective distribution of funds from any new mechanism to mine action, including any funds to Ukraine from a global frontloading mechanism received by Ukraine.
- h. Recommendation 8:** The Government of Ukraine, UNDP, donors, partners and the report's authors should raise awareness of the report's findings and recommendations. Key stakeholders would include government departments and bodies within Ukraine, government departments beyond mine action stakeholders in donor and partner countries, IFIs and the private sector.



# Annex A: Long List Option Details

Solution Name	Solution Category	Description of Mechanism	Status	Score
1 Mine Action Lending	Blended Finance	Lending facility by a development or commercial bank or microfinance institution that actively prioritises or encourages mine action related loans. The facility or fund may have specific requirements for loan approval or allocation in the form of environmental criteria and assessments.	In Progress	25
2 Waterfall Structure	Blended Finance	A method used in private equity and other forms of investment where cash distributions are allocated among different tiers of stakeholders according to a predetermined sequence. It typically involves stages like return of capital, preferred return, catch-up and carried interest, ordered to ensure that initial investor risk is minimised before rewards are escalated to managers.	Tested Elsewhere	16
3 Mine Action Impact Bonds	Blended Finance	A public-private partnership or performance-based financial tool based on social or environmental impact that allows private investors to provide upfront capital for traditionally public projects. If the project succeeds, the investors are repaid by a government an aid agency, or other philanthropic funder with capital plus interest. If the project fails, the interest and part of the capital is lost. While commonly referred to as a 'bond', the solution replicates in essence a payment-for-results scheme.	Tested Elsewhere	18
4 Outcomes-Based Public Private Partnerships	Blended Finance	A mechanism where the government commits to transferring ownership of part or all of a plot of land to a private investor following mine clearance financed by that investor. Where land is highly valuable and contamination relatively easy to clear, the investor might be expected to receive only a portion of the land from government in return for clearance, paying market price for the remainder. Where land is less valuable and more expensive to clear, the government may need to forgo any payment from the investor for the land, and pay a portion of the cost of mine clearance as well.	Tested Elsewhere	29
5 Letter of Credit	Private Finance Derisking	A financial instrument issued by a bank that guarantees the buyer's payment to the seller, ensuring the seller receives payment as long as the terms of the letter are met. It is often used in international trade to provide security against the risk of non-payment.	Tested Elsewhere	N/A
6 Sustainability Linked Bonds	Private Finance	Sustainability-linked bonds (SLBs) are fixed-income securities where the financial or structural characteristics, such as the interest rate, are directly tied to the issuer's performance against predefined sustainability targets related to environmental, social, and governance (ESG) objectives. These targets are quantified through Key Performance Indicators (KPIs) and assessed against Sustainability Performance Targets (SPTs).	Tested Elsewhere	29
7 Carbon Markets	Private Finance	Revenues from carbon markets aiming to reduce greenhouse gas emissions that can be used to generate return of mine action intervention. These can include trading of emission units (instruments representing emission reductions) as well as include emission allocation credits and emission reduction credits.	Tested Elsewhere	11
8 Licence Plates	Private Finance	Special license plates featuring mine action related images, based on a US model for conservation finance. Plates are sold at a higher price to car owners creating a funding stream for mine action activity.	Tested Elsewhere	11
9 Mine Action Banks	Private Finance	State or donor-sponsored financial entity that works in partnership with the private sector, typically with government backing, to increase investments into mine action businesses and markets that are underserved by commercial finance.	Tested Elsewhere	7





