Final Evaluation of the 'Support for Winterization and Repairing of Energy Sector Infrastructure Facilities' Project. Project ID: 00134106

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Project title: Support for Winterization and Repairing of Energy Sector Infrastructure Facilities	**Quantum ID**: 00134106
Implementing agency: UNDP. **Key partners**: Ministry of Energy of Ukraine of Ukraine.	**Project start date**: 1 January 2023. **End date**: 18 April 2024 (for PIP).
The main objective of this project is to support national and local governments to repair critical energy infrastructure to provide basic life-saving services to the populations in the war- affected areas.	**Country**: Ukraine
Evaluation timeframe: October-November 2024 **Total committed budget:** US$ 91,973,642.51	**Funding source:** Japan, Sweden, Norway, Iceland, Germany, and Republic of Korea.

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Disclaimer

This report is the work of independent consultants, and does not necessarily represent the views, policy, or intentions of the UNDP and its partners. The opinions and recommendations in the evaluation will be those of the Evaluators and do not necessarily reflect the position of stakeholders.

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Acronyms

Abbreviation	Description
CPD	Country Programme Document
CSO	Civil society organization
FE	Final Evaluation
GoU	Government of Ukraine
GPD	Global Programme Document
HRBA	Human Rights Based Approach
IDP	Internally Displaced Person
M&E	Monitoring and evaluation
NGO	Non-governmental organization
PE	Project Evaluation
PIP	Project Initiation Plan
RPD	Regional Programme Document
RPA	Responsible Party Agreement
SDGs	Sustainable Development Goals
ToR	Terms of Reference
UNDP	United Nations Development Programme

Project/Outcome Information		
Project/Outcome title	Support for Winterization and Repairing of Energy Sector Infrastructure Facilities	
Quantum project ID	00134106	
Corporate outcome and output	Contributing Outcome (United Nations in Ukraine Transitional Framework): SP 2: Strengthening Systems; SP 3: Building Resilience. Indicative Output(s) with gender marker: CPD Output 3.3 Local authorities and communities adopt gender-responsive and sustainable solutions for increased energy efficiency and modern energy access, especially of renewable energy. GEN2	
Country	Ukraine	
Region	Eastern Europe	
Date Cost-sharing Agreement signed	Norway (through Funding Window): 23 January 2023 Sweden (through Funding Window): 12 May 2023 Japan: 28 March 2023 Iceland (through Funding Window): 21 June 2023 Germany (through Funding Window): 18 July 2022 Republic of Korea (through Funding Window):: 12 January 2023	
PAC Meeting date	n/a (Project Initiation Plan modality), 18 April 2024 LPAC for Green Energy Recovery Programme	
Project dates	**Start**	**End date**
	1 January 2023	18 April 2024 (for PIP), 31 December 2029 (for Green Energy Recovery Programme)
Project budget	US$ 91,973,642.51	
Project expenditure at the time of evaluation	68,910,226	
Funding source	Norway (through Funding Window): US$ 9,892,766.50 Sweden (through Funding Window): US$ 5,580,876.00 Japan: US$ 70,000,000.00 Iceland (through Funding Window): US$ 500,000.00 Germany (through Funding Window): US$ 4,000,000.00 Republic of Korea (through Funding Window): US$ 2,000,000.00	
Implementing party	UNDP in Ukraine	

Executive summary

Project background

The **Support for Winterization and Repairing of Energy Sector Infrastructure Facilities" (USD 91 million) (refer to herein and after as " the Project")** being the **core focus of this Evaluation report**, aimed to support the national and local governments to repair critical energy infrastructure to provide basic life-saving services to the populations in the war-affected areas to restore their devastated living conditions and minimize sufferings of Ukrainian people.

The project provides support to the winterization and power-supply materials and equipment, restoring the natural gas supply to Kharkiv city and its neighbouring areas, and restoring the high-voltage energy infrastructure and equipment for supporting electricity generation, transmission, and supply.

The 'Support for Winterization and Repairing of Energy Sector Infrastructure Facilities' project is implemented by the UNDP Country Office of Ukraine following UNDP's Direct Implementation Modality (DIM). The project started on the 1 January 2023, it was due to be closed by 18 April 2024 for the Project Initiation Plan (PIP) stage, and will continue until 31 December 2029 as part of the broader Green Energy Recovery Programme). The project is funded by Japan, Sweden, Norway, Iceland, Germany, and Republic of Korea with a total funding of US$ 91,973,642.51.

Evaluation scope and approach

This Final Evaluation (FE) aimed to assess Relevance, Effectiveness, Efficiency, Sustainability and Gender responsiveness of the project and provides recommendations and any improvements that can be made for future projects with a similar outcome particularly for the expected phase II of this project. The evaluation placed a significant emphasis on identifying lessons learned and good practices that derive from the project's implementation. The evaluation covered the period January 2023 – to April 2024 and addresses the results of project implementation. This evaluation was undertaken under the direction of the UNDP's commissioning unit in Ukraine and working closely with the Project Team.

The methodology of the FE encompassed a comprehensive desk review of project documentation, semi-structured interviews with key stakeholders and focus group discussions with key teams to collect firsthand evidence. This mixed-method approach allowed for data triangulation, increasing accuracy and informing the reliability of the evaluation results. Throughout the process, purposive sampling aimed to capture a diverse range of stakeholder perspectives, ensuring gender responsiveness and inclusivity in data collection and analysis. Analytical techniques included descriptive analysis, content analysis, thematic analysis, and basic quantitative analysis of monitoring data before and after the project, all aimed at identifying common trends, themes, and quantifiable project impacts.

Brief findings

Achieved results: The procurement efforts are expected to benefit over 5.4 million people across key regions, including Odesa, Kyiv and Kharkiv, once installations are completed. All planned procurements within the winterisation project have been completed as planned, some of which have advanced to delivery and installations

stages while others are progressing. The project ability to complete all procurements on time despite the significant procurement challenges is commendable.

Key preparatory activities included technical assessments to identify infrastructure gaps, stakeholder engagement to refine objectives, and alignment with donor expectations. These efforts secured additional funding and built governance structures and methodologies tailored to Ukraine's complex environment. However, challenges such as lengthy procurement processes, insufficient installation funding, and the volatile security situation have delayed the installation and operation of procured equipment, limiting the immediate measurable socio-economic impact. Additionally, the lack of budgetary provisions for auxiliary equipment and unfamiliarity with UNDP procurement processes among suppliers further prolonged timelines and increased financial pressures.

Coherence and Relevance: The winterization project, implemented using the Project Initiation Plan (PIP) format, aimed to address urgent energy needs in Ukraine amidst the ongoing conflict. With a substantial budget of $90 million, the project enabled rapid procurement of critical energy infrastructure while laying the foundation for the broader Green Energy Recovery Program. Despite its simplified design, which restricted comprehensive evaluation of outcomes, the PIP facilitated immediate responses to infrastructure needs and aligned with Ukraine's national energy strategy, recent assessments, and UN humanitarian priorities. The winterization project is highly relevant to the urgent energy needs of vulnerable Ukrainian communities, empowering local and national stakeholders to restore and manage critical infrastructure while adhering to UNDP's "build-back-better" framework.

Effectiveness: Despite progress, significant challenges persisted. The ongoing war created a highly volatile environment, requiring frequent reallocations of resources and adjustments to plans, while security concerns deterred suppliers from operating in high-risk areas, increasing costs and logistical complexities. Stakeholder expectations about project timelines and complexities were often misaligned, highlighting the need for clearer communication.

Gender mainstreaming: The Project Initiation Plan (PIP) did not explicitly incorporate a gender mainstreaming approach, as the primary focus was on procuring critical energy infrastructure to address the urgent needs on the ground. However, the project laid the foundation for the Green Energy Recovery Program, which integrates gender-sensitive practices into planning, implementation, and monitoring.

Efficiency: The project demonstrated high cost efficiency by leveraging investments and in-kind contributions from partners while delivering outputs within budget. Ukrainian authorities provided substantial support, including covering insurance costs, preparing installation sites, and constructing attack-proof shelters, demonstrating strong ownership of the project. However, sustainability risks remain due to the war, as energy infrastructure continues to be a target for attacks.

Sustainability: The sustainability of the winterization project faces significant risks from the ongoing war, with energy infrastructure remaining a likely target for renewed attacks. Protective measures, such as attack-proof shelters at critical sites, have been implemented to enhance resilience and maintain energy services under challenging conditions. The availability of funding for the installation of procured equipment remains critical for the project's success, as it directly impacts the timely realization of benefits and restoration of energy services.

The replacement of energy equipment involves environmental risks, particularly exposure to hazardous materials like polychlorinated biphenyls (PCBs). While Ukrainian authorities report adherence to safety protocols and

international guidelines, the project team has not conducted direct inspections or received detailed reports on compliance, highlighting the need for enhanced oversight.

Recommendations

With the broader Green Energy Programme already started, the recommendations provided by this FE are expected to play an important role to inform the implementation of the programme. The FE insights can help refine strategies, address potential gaps, and strengthen project execution as it progresses over the next few years. **See details in section 6.1**.

1. Engage further with the relevant authorities to ensure that environmental risks, particularly those related to hazardous waste, have been properly managed.
2. Showcase project successes to donors and stakeholders for resource mobilisation.
3. Explore a wide range of methodologies to ensure installation support from the suppliers which are facing the difficulties to enter Ukraine. One promising option is to train Ukrainian engineers by facilitating their travel to the supplier's facilities abroad
4. Document and share insights and best practices gained from the procurement processes applied in this project with UNDP-HQ.
5. Develop and implement a targeted communication strategy with two key objectives: 1) Demonstrate Project Impacts, and 2) Manage Stakeholder Expectations.
6. Develop and implement an Impact Evaluation Framework for the Green Energy Recovery Program.
7. Future project designs should encompass the entire lifecycle of energy infrastructure deployment, from procurement and delivery through to installation, commissioning, and setting the basis for ongoing operation.

1. Introduction

1.1 Background and context

Since 24 February 2022, the ongoing war in Ukraine has already resulted in significant loss of life, devastating destruction of infrastructure and unprecedented displacement internally and towards neighbouring countries. The scope and scale of damage to critical infrastructure caused by the conflict are devastating in Ukraine. Public service provision continues to be constrained across the country – water, electricity, heating, gas and emergency health and social services – remain under severe pressure. The economic impact of the war is dire.

Since 10 October 2022, attacks against energy infrastructure in Ukraine have intensified across the country, disrupting essential public services of electricity, heating, and water. During the project start estimates from UkrEnergo indicated that approximately 50% of Ukraine's energy infrastructure has been occupied or damaged, while every major power plant and electricity transmission system have suffered damages. Repairs of the infrastructure are ongoing; the Government has sent official requests to the UN and member states for the urgent purchase of materials to ensure that those repairs can continue. Blackouts in the capital and other major cities are a near-daily occurrence. In Kyiv, the latest round of missile strikes on 23 November left approximately 50% of the capital without electricity for several days. The repeated strikes against infrastructure have resulted in prolonged electricity cuts and the continuation of rolling blackouts as the city tries to restore its connections.

Continuing attacks on energy infrastructure are leading to a major energy crisis in the country, with repeated cuts and power outages, not only in the capital Kyiv but also in the newly accessible areas. No electricity means no running water and impedes provision of other basic services, including health and education. Humanitarians continued expanding the reach of assistance to people in villages and towns of Donetska, Kharkivska, Khersonska, Luhanska and Zaporizka oblasts that Ukraine has retaken over the past months of October and November in 2022.1 Since the last 2022, the Ukrainian energy system has been able to cover only 70 per cent of the peak demand to generate power, and the damages on energy infrastructures have been augmenting. UNDP has conducted the Energy Sector Damage Assessment in collaboration with the World Bank, entrusted by the UN Secretary-General to respond to the request of the President of Ukraine to ensure a comprehensive assessment is performed to the energy sector in its entirety. The preliminary results show enormous needs for infrastructure and equipment for high voltage electricity and energy generation and transmission.

1.2 Problems to be addressed by the project

The onset of winter brings new dimensions to the humanitarian crisis, as attacks and damage to homes leave millions at risk of deadly temperatures that can drop below -20°C. In their Ukraine Situation Report as of 16 November 2022, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) highlighted that "millions of people in Ukraine are without electricity, water or heating today, following a wave of missile attacks that hit critical infrastructure in at least 16 of the country's 24 regions and in the capital Kyiv." While grid operators work 24/7 to repair damaged transmission systems, civilians will need ways to stay warm in the cold Ukrainian winter, and shortage of electricity expected to continue.

Needs for immediate restoration of energy infrastructure are again addressed in Humanitarian Response Plan 2023, issued in February 2023. The intensified support for repairing critical energy infrastructure in the conflict affected areas is urgently required to meet the unprecedented circumstance of damages on energy infrastructure

in Ukraine. People in all regions of the country have constant power outages, both electricity and gas, also affecting civilians' access to water and heating. In addition, disrupted energy and electricity supply will negatively affect industrial and business productions in Ukraine, which places impediments on sustaining Ukrainian economy.

Given these enormous challenges that Ukraine faces, the winterization project is meant to support the restoration and smooth functioning of public services and fulfil the life-saving energy and heating needs according to the UN Flash Appeal for Ukraine in 2022, while promoting recovery and resilience in the war-affected areas by building capacity and social capital and reducing the risk and effects of future negative events.

The project aims to provide immediate and emergency support to the national and local governments to repair critical energy infrastructure to provide basic life-saving services to the populations in the war-affected areas to restore their devastated living conditions and minimize sufferings of Ukrainian people.

1.3 The project's strategy

The main objective of this project is to support national and local governments to repair critical energy infrastructure to provide basic life-saving services to the populations in the war- affected areas. To this end this project will provide support to the following critical areas:

1) Winterization and power-supply materials and equipment provided to the local authorities and the conflict-affected population

2) Natural gas supply to Kharkiv city and its neighbouring areas restored and enhanced for energy and heating use

3) High-voltage energy infrastructure and equipment restored for supporting electricity generation, transmission, and supply.

The impacts of the planned outputs and activities are expected to benefit the vulnerable population, including women, in the target areas by providing equal and affordable access to electricity to them.

The proposed outputs and activities under this project supported by different donor partners are summarized below:

- Output 1: Local authorities and the war-affected population in target locations benefit from the provision of winterization and power supply materials and equipment
- Output 2: Winterization materials and equipment provided to the local authorities and the conflict-affected population
- Output 3: Winterization materials and energy infrastructure equipment provided to the local authorities and the conflict-affected population
- Output 4: High voltage energy infrastructure and equipment restored for supporting electricity generation, transmission, and supply
- Output 5: Power supply to Combined Heat and Power Plants (CHPs) restored and enhanced to supply consumers with electricity, heat and water in Kyiv and Odesa

- Output 6: High voltage energy infrastructure and equipment restored for supporting electricity generation, transmission, and supply.

1.4 Project timeframe, funding and location

The 'Support for Winterization and Repairing of Energy Sector Infrastructure Facilities' project is implemented by the UNDP Country Office of Ukraine following UNDP's Direct Implementation Modality (DIM). The project started on the 1 January 2023, it was due to be closed by 18 April 2024 for the Project Initiation Plan (PIP) stage, and will continue until 31 December 2029 as part of the broader Green Energy Recovery Programme). The project is funded by Japan, Sweden, Norway, Iceland, Germany, and Republic of Korea with a total funding of US$ 91,973,642.51.

The project is focused on war-affected areas including Kyiv oblast, and the cities of Kharkiv and Odesa by repairing critical energy infrastructure to provide basic and life-saving services to the populations in these areas.

1.5 Stakeholders' participation

The main Project stakeholders are (including but not limited to):

- Ministry of Communities, Territories, and Infrastructure Development of Ukraine;
- Ministry of Energy of Ukraine;
- NEC "Ukrenergo"
- NAT "Ukrgasvydobuvannya"

2. Evaluation scope and objectives

This FE aims to assess the Relevance, Effectiveness, Efficiency, Sustainability, Gender Responsiveness, Results Framework, and assess achievements of the project and lessons learned; and provide recommendations and any improvements that can be made for future projects with a similar outcome. The evaluation places a significant emphasis on identifying lessons learned and good practices that derive from the project's implementation.

The evaluation covers the period 2023-2024 and addresses the results of project implementation.

This evaluation was undertaken under the direction of the UNDP's commissioning unit (Energy and Environment Team Leader and UNDP M&E specialist) and working closely with the Project Manager and Chief Technical Advisor. The evaluation focuses on the key criteria, which include, among others:

- Relevance of the component interventions under the project;
- Effectiveness of the components within the project;
- Efficiency of the component design and implementation to-date;
- Potential sustainability of beyond the project;
- Extent to which the project addressed gender equality issues in its design, implementation and outcomes.

The evaluation identifies the pertinent issues such as management arrangements, procurement and financial procedures, timeliness of interventions, selection of partners, incorporation of innovative solutions and prospects for sustainability.

The list of indicative questions to guide the evaluation scope is available in Annex 2 – the evaluation matrix.

3. Evaluation approach and methods

The Final Evaluation (FE) Report provides evidence-based information that is credible, reliable, and useful. The FE evaluator reviewed all relevant sources of information, including documents prepared during the preparation/design phase, the project document, project reports, project revisions, relevant strategic and legal documents, and any other materials that the FE evaluator considers useful for this evidence-based review.

The FE complied with UNDP Evaluation Guidelines and United Nations Evaluation Group (UNEG) Norms and Stand for Evaluations. The evaluation was undertaken in line with UNDP principles concerning independence, credibility, utility, impartiality, transparency, disclosure, ethical, participation, competencies and capacities. The consultants signed the Evaluation Consultant Code of Conduct, thereby agreed to abide by the UNEG Code of Conduct in the UN System (2008)[1]. The evaluation will be carried out by an independent international consultant.

The evaluation process is independent of UNDP, implementing partners and programme partners. The opinions and recommendations in the evaluation will be those of the Evaluator and do not necessarily reflect the position of UNDP, or any of the programme stakeholders. Once accepted, the evaluation becomes a recognized and publicly accessible component of the programme's documentation. The evaluation was carried out between October 2024 and November 2024, and stakeholder engagement took place in the same period.

Evaluation is an evidence-based assessment of a programme's concept and design, its implementation and its outputs, outcomes and impacts as documented in the project document. Evidence will be gathered by reviewing documents, interviewing key, selected stakeholders and from other ad hoc observations.

The Terminal Evaluation (TE) employed a **collaborative, consultative, participatory, and utilization-focused** approach to ensure relevance and maximize the usefulness of its findings. The evaluation utilized a **Participatory Evaluation (PE)** framework, engaging key stakeholders, including representatives from the UNDP and Ukrainian Government, to jointly determine critical aspects of the process, such as the stakeholders to consult and project documents to review. This collaborative approach facilitated a comprehensive understanding of the evaluation framework and ensured the process was tailored to uncover improvement opportunities within the project. Importantly, the consultant emphasized inclusivity by involving primary stakeholders as active participants in the evaluation process, rather than merely sources of information. This included creating opportunities for both women and men community members to analyze, reflect, and contribute to decision-making and action.

Additionally, the evaluation followed a utilization-focused approach, which prioritizes the needs and expectations of the intended users of the evaluation from the very beginning. By addressing these needs, the evaluation ensured that its findings, lessons, and recommendations were actionable and valuable to stakeholders.