Solution Name	Solution Category	Description of Mechanism	Status	Score
10 Sustainable Bonds	Private Finance	Sustainable bonds ('use of proceeds' bonds) can mobilise resources from domestic and international capital markets for a range of sustainable projects. They are the same as conventional bonds but with the unique characteristic being the specified use of proceeds which are invested in projects that generate environmental and/or benefits.	Tested Elsewhere	29
11 Community Finance	Private Finance	Community finance, often considered part of microfinance, is a mechanism where financial providers have a stated mission to deliver financial solutions for people in a defined community. Lending practices include community revolving funds and credit unions in which the community itself is often the main shareholder of those institutions and can be the sole source of capital such as in village savings and loans.	Tested Elsewhere	19
12 Green Microfinance	Private Finance	Microfinance programmes that integrate mine action related principles, criteria and/or assessments into lending policies.	Tested Elsewhere	16
13 Lotteries	Private Finance	A form of gambling that involves the drawing of lots for a prize, and include instant games, lotto, and electronic terminals that could generate funds for mine action.	Tested Elsewhere	17
14 Venture Capital	Private Finance	A type of equity financing that responds to the need of companies that due to size, assets or stage of development cannot seek capital from more traditional sources, such as public markets and banks. With a higher risk appetite and longer-term outlook, venture capitalists play a more active role in the companies they invest primarily in small, early-stage and high-growth companies.	Tested Elsewhere	16
15 Business Incubator	Private Finance	Business incubators are institutions that provide technical or financial services to strengthen startups and early stage enterprises. Incubators could support companies with an explicit commitment to mine action by hosting them in their premises and facilitating matching capital from angel investors, state governments, economic-development coalitions and others.	Tested Elsewhere	14
16 Enterprise Funds	Private Finance	Highly flexible for-profit investment funds providing investment vehicles and return through debt or equity to companies. Funds are structured to cover the typically unmet capital needs (debt, equity or quasi-equity).	Tested Elsewhere	14
17 Mine Action Collectibles	Private Finance	A unique digital representations of a mines and mine action equipment connected to a demining project, written to a zero-carbon blockchain where they cannot be copied or multiplied, making them a unique and rare collectible item.	Tested Elsewhere	5
18 Debt-for-Peace Swaps	Private Finance	Debt restructuring agreements that can write off a proportion of their foreign held debt, releasing funds for domestic programmes. They often involve the establishment of a Trust Fund to channel the funds. Debt-for-Peace typically target both official lending though can also be applied to commercial lending.	Tested Elsewhere	16
19 Peace Bond	Private Finance	A debt instrument issued by a country/countries with a high credit rating to promote increased societal resilience to future violence, conflict and shock. They are similar to 'Green Bonds' used in environmental projects.	Untested	13
20 Tokenisation	Private Finance	A mechanism involving government acquisition of land from smallholder farmers using secured tokens based on the land's value, there is a unique opportunity to reintegrate these lands into productive agricultural. This process includes leasing the land back to the smallholder farmers, thereby ensuring their continued engagement and livelihood.	Tested Elsewhere	5



Solution Name	Solution Category	Description of Mechanism	Status	Score
21 War Risk Insurance	Private Finance Derisking	A specialised type of insurance that covers losses or damages resulting from war-related events, including acts of war such as invasions, insurrections, military coups, terrorism and other hostilities. This form of insurance is critical for businesses and individuals operating in areas prone to political instability or conflict.	Tested Elsewhere	N/A
22 Enterprise Challenge & Innovation Funds	Private Finance Derisking	Funding instrument that distributes grant or concessional finance to profit-seeking projects on a competitive basis. It subsidises private investment where there is an expectation of commercial viability accompanied by measurable environment or social outcomes. Challenge funds can mitigate market risks while spurring innovation.	Tested Elsewhere	N/A
23 Financial Guarantees	Private Finance Derisking	Funds to mobilise and leverage commercial financing by mitigating and/or protecting political, regulatory, foreign exchange and other risk, notably commercial default or political risks. The guarantee functions as a promise by the guarantor to the lender that, in the event that the borrower defaults on payment, the guarantor will repay the lender a specified proportion of the foregone principal. This allows traditional lenders to take risks and learn new markets outside current risk profiles.	Tested Elsewhere	N/A
24 Private Guarantees	Private Finance Derisking	Market-based guarantees that mobilise and leverage commercial financing by mitigating and/or protecting risks (such as political, regulatory, and foreign-exchange risk), notably commercial default or political risks. The guarantee functions as a promise by the guarantor to the lender that, in the event that the borrower defaults on payment, the guarantor will repay the lender a specified proportion of the foregone principal. This allows traditional lenders to take risks and learn new markets outside current risk profiles.	Tested Elsewhere	N/A
25 First Loss Provisions	Private Finance Derisking	Financial protection mechanism where a party agrees to absorb the first portion of any loss incurred, often seen in credit enhancements where the holder of the first-loss position covers initial defaults or losses before others are affected.	Tested Elsewhere	N/A
26 Over-Collateralisation	Private Finance Derisking	A risk management strategy where the value of collateral exceeds the loan amount. This provides additional security to the lender by creating a buffer that can absorb potential losses in case of default. They are commonly used in securitised products like mortgage-backed securities and collateralised loan obligations.	Tested Elsewhere	N/A
27 Excess Spread	Private Finance Derisking	Donor-issued bonds to cover the difference between the interest received from loans or assets in a financial portfolio and the interest paid to investors in debt securities issued against them. It is often used as a buffer to cover losses in structured finance transactions.	Tested Elsewhere	N/A
28 Political Risk Insurance	Private Finance Derisking	A type of insurance that provides coverage for businesses and investors against financial losses resulting from adverse political events, including expropriation, nationalisation and selective discrimination, as well as political violence, unrest, and the inability to convert or transfer currency due to government-imposed exchange controls.	In Progress	N/A
29 Collateralised Debt/Loan Obligation	Public Finance	A collateralised instrument that is backed by a pool of loans and other debt instruments that are sold to investors.	Tested Elsewhere	23
30 Frontloading Facility	Public Finance	Mechanisms that make public funds available for development earlier than would normally be the case via the issuance of bonds that are repaid later through committed funding. This form of facility ensures the greater availability of up-front funding and more predictability in terms of funding flow.	In Progress	30