An important tool developed for the IE process was an Evaluation Question Matrix (Annex 3). This matrix defined evidence that will be used for each question, guided the data collection process, and used to display data obtained from various sources that relate to relevant evaluation criteria and questions. The matrix contains Evaluative

[1] UNEG Code of Conduct for Evaluation in the UN system, 2020. Available here.

Criteria Questions, i.e. sets of questions and sub questions, detailing each review criteria, indicators; sources; and methodology.

Phases of the IE

The primary phases of the TE Implementation included the development and presentation of the TE Inception Report, TE mission for primary data collection, presentation of initial TE findings to key stakeholders and reporting.

TE inception phase

The purpose of the inception report was to define the overall approach and set out the conceptual framework to be applied in the evaluation. The inception report included the understanding of the evaluation objectives, evaluation questions and possible evidence to be generated, defined the methodology, and provides information on data sources and collection, sampling, and key indicators.

This phase included a review of project documentation, review of evaluation questions, and the establishment of criteria for assessing project outcomes. Stakeholder analysis has also been conducted to identify all parties relevant to the evaluation. The inception report has been crucial for ensuring that all parties have a clear understanding of the evaluation scope, methods, and expected deliverables.

TE mission for collecting primary data

The objective of this phase was to gather first-hand data from the project teams and stakeholders. The TE evaluation team conducted interviews with key stakeholders and project teams. The data collected during this process formed the backbone of the evaluation, providing essential insights into the project's implementation and effectiveness.

Data analysis: Data analysis was based on observed facts, evidence, and available data. Findings were specific, concise, and supported by quantitative and/or qualitative information that is reliable, valid and generalizable.

Information was analysed and consulted with project team or commissioning unit, and then an evaluation report draft was developed. All analysis has been based on observed facts, evidence and data. The broad range of data provided strong opportunities for triangulation and validation. This process is essential to ensure a comprehensive and coherent understanding of the data sets, which was generated by the evaluation.

Presentation of initial TE findings to key stakeholders

This phase aimed to share preliminary findings with stakeholders to validate the information and gather additional feedback. A wrap-up meeting & presentation of initial findings to share preliminary findings, assessments, conclusions and emerging recommendations. Feedback from stakeholders during this phase was used to refine and finalize the evaluation report, ensuring it accurately reflects the project's outcomes and the perspectives of those involved.

Drafting evaluation report

The final phase involved compiling this comprehensive evaluation report which includes detailed findings, conclusions, and recommendations. The report integrates all data and analyses from the evaluation process and is crafted to provide clear evidence-based findings about the project's effectiveness and impact. The final report

is essential for accountability and learning. It is used to inform future projects, improve ongoing strategies, and fulfill reporting obligations to donors or other key entities.

3.1 Data collection methods

Mixed methods[2] were used for the evaluation to generate mix of qualitative and quantitative data to best describe the project results based on the on the results framework as outlined in the project document. The use of mixed methods has the advantage of supporting data triangulation across multiple sources, which creates the potential for increased data accuracy and credibility to inform the reliability of the evaluation results.

The evaluation used methods of document review and interviews for data collection to obtain answers to all of the evaluation questions. The evaluation had two levels of data collection and validation of information:

- A desk review of project documentation where both qualitative and quantitative data were collected – See annex 4 for list of documents reviewed, and
- Semi-structured interviews with key stakeholders for qualitative data collection (Annex 3 list of persons interviewed).

An evaluation matrix was developed as a base for gathering of qualitative inputs for analysis. The evaluation matrix defined the objective for gathering non-biased, valid, reliable, precise, and useful data with integrity to answer the evaluation questions.

Engaging stakeholders was critical for the success of the evaluation. The project involved multi-stakeholders and teams in different capacities and the FE engaged with various stakeholders to cover different perspectives taking into account the principle of gender responsiveness.

Gender responsiveness has been integrated throughout the evaluation process including gender balance during the engagement with stakeholders by ensuring both genders are engaged, particularly when it comes to beneficiaries, assessing the gender integration in the project design and delivery, and ensuring that data collection and analysis are gender sensitive. The evaluation used gender-disaggregated data of personnel engaged by the project to identify barriers and differentiate roles that may be more suited to each gender. The evaluation also checked whether all "people count" indicators are gender segregated and if the project had reported women ratio in related indicators. The FE evaluation assessed the extent to which the project has addressed vulnerability to ensure equal participation of men, women, children and youth, people with disability and other marginalized groups as well as benefits from the project investments.

Throughout the evaluation process, the main stakeholders were engaged and interviewed using semi-structured interview[3]. Interviews relied on targeted and purposive sampling strategy to include a diversity and balance of perspectives from each stakeholder category.

[2] Mixed methods involve desk review, semi-structured interviews, and surveys for data collection, and also descriptive analysis, content analysis, thematic analysis and simple quantitative data analysis in excel for survey data and quantitative indicators for data analysis. See below sections for more details.

[3] A semi-structured interview is a method of research used most often in the social sciences. While a structured interview has a rigorous set of questions which does not allow one to divert, a semi-structured interview is open, allowing new ideas to be brought up during the interview as a result of what the interviewee says. The interviewer in a semi-structured interview generally has a framework of themes to be explored.

3.2 Data analysis methods

Data analysis was based on observed facts, evidence, and available data. Findings are specific, concise, and supported by quantitative and/or qualitative information that is reliable, valid and generalizable.

Information was analysed and consulted with project team or commissioning unit., and then an evaluation report draft was developed. All analysis has been based on observed facts, evidence and data. Findings have been designed to be specific, concise and supported by quantitative and/or qualitative information that is reliable, valid and generalizable. The broad range of data provided strong opportunities for triangulation. This process is essential to ensure a comprehensive and coherent understanding of the data sets, which was generated by the evaluation.

The data analysis method involved:

- **Descriptive analysis**: A descriptive analysis of the PROJECT was used to understand and describe its main components, including related activities; partnerships; modalities of delivery; etc. Descriptive analysis preceded more interpretative approaches during the evaluation.
- **Content analysis**: A content analysis of relevant documents and the literature was conducted to identify common trends and themes, and patterns for each of the key evaluation issues (as the main units of analysis). Content analysis was used to flag diverging views and opposite trends and determine whether there was need for additional data generation.
- **Thematic analysis**: Responses collected from semi-structured interviews and field visit observations were analysed through thematic analysis, this is a method of analysing qualitative data. The evaluators has closely examined the data to identify common themes – topics, ideas and patterns of meaning that come up repeatedly from interviews and other sources.
- **Quantitative analysis**: A simplified analysis was conducted on all quantitative measures (for example number of beneficiaries) by reviewing and validating project datasets on quantitative indicators. The generated statistics were used to develop emergent findings and inform the triangulation process.
- **Triangulation**: In this evaluation, triangulation involved validation of data through cross verification from at least two sources, and evaluation findings and conclusions were synthesized based on triangulated evidence from the desktop review and interviews. This process was essential to ensure a comprehensive and coherent understanding of the data sets, which have been generated by the evaluation.

3.3 Ethical Considerations

The FE consultants were held to the highest ethical standards and was required to sign a code of conduct upon acceptance of the assignment. This evaluation was conducted in accordance with the principles outlined in the UNEG 'Ethical Guidelines for Evaluation'[4]. The evaluators ensured to safeguard the rights and confidentiality of information providers, interviewees, and stakeholders through measures to ensure compliance with legal and other relevant codes governing collection of data and reporting on data. The evaluators also ensured security of collected information before and after the evaluation and protocols to ensure anonymity and confidentiality of sources of information where that is expected. The information knowledge and data gathered in the evaluation process has been solely used for the evaluation and not be used for other purposes without the express authorization of UNDP and partners.

[4] UNEG Ethical Guidelines for Evaluation, 2020, available here.

3.4 Limitations

One of the main constraints experienced during this evaluation was related to data collection and the availability of stakeholders for interviews. Stakeholder availability was affected by coinciding missions, travel schedules, and other work commitments for some key individuals. In response to these challenges, the project management team played a crucial role in coordinating with stakeholders to ensure their participation in the evaluation process. They facilitated scheduling interviews and, where necessary, arranged alternatives such as conducting online interviews for those who were not available in person. This proactive approach helped to mitigate the impact of scheduling conflicts and ensured that the evaluation could proceed with input from all relevant stakeholders.

Another limitation relates to the ongoing war in Ukraine and the potential for escalation, which could involve renewed targeting of energy assets. This heightened security risk has influenced the handling of energy-related data, requiring strict confidentiality and limited access to sensitive information during the evaluation process. The need for restricted data access has impacted the evaluation by limiting the availability of certain operational details and performance metrics. Ensuring confidentiality has been essential for safeguarding project assets and personnel.

4. Findings

4.1 Coherence and Relevance

Findings
The winterization project utilized the PIP (Project Initiation Plan) format to enable a rapid response to urgent energy needs, facilitating the immediate procurement of critical energy infrastructure while allowing time for the detailed design of the broader Green Energy Recovery Programme. While the simplified PIP design was necessary for rapid deployment, it restricted the ability to comprehensively evaluate outcomes. However, it successfully addressed immediate infrastructure needs without delay. The PIP's focus on large-scale energy infrastructure restoration, with a substantial budget nearing $90 million, exceeded the typical scope of project initiation, enabling a rapid response to urgent energy access needs. However, this approach also introduced significant risks due to the reliance on a brief project design. The winterization project's design primarily focused on procuring energy infrastructure equipment, including transportation, technical supervision, and post-installation warranty, with installations initially planned to be managed by the recipients. However, in the case of the 54MW turbine installation in Kyiv, unexpected financial pressures arising from escalating repair needs prompted the recipient to request additional support for the installation, which was provided while design works were being carried out. The winterization project is highly relevant to the urgent energy needs of vulnerable Ukrainian communities while empowering local and national stakeholders to restore and manage critical infrastructure. By aligning with UNDP's "build-back-better" framework and fostering collaboration with governments and international partners, the project not only ensured the continuity of essential services during extreme winter conditions but

also laid the groundwork for long-term energy efficiency, sustainability, and resilience in Ukraine's recovery efforts.

The project is well-aligned with Ukraine's national energy strategy, recent energy assessments, and the humanitarian and development needs identified by the United Nations. This alignment ensures that the project addresses critical priorities, such as restoring energy infrastructure, meeting urgent community needs, and supporting long-term energy resilience and development in Ukraine.

The winterization project was designed using the PIP (Project Initiation Plan) format, given the urgency of the situation and the need to facilitate the immediate procurement of critical energy infrastructure. This approach allowed the project to respond rapidly to pressing energy needs while providing time for the development of a more comprehensive design for the broader Green Energy Recovery Programme. The PIP outlined the basic elements of the project, including its objectives, key outputs, and activities. However, it did not include a detailed theory of change, SMART targets or in-depth guidance on the implementation of activities, which would typically be provided in a standard project document. This lack of detailed targets limits the ability to track progress systematically and to evaluate performance against predefined criteria. As a result, this evaluation needed to rely primarily on qualitative assessments, such as feedback from stakeholders and analysis of procurement and implementation efforts, to gauge the project's effectiveness.

Nonetheless, **the simplified design was deemed essential** for rapid deployment but limited the framework for tracking progress and evaluating outcomes comprehensively. This streamlined approach ensured that critical infrastructure needs could be addressed without delay, while the more robust Green Energy Recovery Programme would later build on these initial efforts with detailed planning and longer-term objectives.

The nature of activities outlined in the PIP extends well beyond the typical scope of project initiation, as it focuses on the actual delivery of large-scale energy infrastructure restoration, with a budget nearing $90 million. While this approach helps expedite the response to critical energy access needs, it also introduces significant risks associated with undertaking such a large and complex intervention based on a brief project design. In fact, the activities defined in the PIP did not include any technical assistance components that could lay the groundwork for developing a broader program. The focus was primarily on the immediate procurement and restoration of energy infrastructure to address urgent needs, leaving little room for activities aimed at capacity-building, knowledge transfer, or long-term planning that could have supported the transition to the Green Energy Recovery Programme.

The design of the winterization project was primarily focused on procuring energy infrastructure equipment including transportation of equipment, technical supervision on the installations and warranty for post installation, however, the installation was agreed that installations would be done by the recipients, but in the case of the 54MW turbine installation in Kyiv, unexpected financial pressures arising from escalating repair needs prompted the recipient to request additional support for the installation.

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In some cases, the cost of auxiliary equipment was not accounted for in the project's design and budget, leading to unforeseen challenges during implementation. Auxiliary equipment, which is critical for the proper installation and operation of the main energy infrastructure, had to be sourced and funded separately, creating additional financial pressures. This oversight highlighted the importance of comprehensive project planning that includes all associated costs, from primary infrastructure to supporting components. Future project designs should incorporate detailed assessments of all equipment requirements and associated expenses to avoid such issues, ensuring smoother execution and uninterrupted progress.

The outputs presented in the PIP are repetitive, with outputs 1, 2, and 3 being nearly identical in scope and content. The project team justified this repetition as a way to link each output to a specific donor, with one donor assigned to each output. However, this structure created redundancy and could have been better streamlined to enhance clarity and efficiency. A more concise design could have consolidated similar activities under fewer, broader outputs while maintaining transparency about donor contributions. The funding breakdown could have been elaborated more clearly in the action plan and budget to avoid confusion, ensuring that donors' contributions were appropriately tracked without duplicating outputs. Streamlining the outputs would have simplified project management, improved reporting, and facilitated better coordination among stakeholders and donors.

On a positive note, **the winterization project design was informed by insights from other initiatives**, particularly the Energy Damage Assessment conducted by UNDP and the World Bank in 2022 and 2023. In fact, the winterization project closely reflects the needs and priorities identified in the assessment, making the selection of activities more targeted and well-grounded. By aligning its interventions with the findings of the assessment, the project ensured that resources were directed toward the most urgent areas, such as restoring access to electricity, heating, water, and communication services. The reliance on data from the assessment also strengthened the project's design, ensuring that activities were not only appropriate but also responsive to the realities on the ground.

Another project that the winterization project aligns with is the 'Transformational Recovery for Human Security in Ukraine' project. The primary objective of this initiative is to support transformational recovery from the widespread death, destruction, displacement, and suffering caused by the war and to promote human security throughout Ukraine. This project identifies the restoration of essential infrastructure and the provision of equipment and materials to maintain life-line services as a crucial component of its recovery efforts. Winterization support is highlighted as a key output, with a dedicated budget allocated to ensure that communities can access critical services such as heating, electricity, water, and healthcare during the harsh winter months.

The **alignment of the winterization project with human security project and damage assessment project reinforces complementarities**, informed selection of activities and integrated approach toward infrastructure restoration and human security, ensuring that immediate relief efforts contribute to both short-term survival and long-term resilience. This alignment ensures that immediate relief efforts address urgent needs while also contributing to both short-term survival and long-term resilience.

Relevance to the needs of beneficiaries and stakeholders

The winterization project activities are highly relevant to the needs of Ukrainian communities, particularly vulnerable groups living in isolated conditions without access to main energy and heating infrastructure, who require prioritized technical support. Continuous waves of attacks on energy infrastructure have caused widespread destruction, leaving 12 million people across Ukraine with no or limited electricity. These disruptions have not only affected power supply but have also interrupted internet communications, water services, and heating systems during a time when temperatures dropped below zero across most regions. From 10 October 2022 to the end of December 2022, the average Ukrainian household endured five cumulative weeks without electricity, according to estimates based on Ukrenergo data. In addition to the loss of electricity, disruptions to gas networks, district heating systems, and power supplies significantly impacted water delivery in major cities. Power outages have also deprived at least 4.6 million Ukrainians of access to safe water, compounding the humanitarian challenges. By restoring energy infrastructure, the winterization project plays a critical role in building more resilient communities. It ensures that essential services—such as healthcare, water, heating, and communication—remain operational not only during winter but also in the face of future crises. This contributes to stabilizing daily life for millions of people, supporting public health, and maintaining access to basic services, which are crucial for Ukraine's recovery and long-term resilience.

The winterization project is also highly relevant to the needs of participating stakeholders, who directly benefited from the provision of winterization and power supply materials and equipment. It empowered local actors by equipping them with the tools and resources needed to effectively manage and utilize the equipment, ensuring the continuity of essential services during the winter months. In addition, the project aligned with the priorities of national stakeholders and key ministries by strengthening their capacity to fulfill their responsibilities and deliver energy services to communities and public institutions. By supporting these actors in restoring critical infrastructure, the project enabled them to better meet the energy demands of households, hospitals, schools, and other essential facilities, thereby enhancing the overall resilience and functionality of public services.

The winterization project reflects UNDP's integrated approach to both humanitarian relief and long-term resilience. By addressing the immediate needs of affected populations through validated data and consultations with local authorities and stakeholders, UNDP aims to alleviate the hardships caused by power outages and blackouts during harsh winters. In doing so, the project not only supports the recovery of public services but also strengthens the capacity of local governments to manage future crises, contributing to the development of a more resilient energy infrastructure network. Additionally, the provision of equipment and infrastructure restoration services aligns with UNDP's "build-back-better" framework, ensuring that restored systems are not only operational but also more energy-efficient, sustainable, and climate-resilient. These efforts are being closely coordinated with local and national governments, as well as international partners, to maximize the project's impact and promote inclusive and sustainable development in the affected areas.

Relevance to the National Energy Strategy of Ukraine

The winterization project is aligned with the National Energy Strategy of Ukraine, which was revised in April 2023 following extensive damage assessments and evaluations of power generation adequacy. In light of the severe damage and the significant loss of electricity generation capacity caused by the conflict, Ukraine has identified the urgent need for a comprehensive rebuild and expansion of its energy sector. According to Ukrenergo, an additional 15 gigawatts (GW) of new generation capacity is essential not only to power the country's economy and support

its recovery but also to provide export capacity to neighboring Eastern European countries. This ambitious increase in generation capacity is regarded as critical for Ukraine's economic recovery and long-term energy security. The winterization project contributes directly to these national goals by restoring essential energy infrastructure and laying the groundwork for future energy expansion, helping Ukraine stabilize its energy supply in the short term and enhance its energy independence and regional integration in the long term.

Another objective of the strategy is green transition and decentralization by means of further harmonization with the EU markets to provide affordable, reliable, and modern energy, through building and installing new highly maneuvering generating capacities, to which the broader program of Green Energy Recovery contributes to directly.

Relevance to the Energy Damage Assessment of 2023

The winterization project is also aligned with the findings and recommendations of the Energy Damage Assessment conducted by UNDP and the World Bank. This assessment provided a detailed quantification of the damage inflicted on the energy sector by the war and served as the basis for prioritizing interventions. It identified the most critical needs for restoring electricity access for millions of Ukrainians, as well as for key social infrastructure. A key recommendation from the assessment emphasized that preparation for the 2023/24 winter season should primarily focus on restoring electricity supply to both residential areas and essential social infrastructure, including heating systems, potable water facilities, wastewater treatment, and communication networks. The winterization project directly addresses these priority needs, ensuring that essential services are restored in time to mitigate the humanitarian impact of the harsh winter conditions and stabilize the affected communities.