Solution Name	Solution Category	Description of Mechanism	Status	Score
31 Government Private Land Owner Investment	Public Finance	Mine action in return for government investment in private land, potentially also improving land value in return for sustainable agriculture practice.	In Progress	26
32 Public Mine Action Subsidies	Public Finance	Government subsidies that support individuals and mine action organisations, including through tax relief, technical support and price support.	In Progress	19
33 Corporate Social Responsibility Tax	Public Finance	Government taxation that requires (usually large) companies to spend a percent of their profits on mine action as a corporate social responsibility (CSR) activity, either through NGOs or government social investment funds. Unlike traditional taxation, companies have greater involvement in where to invest and implement programmes.	Tested Elsewhere	16
34 Sovereign Wealth Funds	Public Finance	State owned investment funds capitalised from balance of payments surpluses, foreign currency operations, royalties on extractive industries and other transfers and economic rent. Available resources are generally invested in capital and equity markets often through intermediaries to achieve returns. These returns are either reinvested or distributed to the government or other recipient entities. Their investment policies can be oriented towards sustainable standards and practices-for example by investing a percentage of the capital in high impact projects.	Tested Elsewhere	18
35 Trade Finance	Public Finance	Broadly defined as the set of financial instruments that support foreign trade transactions, including includes letters of credit, factoring, export credit and insurance.	Tested Elsewhere	19
36 Redirection of Interest from Frozen Russian Assets	Public finance	There are over USD300bn of Russian assets frozen overseas that have generated approximately USD3bn in interest yearly since 2022. Most of these assets are held and managed within the EU. While transfer of the frozen assets themselves to Ukraine would be in violation of international law, the use of revenues made on them is not as they are not contractually owed to Russia. It is therefore within the purview of states holding Russian assets to decide if and how to use the interest earned.	Untested	25
37 Sovereignty Bond	Public finance	A form of frontloading led by one government, a sovereignty bond is a bond issued by a government (ideally with a high credit rating) the proceeds of which are directed to address a particular need in a beneficiary country.	Tested Elsewhere	16
38 Public Guarantees	Public Finance Derisking	Government guarantees to that can mobilize and leverage commercial financing by mitigating and/or protecting risks (such as political, regulatory, and foreign-exchange risk), notably commercial default or political risks. A public guarantee can encourage financial institutions, i.e. commercial and development banks, to offer loans to new companies. Public guarantee programs are often part of bilateral or multilateral development assistance and seek to address market failures without unintentional distortion of existing banking systems and financial markets.	Tested Elsewhere	N/A
39 Solidarity Taxes	Taxation & Levy	Mechanisms that generate funds from new taxes and obligatory charges on expenditure at the point of sale that are subsequently allocated to international development activities and funds. These could include taxation on public transport, fuel or financial and currency transactions.	Tested Elsewhere	17



# Annex B: Technical aspects for issuance of a SLB

## a. Separation of Proceeds

1. 'Separation of proceeds' reflects the sustainability bond component of the SLB and the ICMA Guidelines and Principles. While not a financial derisking activity in itself, the Government of Ukraine's approach to separation of proceeds within the SLB will play an important role in building confidence with investors and potential guarantors.
2. Sovereigns have adopted different approaches to separation of proceeds, from complete separation to less stringent procedures. There are various possibilities to ringfence the proceeds:<sup>68</sup>
  - **Proceeds tracking:** The funds raised are deposited in the general treasury account(s), with the sustainable funding identified and the corresponding expenditures tracked. The issuer ensures proper tracking and promises that the funds will not support excluded expenditures. Proceeds tracking promotes confidence by demonstrating to the bond investors that the promised projects were executed in line with the promises made to them.
  - **Sub-account approach:** While part of the general treasury account(s), the proceeds are tracked in a sub-account from which project expenditures are deducted when they occur. The sub-account can contain the receipts from sequential bond issuances.
  - **Full segregation:** The bond proceeds are kept in an account that is fully separated from other government accounts. Full segregation amounts to ringfencing the funds, which means that the affected funds can only be spent on the projects described in the bond framework, with the funds not usable for any other purpose, even temporarily. This approach can be modified to allow for keeping the receipts from sequential sustainable bond issuances in the same account.
3. It would be necessary for Ukraine's Ministry of Economy to consider the best approach to separation of proceeds within Ukrainian fiscal legislation and policy, and taking into account likely investor confidence levels in each option.