Ukraine Flash Appeal for Ukraine of 2022

The winterization project is also relevant to the Ukraine Flash Appeal of 2022. The appeal highlights that, during the cold season, the destruction of homes and lack of access to fuel or electricity due to damaged infrastructure could become a matter of life or death. It underscores the urgent need to repair critical infrastructure, including water, gas, and electricity utilities, to safeguard the well-being of affected populations. The winterization project directly addresses the needs and priorities outlined in the flash appeal by focusing on the restoration of essential energy infrastructure. This includes repairing power transmission systems, restoring access to heating and electricity, and ensuring that water and wastewater facilities are operational. By prioritizing these interventions, the project mitigates the risks posed by winter conditions, helping to protect vulnerable communities and maintain vital public services during one of the most challenging periods of the year.

Winter Priority Procurement & Repair Plan 2022-2023

Similarly, the winterization project aligns with the key activities outlined in the Winter Priority Procurement & Repair Plan 2022-2023, which emphasizes the importance of initiating critical procurement and repair efforts well before the onset of winter. This plan focuses on ensuring that vulnerable communities are protected from the cold by addressing urgent infrastructure needs in a timely manner. The plan identifies people living in war-damaged areas as a priority population, recognizing their heightened vulnerability and often isolated living conditions, particularly in areas not connected to main energy and heating infrastructure. The winterization project directly responds to these priorities by restoring essential energy services, including electricity and heating, and targeting interventions in regions most affected by the conflict. Through these efforts, the project ensures

that isolated and vulnerable populations have access to the energy needed to withstand harsh winter conditions, reducing risks to health and safety.

Alignment with the Sustainable Development Goals (SDGs)

The winterization project aligns with efforts to achieve Sustainable Development Goal (SDG) 7, which focuses on ensuring access to affordable, reliable, sustainable, and modern energy for all. By restoring energy services and improving access to electricity, the project not only addresses immediate humanitarian needs but also lays the foundation for long-term energy security and economic development. In addition to restoring critical infrastructure, the project contributes to building more resilient communities by ensuring that essential services such as healthcare, water, heating, and communication remain operational during winter and future crises. Reliable access to energy supports local economies by enabling businesses and public services to function effectively, fostering economic recovery. These interventions directly promote sustainable energy solutions, helping to stabilize communities while contributing to Ukraine's broader development goals.

United Nations in Ukraine Transitional Framework 2022-2023.

As part of its Strategic Priority 2 (Strengthening Systems and Building Resilience), the United Nations Transitional Framework 2022-2023 in Ukraine identifies "winterization, mitigating the energy crisis, preparedness for the next heating season, and energy management systems" as key priorities for supporting Ukrainian communities. The winterization project directly aligns with these priorities by focusing on restoring critical energy infrastructure, ensuring reliable access to heating and electricity, and enhancing energy management systems. By addressing urgent energy needs and preparing for future heating seasons, the project helps mitigate the humanitarian impact of the energy crisis and supports the resilience of communities affected by the conflict. These efforts not only provide immediate relief but also contribute to longer-term stability and sustainability in Ukraine's energy sector.

4.2 Achieved Results

Findings

The procurement of essential equipment and services is progressing, with delivery planned to continue throughout 2024. Once installed and operational, these efforts are expected to benefit over 5.4 million people in key regions, including Odesa, Kyiv, and Kharkiv. The equipment and infrastructure upgrades are specifically designed to address the unique energy challenges in each area, ensuring the restoration and continuity of electricity, heating, and water services amidst the severe disruptions caused by the ongoing conflict.

The winterization project successfully laid the groundwork for the broader Energy Green Recovery Program by initiating the procurement of critical energy assets and equipment while setting the stage for long-term energy recovery. It facilitated key preparatory activities, including technical assessments to identify infrastructure gaps and priorities, stakeholder engagement to refine objectives, and proposal drafting to align with donor expectations. These efforts secured future financial support and established essential expertise, governance structures, and a robust methodology tailored to Ukraine's complex environment. The initiation phase enabled the identification and mitigation of risks, such as challenges in transporting energy equipment across borders, ensuring a resilient and adaptable approach moving forward.

All planned procurements within the winterisation project have been completed as planned, some of which have advanced to delivery and installations stages while others are progressing. Challenges in achieving this

stage are primarily due to the lengthy and complex procurement processes including the long time needed to manufacture these equipment, and the challenging security situation in the targeted areas.

As part of the contracts for energy equipment procurement, suppliers have provided training to local staff on maintenance and operation, equipping them with the skills needed to effectively manage the new infrastructure. The winterization project has effectively utilized a multi-channel communication strategy to engage the public and stakeholders. These efforts include publishing videos on YouTube, sharing updates through social media platforms, and producing seven web articles that highlight key milestones and achievements. The project has also contributed articles to the platforms and websites of partner organizations, further expanding its visibility.

Project Objective

The main objective of this project proposal is to support national and local governments to repair critical energy infrastructure to provide basic life-saving services to the populations in the war- affected areas.

The procurement of essential equipment and services is well underway, with delivery scheduled to take place progressively throughout 2024. These efforts are anticipated **to benefit more than 5.4 million people in key urban centers and regions**, including Odesa, Kyiv and Kharkiv once the equipment is installed and operated. The equipment and infrastructure upgrades are tailored to meet the unique energy challenges faced by each region, ensuring continuity of electricity, heating, and water services despite the severe disruptions caused by the ongoing conflict.

As an initiation project, the winterization project has laid the groundwork for the broader Energy Green Recovery Program by kickstarting the procurement of critical energy assets and equipment, which was essential to address immediate infrastructure needs while setting the stage for more comprehensive, long-term energy recovery efforts. In addition to procurement, the project facilitated the development of the Energy Green Recovery Program by enabling detailed design activities. This included conducting technical assessments to validate infrastructure gaps and priorities, gathering data on existing systems, and engaging stakeholders to refine the program's objectives. The initiation phase also involved drafting proposals and aligning funding strategies with donor expectations, helping to secure future financial support.

The initiation phase established the essential foundations needed to address urgent energy needs in Ukraine's challenging environment. This phase enabled the project to bring in the necessary expertise, establish project governance, build capacities, and establish a robust methodology tailored to the unique demands of the Ukrainian context in terms of technology selection and sites prioritization. Moreover, the initiation phase provided an invaluable opportunity to identify potential risks associated with implementing such a complex project amid ongoing conflict, such as those risks associated with transporting the energy equipment from borders. This early assessment allowed the team to trial and refine risk mitigation measures, ensuring a more resilient and adaptable approach moving forward. These insights have equipped the project to manage obstacles more effectively as it scales up, laying a secure foundation for the broader Energy Green Recovery Program.

The project developed clear criteria for selecting both technical solutions and geographical target areas to ensure efficient and impactful interventions. For technical solutions, priority was given to factors such as speed of installation and quick launch to restore energy services as rapidly as possible. This approach aimed to minimize disruptions to essential services and mitigate the humanitarian impact of power outages.

In determining geographical target areas, the project focused on key metrics such as the number of inhabitants, their vulnerability in terms of power supply, and vulnerability of the city in terms of the danger of hostilities and shelling. Areas with large populations, heightened risks of prolonged outages, and critical infrastructure—such as hospitals, water treatment plants, and transportation hubs—were prioritized to maximize the positive impact of repairs. This strategic selection process ensured that limited resources were allocated where they were most needed, supporting both immediate humanitarian relief and the stabilization of essential services in high-priority areas.

Through these preparatory activities, the winterization project ensured that the broader program would be built on a solid foundation, drawing on practical insights and early actions. This approach not only accelerated the recovery process but also established a clear framework for embedding sustainable energy solutions and resilience measures into Ukraine's long-term energy infrastructure. The project's effective groundwork has also strengthened donor confidence, as evidenced by the renewed commitment and increased funding pledges from the donor community for the larger Green Energy Recovery Program. This trust reflects confidence in the project's strategic direction and its potential to deliver lasting, sustainable impact, reinforcing the collaborative efforts toward Ukraine's energy security and resilience.

By undertaking these initiatives, the winterization project has responded directly to the urgent needs identified through comprehensive rapid assessments conducted across Ukraine. These assessments have validated the critical gaps in energy infrastructure and confirmed that immediate action is required to mitigate the effects of the widespread damage. The focus has been on restoring high-voltage transmission systems, combined heat and power plants (CHPs), and gas-powered generation units, which are pivotal for ensuring that basic services such as heating, water, and electricity can be restored without delays.

The critical areas identified for intervention were power generation and transmission networks. The project has provided targeted support to both sectors through the rapid and efficient procurement of equipment, facilitating the restoration of power transmission substations and deploying energy generation systems to re-establish power supply. Key components, such as auto-transformers and gas-piston engines, have been prioritized to ensure immediate repairs. These elements are essential to swiftly restore the infrastructure needed for generating and transmitting electricity, which is crucial for addressing the basic needs of affected populations across local communities throughout the country.

Electricity plays a fundamental role in the functioning of hospitals, water treatment plants, and other essential public services. The timely repair of damaged infrastructure significantly reduces the humanitarian impact of the attacks by minimizing service interruptions. Through these efforts, the project not only restores vital services but also strengthens the resilience of local communities, ensuring that power systems can continue to support the population during ongoing crises.

In July-August 2024 most households faced electricity outages three times a day with an average daily outage duration of 5.7 hours; residents in Zaporizhzhia and Dnipropetrovsk oblasts and Kyiv city faced some of the longest outages, while those in Odesa, Cherkasy and Sumy oblasts experienced the highest outage frequency. Winter projections indicate that Ukrainians may need to adapt to having only five to six hours of electricity per day[5].

[5] UNDP, Human Impact of the Energy Crisis in Ukraine, 2024.

The subsequent impacts of energy deficit affect the broader economy, where the electricity deficit will restrain economic growth (reducing forecasted GDP growth in 2024 by 0.7 percentage points) and contribute to higher inflation, according to the Ministry of Economy.

Progress towards outputs

- Output 1: Local authorities and the war-affected population in target locations benefit from the provision of winterization and power supply materials and equipment.
- Output 2: Winterization materials and equipment provided to the local authorities and the conflict-affected population
- Output 3: Winterization materials and energy infrastructure equipment provided to the local authorities and the conflict-affected population.
- Output 4: High voltage energy infrastructure and equipment restored for supporting electricity generation, transmission, and supply.
- Output 5: Power supply to Combined Heat and Power Plants (CHPs) restored and enhanced to supply consumers with electricity, heat and water in Kyiv and Odesa.
- Output 6: High voltage energy infrastructure and equipment restored for supporting electricity generation, transmission, and supply.

Key achievements

The project has been actively supporting the rehabilitation and provision of high-voltage energy infrastructure and equipment to strengthen electricity generation, transmission, and supply in the Kyiv and Odesa regions. The project focuses on restoring critical power infrastructure to ensure the reliable delivery of essential services and enhance energy security in these key areas.

The following is a list of infrastructure assets and equipment that have been funded by the winterization project.

Table 1: List of energy assets and equipment funded by the winterization project

Description	Donors	Status of the procurement process (completed, ongoing)	Delivery	Installation	Operation
Three auto-transformers (3 30kV 195 MVA) for Power Stations in Central Ukraine	Japan (2 units) and Norway (1 Unit)	Completed and transportation of auto-transformers is also supported by this project	Due to be delivered in early Dec. 2024	Installation will start upon delivery.	Not yet operated
9 auto-transformers (750kV or 330kV)	Japan (7 units) and Norway (2 Units)		8 have been completed, remaining the one standing by.	2 have been installed, and the rest are serving as reserves.	Not yet operated.
Bushings (25 for 750kV/15 330kV)	South Korea (25 Units), Iceland (15 Units), Germany (transportation)	Completed	Completed.	Installed	Operational

One gas-powered generation unit in Kyiv	Japan	Completed	On-going. To be completed by the end of 2024.	Installation will start upon delivery.	Not yet operated
One gas-powered generation unit in Kharkiv	Japan	Completed	On-going. To be completed by the end of 2024.	Installation will start upon delivery.	Not yet operated
Auxiliary equipment for three CHPs	Japan	Completed	Some equipment has been delivered. The rest will be done by the end of 2024.	Installation will start upon delivery.	Not yet operated
Four units of Gas engine co-generation (gas pistons) in Odesa	Japan (2 units), Norway (1 unit) Sweden (1 unit)	Completed	Two units have been delivered, and the remaining 2 will be delivered by the end of Dec.	On-going	Not yet operated
One gas compressor in Yuliyivske gas field		Completed	On-going. To be completed by the end of Dec.	Installation will start upon delivery.	Not yet operated

These infrastructure upgrades are designed to address urgent energy needs while also enhancing the resilience of the national power grid. The inclusion of both generation and transmission components ensures that the project not only restores lost capacity but also supports the sustainability of energy systems in the long term.

Provision of Energy Equipment For enhancing energy generation capacity particularly in Kyiv and Odesa, the procurement process of two gas turbines for CHPs was completed and delivered at Gdansk, Poland, which was jointly implemented with another Japan funded project of 'Promotion of human security in Ukraine through responding to the multidimensional crisis caused by the war.' Transportation of the one to be installed near completion, while the other turbine that is initially allocated for Odesa has been standing by in Gdansk ready to be transported. Upon the final decision regarding the relocation by the government of Japan, the recipient of this turbine will be changed to Kharkiv. Taking cautious measures to unforeseeable security risks, it is recommended to store the equipment outside of Ukraine at this moment. The auxiliary units for the gas turbines (boosting compressors, step-up transformers and circuit breakers) are under manufacturing. Four Gas Pistons generation units for Odesa are procured and completed manufacturing. One unit has already been delivered to the site and the rest are on shipment.

Meeting unexpected urgent needs to restore transmission capacity across Ukraine, three auto-transformers were procured under this project, manufacturing and shipping are in progress. Transportation of auto-transformers is also supported by this project.

Status of energy equipment (delivery and installation).

Overall, all planned procurements within the winterization project have been completed as planned, some of which have advanced to delivery and installations stages while others are progressing. The challenges in achieving

this stage are primarily attributed to the lengthy and complex procurement processes, insufficient funding for installation, and the challenging security situation in the targeted areas. The procurement process has been challenged by the specialized nature of the energy infrastructure components, some of which required customization or had to be sourced from international markets. The volatile security environment has also posed significant obstacles, with many suppliers reluctant to operate in high-risk areas, adding further delays to delivery and installation efforts.

As per table 1 above, all procurements have been completed, and delivery of equipment is progressing well with some already delivered and installed and others and due to be delivered and installed soon.

Training and capacity building

As part of the contracts for purchasing the energy equipment, suppliers have been providing training to local staff on the maintenance and operation of the new infrastructure. This training ensures that local personnel are equipped with the necessary skills to manage and maintain the equipment effectively. In the short term, the suppliers are responsible for performing maintenance as part of their contractual obligations, ensuring smooth operations during the initial phase. Over the longer term, the trained local staff will take over these responsibilities, ensuring the sustainability of the equipment and reducing dependence on external support. This approach helps build local capacity, promotes knowledge transfer, and strengthens the ability of local authorities to operate energy systems on the long term, contributing to the long-term resilience of the energy infrastructure.

Stakeholders engagement

The project collaborated closely with local authorities, such as Ukrenergo, and key international suppliers, including Siemens and Hitachi, to ensure effective technical coordination and compliance with national standards. This partnership involved aligning procurement, design, and installation activities with Ukraine's regulatory frameworks, such as the Ukrainian National Building Code, to guarantee that the infrastructure upgrades meet safety, operational, and quality standards. The project collaborated closely with authorities and power utility companies to assess damages, prioritize repairs, and estimate costs through a multi-step validation process. This process ensured that data was gathered exclusively from primary sources and substantiated by robust evidence, including photos, videos, satellite imagery (where available), reports of technical violations within the system, site inspection reports, expert conclusions, and official documentation. Technical experts carefully triangulated the data on damages with reports from the State Emergency Service, decentralized information from Oblast Military Administrations, and centrally collected data from the Ministry of Energy, Ukrenergo, and other key stakeholders.

The collaboration with local authorities was critical not only for meeting compliance requirements but also for leveraging their on-the-ground expertise. Ukrenergo's in-house design team actively participated in developing site-specific engineering plans, while local operational staff provided valuable insights into existing infrastructure challenges. This ensured that the new equipment would be integrated smoothly into the energy grid, minimizing disruptions during installation and operation.

At the same time, the project facilitated engagement of on-the-ground and Ukrenergo's expertise with suppliers like Siemens and Hitachi to address technical issues promptly. These suppliers were involved throughout the process, from the customization of equipment to meet site-specific needs, to providing on-site technical support, training, and supervision during the installation phase. This close coordination helped anticipate and resolve

potential challenges early, ensuring that the equipment was not only compliant but also installed efficiently and maintained to the highest standards.

Communication

The winterization project has actively communicated its activities to the public through a variety of channels. These efforts include publishing videos on YouTube, sharing updates and progress through social media posts, and producing seven web articles to highlight key milestones and achievements. Additionally, the project has extended its visibility by contributing articles to the platforms and websites of partner organizations. This multi-channel communication strategy not only ensures transparency but also helps raise awareness about the project's impact and the importance of energy infrastructure restoration in Ukraine. It fosters public engagement, keeps stakeholders informed, and attracts potential donors by showcasing the progress made and challenges encountered. These efforts are crucial for maintaining momentum, building trust with the public and partners, and securing continued support for future initiatives. Key article published included:

- NPC Ukrenergo received 40 high-voltage bushings from the UNDP, purchased with funds from the governments of Korea and Iceland.
- Ukrenergo received important equipment from Korea and Iceland to restore power facilities
- Ukrenergo receives equipment to restore substations through UNDP
- NPC Ukrenergo received 40 high-voltage bushings from the UNDP, purchased with funds from the governments of Korea and Iceland.
- UNDP in Ukraine, with funding from the governments of the Republic of Korea and Iceland, handed over 40 high-voltage bushings to Ukrenergo
- UNDP, with funding from the Republic of Korea and Iceland, hands over 40 high-voltage bushings to Ukrenergo
- Ukrenergo receives equipment to restore substations through UNDP

4.3 Effectiveness

Findings

The project has been effective in achieving its objectives, as demonstrated by the successful procurement of key energy equipment and the establishment of a foundation for the larger Green Energy Recovery Programme in Ukraine. However, the design of the Project Initiation Plan (PIP) lacked clearly defined targets, which could have served as benchmarks to assess whether the project fully met its intended outcomes. While progress has been made, the transition from outputs to tangible outcomes and long-term impacts is still underway.

The project faced significant challenges in implementing large-scale procurement for energy infrastructure, including the complexity of sourcing non-standard components. Many items required customization to meet site-specific technical needs, further prolonging timelines, while others had to be sourced internationally due to unavailability in Ukraine, leading to extended supplier identification, contract negotiations, and logistics management—some taking up to nine months to finalize. Additionally, suppliers unfamiliar with UNDP's procurement processes required orientation. Despite these significant challenges, the project succeeded in implementing procurement within set timeframes.

The project faced other challenges that slowed progress and hindered achievements. The ongoing war in Ukraine created a volatile environment where energy needs and priorities shifted rapidly due to emergent circumstances, requiring frequent reallocations of resources and adjustments to plans. Security concerns

compounded these difficulties, as many suppliers were unwilling to operate in high-risk areas, leading to delays in installation and increased costs due to logistical complexities, additional safety measures, and higher insurance premiums.