## b. Issuance method

4. The SLB that is being proposed is a sovereign-issued debt-based instrument. Four main methods are used for issuance of this form of government security: auction, private placement, syndication and tap sales. Each is outlined below, with details on procurement, pricing and application.
  - **Auction:** An issuance method that allows investors to place bidding amounts and yield/price according to actual demand and capability.

This is the most commonly used approach as it is more transparent and supports market development. Auction is conducted on a regular basis according to the issuance calendar to allow investors enough time to prepare for the participation.

It typically takes the form of competitive bidding, where bids are ranked from low to high (in cases of yield), or high to low (in cases of price), to determine winners. Additionally, some issuing countries also allow for non-competitive bidding up to a certain percentage of the competitive auction volume by requiring investors to submit purchase amounts only.

<sup>68</sup> <https://www.imf.org/en/Publications/WP/Issues/2023/03/11/Sovereign-ESG-Bond-Issuance-A-Guidance-Note-for-Sovereign-Debt-Managers-530638>



For non-competitive auctions, securities pricing is calculated based on the winning yields/prices (weighted average) of the competitive auction. For competitive auctions, there are three pricing approaches:

- **Multiple price:** Securities prices will differ according to the yield/ price of winning investors. Multiple-price auction can also better reflect market price and help to reduce the chances of selling securities at discount.
  - **Single price:** Securities prices will be uniform using the highest yield or lowest price among yields/prices placed by winning investors. Single-price auction is also used as it is simple, can attract more investors to participate, and avoids or reduces the winner's curse arising from multiple-price auction. It also establishes reference pricing for new instruments.
  - **Hybrid price:** A combination of multiple and single price method where the issuer sets yield/price ranges to split winners into groups. The securities prices for each group are determined using the highest yield or lowest price within the group. Each group will receive different yields/prices, but the winners within a group get the same yield/price. Hybrid pricing is least used given its significant complexity in implementation.
- **Syndication:** An issuance method where a group of institutions act as underwriters to purchase and sell government securities further to final institutional and individual investors.

This approach is generally applied to the issuance of securities in large volume or new security types without an established solid investor base in the market. Alternatively, syndication can be pursued based on the specific needs of the issuer and actual market conditions.

The issuer (in this case the Government of Ukraine) appoints a group of institutions, potentially comprising banks and financial institutions and/or securities firms, to act as underwriters, intermediaries, book runners and advisors on pricing and allocating the government securities.

In addition, lead managers or joint lead managers, typically banks, are designated to reach out to investors to purchase the government securities and provide feedback on actual market demand. The issuer would then set the securities price after consultation with the syndicate group.

- **Private Placement:** An issuance approach where securities are sold directly to the targeted investors via negotiation.

This approach is only applied to certain securities types and specific targeted investors and is based on the securities price being determined through mutual agreement between the issuer and investor.

Investors submit purchase request directly or through intermediary to the issuer by specifying proposed conditions, such as amount, tenor or coupon rate. In case of agreement, the issuer notifies the investor and proceeds with concluding the securities sale and purchase agreement and issuing a confirmation letter.

In the event that the proposed conditions are not agreed, the issuer notifies the investor on rejection or proposes further negotiation.

- **Tap Sale:** An issuance approach where previously auctioned government securities (of the same type, maturity date, nominal value, coupon rate and security identification ISIN code) are re-opened for additional sale, allowing investors to submit purchase requests within a defined period. Generally, the re-opened securities will have a remaining maturity shorter than the original tenor.



This approach, essentially a 're-auction', is generally applied to short-tenor government securities (up to three years) to raise funds quickly in the face of needs that arise. The issuing institution sets the securities price based on the prevailing market conditions and demand.

At the initial securities auction, the issuing institution specifies which securities type will be re-opened for tap sale in the future. When there is an actual need, the issuer publicly notifies to the investors the tap sale size, participation terms, and typical order period. This typically lasts for between three days and a week. After receiving the orders, the issuer decides on: price, allocation amounts, and issuance date.

- 5.** While auctions are most prevalent, in practice the issuance methods can be combined and tailored depending on countries' specific circumstances. In the case of the proposed SLB in Ukraine, syndication is likely to be a preferred option given that the mine action element of the bond is a new proposition to investors for Ukraine, and also that sustainability and SLBs for Ukraine are a newer product in the market.
- 6.** A syndication approach also enables the generation of a body of supportive organisations able to make the case to investors, while working with them to determine an appropriate coupon price point. Engagement in this way would also bring insight to the variable rate coupon component of the SLB.





# Enhancing Mine Action Finance in Ukraine



Feasibility Report

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