Managing stakeholder expectations presented another significant obstacle, as recipients of energy equipment often underestimated the complexity and timelines involved in large-scale infrastructure projects. Misaligned expectations led to frustration, highlighting the need for clear and ongoing communication about project timelines and the naturally lengthy procurement process for energy equipment.

The project has been somehow effective in meeting its objectives, as evidenced by the procurement of key energy equipment and the establishment of a foundation for a larger initiative, the Green Energy Recovery Programme in Ukraine. However, the design of the Project Initiation Plan (PIP) did not include clearly defined targets that could serve as benchmarks for assessing whether the project fully achieved its intended outcomes.

While progress has been made, the transition from outputs to tangible outcomes and long-term impacts remains ongoing. The procurement of energy equipment is still underway, and the anticipated positive effects of restoring energy supply on Ukrainian communities have yet to fully materialize. As the equipment installation and energy restoration efforts continue, it is expected that the project's impact on essential services, such as healthcare, water supply, and overall community well-being, will become more apparent over time.

The project has made notable progress in enhancing energy generation capacity, particularly in the key urban centers of Kyiv and Odesa, by advancing the procurement of critical energy infrastructure. A major milestone has been the successful procurement of two gas turbines for Combined Heat and Power Plants (CHPs), which will play a pivotal role in stabilizing the energy supply in these regions. These turbines are designed to ensure a more reliable source of electricity and heating, particularly during periods of peak demand and harsh winter conditions.

In addition to the turbines, the project has procured gas-powered generation units and gas-piston co-generation systems, which provide both electricity and heat more efficiently. These co-generation units are essential for improving energy efficiency by maximizing fuel utilization, making them ideal solutions for areas with simultaneous power and heating needs. The accompanying auxiliary equipment, such as compressors, transformers, and control systems, has also been procured to ensure smooth installation and operation of the main equipment. To further strengthen the energy transmission network, the project procured high-capacity auto-transformers (330kV) to support voltage regulation and stabilize power flows across the grid. These transformers are essential for restoring and enhancing the transmission of electricity, reducing the frequency of blackouts, and ensuring consistent energy delivery to households, businesses, and critical infrastructure, such as hospitals and water treatment plants.

These efforts reflect the project's commitment to not only restore power generation but also build a resilient energy infrastructure capable of withstanding future disruptions. As installation and commissioning of these assets progress, Kyiv and Odesa are expected to experience significant improvements in energy security, contributing to both the short-term recovery of essential services and the long-term sustainability of energy systems in Ukraine.

Success factors and challenges

One of the key success factors for the project was that, despite its brief design phase, it was informed by insights from the Ukraine Energy Damage Assessment conducted in 2023 by UNDP and the World Bank, in collaboration with the Government of Ukraine. This comprehensive assessment provided a detailed quantification of the damage inflicted on the energy sector by the war and served as the foundation for prioritizing interventions. The assessment identified the most critical needs for restoring access to electricity for millions of Ukrainians, as well as for key social infrastructure. These priorities included not only the restoration of power to residential areas but also the repair of essential services such as heating, potable water systems, wastewater treatment facilities, and communication networks. By relying on data from this assessment, the project was able to focus its efforts on the areas with the highest impact, ensuring that interventions addressed the most urgent needs while laying the groundwork for long-term recovery and resilience in the energy sector.

Another key success factor has been the generous support from the donor community, which recognized the critical importance of restoring energy supply for Ukrainian communities during these challenging times. This financial and logistical backing has been instrumental in enabling the timely procurement of essential equipment and supporting repair efforts across the energy infrastructure. The commitment from international partners reflects a shared understanding that restoring access to electricity is not only vital for powering homes but also essential for maintaining critical services such as healthcare, heating, water supply, and communication networks. The donors' contributions have ensured that resources were mobilized swiftly and effectively, helping to mitigate the humanitarian impact of the ongoing conflict. Their support has allowed the project to implement solutions that address both immediate needs and the longer-term objective of building a more resilient, sustainable energy system in Ukraine.

On the other side, the project has been challenged by a number of factors that either slowed down progress or hindered the achievements of the project, these include:

- **The ongoing war in Ukraine has created a highly volatile environment, where energy needs and priorities are rapidly evolving based on the circumstances on the ground**. This dynamic situation has impacted the project's ability to clearly define and maintain consistent priorities, leading to occasional shifts in focus. The challenge was further complicated by urgent requests from cities facing sudden disruptions in energy supply following attacks. These emerging needs required immediate action, forcing the project to reallocate resources, change sites and adjust plans on short notice to restore energy services. While responding to these urgent requests was essential to mitigate the humanitarian impact, it also strained the project's ability to follow its original framework and led to operational challenges in balancing long-term goals with short-term demands.
- The **implementation of large-scale procurement for energy infrastructure** is naturally complex and lengthy. Many of the required items were not standard components in UNDP's procurement systems, making it difficult to identify the most efficient processes for managing such large-scale acquisitions, especially when the UNDP procurement system is not necessarily designed to serve large scale infrastructure. Additionally, some of the equipment was not readily available in the market and needed to be customized to meet the specific technical requirements of individual sites. The project had to wait for the manufacturing and customization of these specialized assets. Further complications arose from the need to source some equipment from international markets, as these items were unavailable domestically in Ukraine.
  On the other hand, a key challenge was that common suppliers for energy infrastructure are often unfamiliar with UNDP's procurement systems and additional effort in aligning processes. Suppliers required orientation and support to navigate the specific requirements, which slowed procurement timelines.
  The procurement process was therefore extended by the time needed to identify suppliers abroad, negotiate contracts, and manage international shipping logistics, for example, it took 9 months to reach a point of signing a contract with the preferred supplier in some cases.

Despite these challenges, the project successfully completed all procurement as planned and deployed engineering expertise to develop precise technical specifications for each energy asset. This expertise ensured that the equipment met the unique operational needs of the different sites. Additionally, the project implemented a rigorous inspection process to guarantee compliance with technical standards and ensure the delivery of high-quality equipment. These efforts were critical to overcoming the complexities of procurement, ensuring the project stayed aligned with its goals of restoring energy supply and building resilient infrastructure.

The installation of the new energy equipment faces a critical timing challenge, as it must be completed before the onset of harsh winter weather. Delays in installation could leave vulnerable communities without reliable energy access during the coldest months, exacerbating the already challenging living conditions in affected areas. This urgency requires careful coordination among project teams, suppliers, and local authorities to ensure that installation schedules are adhered to and any unforeseen delays are mitigated. Adaptive planning, streamlined logistics, and contingency measures will be essential to meet this tight timeline and ensure the infrastructure is operational when it is needed most.

- **Security concerns within Ukraine have made it challenging to find suppliers willing to deliver and install equipment in areas identified as high-security risks**. Many international suppliers were reluctant to operate in these regions due to the potential dangers posed by the ongoing conflict. .

  This challenge has been particularly present for the gas turbines, as no viable international assembly teams have been willing to operate in high-risk areas, however, this should have minimal impacts as the project indicated the existence of qualified companies locally in Ukraine who are able to deliver the installation, the project is currently implementing the biding process for this purpose..

  One potential scenario is to facilitate the training of Ukrainian engineers by sending them to the supplier's facilities abroad. This approach would allow local experts to gain hands-on experience with the equipment installation process directly from the manufacturers. Upon returning to Ukraine, these engineers could lead the assembly efforts with remote support and guidance from the supplier's technical teams. To supplement this, the project also is also arranging for real-time online consultations, enabling the supplier's experts to provide step-by-step guidance and troubleshooting during the assembly process.

  UNDP uses its Long Term Agreement (LTA) for war insurance with reasonable cost to cover the insurance for equipment procurement.
- The project faced challenges in **managing stakeholder expectations, particularly among recipients of energy equipment**, who developed inaccurate expectations about the time required to procure, install, and operationalize large-scale energy infrastructure. Given the urgency of the situation, some stakeholders anticipated quicker timelines, underestimating the complexity and length of the procurement, logistics, and installation processes involved in deploying new energy equipment at this scale. To address this, clear and ongoing communication with stakeholders about project timelines, the naturally lengthy procurement process for energy equipment, and logistical challenges is essential. Establishing a transparent dialogue early on can help align expectations with the realities of large-scale infrastructure projects, fostering patience and understanding among recipients and other stakeholders. This approach can build trust, reduce frustration, and improve collaborative support throughout the project lifecycle.
- **Coordination and communication with various agencies proved challenging**, as differing perspectives emerged regarding priority areas and infrastructure to be targeted. Each agency, based on its mandate, expertise, and assessment of needs, had its own view on which regions and facilities required immediate intervention. This divergence in priorities complicated efforts to align actions and coordinate resources effectively. For example, some agencies prioritized restoring power in urban centers with large populations, while others focused on critical infrastructure such as hospitals or water treatment facilities in rural or conflict-affected areas. These differences occasionally led to delays in decision-making and operational planning, requiring extensive discussions to reach a consensus on the sequencing and scope of interventions. However, the project worked actively to mitigate these challenges by establishing regular communication channels with key stakeholders, including national authorities and local agencies. Coordination meetings, shared progress reports, and joint assessment processes were employed to align efforts and ensure that the most urgent needs

were addressed in a timely manner. While the differing priorities posed initial challenges, the collaborative approach helped build stronger partnerships over time, fostering better understanding among agencies and improving the effectiveness of interventions.

Gender mainstreaming

Findings

The Project Initiation Plan (PIP) did not explicitly incorporate a gender mainstreaming approach, as the primary focus was on procuring critical energy infrastructure to address the urgent needs on the ground. However, the project laid the foundation for the Green Energy Recovery Program, which integrates gender-sensitive practices into planning, implementation, and monitoring. The new program incorporates gender-disaggregated data analysis and networks to address barriers to women's empowerment in the energy sector, such as traditional gender norms, underrepresentation in education and training, and inadequate recruitment strategies.

The Project Initiation Plan (PIP) did not explicitly incorporate a gender mainstreaming approach, as the primary focus was on procuring critical energy infrastructure to address the urgent needs on the ground. Given the severity of the situation, the immediate priority was to restore power and essential services to mitigate the humanitarian impact of energy shortages, which in turn will benefit vulnerable communities including women and men. Although gender-specific considerations were not part of the initial project design, restoring energy access plays a crucial role in improving the well-being of all affected populations. Reliable energy supply supports critical services such as healthcare, heating, water provision, and communication, which are essential for everyday life and particularly important for vulnerable groups.

In addition, as an initiation project, the PIP laid the foundation for more comprehensive interventions and the subsequent Green Energy Recovery Program has integrated gender mainstreaming elements into its framework to ensure that future efforts address the diverse needs of all population groups. This includes considering the different ways energy access impacts men, women, and vulnerable groups, and promoting equitable access to energy services. The new program aims to embed gender-sensitive practices across all phases of planning, implementation, and monitoring, ensuring that the recovery process is inclusive and supports long-term social and economic empowerment. This including the collection and analysis of gender-disaggregated data and the development of ecosystems and networks promoting gender mainstreaming, in line with Eurostat requirements and the 10-points Agenda for Gender Equality in Crisis 10-Point Action Agenda for Advancing Gender Equality in Crisis Settings.

The new program design recognises that a better understanding of gender dynamics in the sector can improve governance by informing more inclusive and equitable policies. Through these efforts, the Programme aims to enhance governance, promote gender equality, and attract investment for sustainable development in Ukraine's energy sector.

A key activity under the program is to undertake gender analysis on impact of the war on the energy sector. Recommendations of the gender analysis under this activity will provide strategic action for women empowerment in the energy sector, taking into consideration the context of the war and projected increased share of renewables in the energy capacity. The gender analysis should further address key barriers to women's employment and empowerment identified in research, including restrictions on employment in professions with difficult or hazardous conditions, (under)representation in energy and renewable energy education and training

programs, traditional gender role norms, inadequate gender-sensitive recruitment strategies, and the absence of gender-based development goals within energy companies.

4.4 Efficiency

Findings

The cost efficiency of the project is rooted in its programmatic approach, where the PIP functions as an initiation and preparatory phase for the larger Green Energy Recovery Program while simultaneously addressing urgent energy needs. This approach leverages early investments in infrastructure, planning, and procurement to minimize service disruptions and avoid the higher costs associated with prolonged energy outages.

Overall, the project demonstrated high efficiency in delivering outputs within budget and agreed disbursement limits while leveraging additional investments and in-kind contributions from partners. This approach not only optimized resource use but also laid a solid foundation for achieving long-term outcomes and impacts.

Although the Ukrainian government did not make direct financial contributions to the project accounts, it provided significant funding to facilitate implementation, including covering insurance costs and preparing installation sites by removing old, damaged infrastructure and clearing areas for new equipment. Additionally, Ukrainian authorities constructed attack-proof shelters to protect the newly installed equipment from potential future attacks, demonstrating their commitment to safeguarding investments. Another significant contribution was the recycling and disposal of old, damaged energy equipment. This involved safely removing, handling, and properly disposing of non-functional infrastructure, ensuring environmental compliance and clearing space for new installations.

So far, 75% of the total financial resources had been utilized, leaving a remaining balance of US$ 23,093,744. This unspent amount has been reallocated to the Green Energy Recovery Program to continue similar activities. The expenditure of nearly $69 million within one year is justified by the scale of procurement involved, reflecting the significant investments required to address urgent energy infrastructure needs and lay the foundation for long-term recovery efforts.

Efficiency is a measure of how economically resources/inputs (funds, expertise, time, etc.) are converted into results.

The cost efficiency of the project is embedded in its programmatic approach, where the PIP serves primarily as an initiation and preparatory phase for a larger, more comprehensive program while simultaneously addressing urgent needs. This approach is cost-effective because it leverages the initial investments in infrastructure, planning, and procurement to lay the groundwork for the subsequent Green Energy Recovery Program. By addressing immediate priorities early on, the project minimizes disruptions to critical services and avoids the potentially higher costs associated with prolonged energy outages.

Furthermore, the preparatory nature of the PIP allows for efficient resource allocation and smoother scaling of activities, as lessons learned during this phase inform the design and implementation of the larger program. Additionally, the integration of engineering expertise and careful coordination with national and local stakeholders during this preparatory phase reduces the risk of rework or misaligned investments, further enhancing cost efficiency.

UNDP also implemented cost-effective measures in the major procurement tenders conducted during this project by adhering to its Programme and Operations Policies and Procedures (POPP). These policies ensure that procurement processes are transparent, competitive, and efficient, maximizing value for money. By following

POPP guidelines, the project was able to identify the most suitable vendors through competitive bidding, negotiate favourable terms, and ensure that procurement timelines were met without compromising quality. The application of POPP also helped mitigate risks associated with large-scale procurement, such as supply chain disruptions and market volatility, by establishing clear procedures for contract management, supplier performance monitoring, and contingency planning. This structured approach ensured that resources were allocated effectively, avoiding unnecessary expenses and delays.

In brief, the Project has been efficient in delivering outputs/products and in paving the way for outcomes and effects/impact in a high degree of accomplishment vis-à-vis expected targets. Also, it has provided value-for-money since it achieved most of the results within budgets, agreed disbursement, etc., while leveraging investments and in-kind support from partners engaged in the project.

Finance

In terms of financial resources, the total funding for the PIP stage amounted to **US$ 92,003,970**, provided by multiple bilateral donors, including Germany, Norway, South Korea, Iceland, Japan, and Sweden. Japan contributed the largest share, accounting for over three-quarters of the total funding, reflecting its strong commitment to supporting the restoration of Ukraine's energy infrastructure. This diverse funding base ensured that the project could address urgent energy needs effectively while laying the foundation for the longer-term Green Energy Recovery Program. The collaborative effort from these international partners highlights the global recognition of the importance of restoring energy services in Ukraine, which are essential for maintaining critical public services and supporting the resilience of war-affected communities.

Although no direct financial contributions were made by the Ukrainian government to the project accounts, the Ukrainian authorities have made significant contributions to support the implementation. Their efforts include covering the insurance cost and preparing the sites for the installation of new energy equipment by removing old, damaged infrastructure and clearing the areas. Additionally, the authorities have constructed attack-proof shelters to protect the newly installed equipment from potential future attacks.

Another cost borne by the Ukrainian authorities is related to the recycling and disposal of the old, damaged energy equipment. This process involved the safe removal, handling, and proper disposal of non-functional infrastructure to ensure the cleared sites were ready for new installations. Recycling and disposal efforts are critical not only for environmental compliance but also for making space for the new equipment.

These contributions highlight the Ukrainian authorities' active role in facilitating the project's implementation. Their involvement has reduced the project's operational burden, enabling more efficient use of financial resources while ensuring the new infrastructure is installed in a timely and sustainable manner.

Table 2: Funding breakdown by funding source.

Source of funding	Total Budet	Percentage
Germany	$ 4,000,000.00	4%
Norway	$ 9,923,094.00	11%
South Korea	$ 2,000,000.00	2%

Iceland	$ 500,000.00	1%
Japan	$ 70,000,000.00	76%
Sweden	$ 5,580,876.00	6%
Total project budget	**$ 92,003,970.00**	100%

By the end of the winterisation project, the project had utilized over 75% of its total financial resources, leaving a remaining balance of US$ 23,093,744 which has been already reallocated to the Green Energy Recovery Program to pursue similar activities. The ability to spend nearly $69 million in one year is justified by the scale of the procurement that this project has been doing.

Table 3: project expenditures overview

Award	Output	Source of funding	Total Budget	Open Ordered Amount (IPSAS)	GL (Net Accounted Amt) - actual expenditures	Total consumption up to October 2024[6]	Remaining	% delivery
910441	Output 1	Germany	$ 4,000,000	$ 1,725,315	$ 159,929	$ 1,885,244	$2,114,756	47%
1083013	Output 2	Norway	$ 9,923,094	$ 3,991,493	$ 3,018,268	$ 7,009,761	$v2,913,333	71%
1010029	Output 3	South Korea	$2,000,000	$ 14,325	$ 1,397,714	$ 1,412,039	$ 587,961	71%
1071015	Output 4	Iceland	$500,000	$ -	$ 446,756	$ 446,756	$ 53,244	89%
1063018	Output 5	Japan	$ 70,000,000	$12,405,580	$ 41,137,873	$ 53,543,453	$ 16,456,547	76%
1131127	Output 6	Sweden	$ 5,580,876	$ 3,860,105	$ 752,867	$ 4,612,972	$ 967,904	83%
	Total		**$ 92,003,970**	**$ 21,996,818**	**$ 46,913,408**	**$ 68,910,226**	**$ 23,093,744**	**75%**

In terms of the project financial management, the UNDP reviews the expenditures and closely monitor the expenditures according to the plans and in accordance with UNDP rules and procedures.

Regarding the timeframe, the project commenced in January 2023 and was originally scheduled to conclude in April 2024. However, due to delays resulted from change of the installation of the turbine from Odesa to Kharkiv, the Japan funded component has been extended till Sept 2025 to be managed under the green energy programme . On 18 April 2024, the Project Board formally acknowledged the results achieved under the PIP for the Support for Winterization and Repairing of Energy Sector Infrastructure Facilities. Following this review, the board endorsed the transition to a full-scale development initiative, the Green Energy Recovery Programme. This new program will build on the progress made under the PIP by continuing efforts to restore Ukraine's critical energy infrastructure while introducing a green transition component.

The project experienced substantial time pressures in the procurement processes for energy equipment, primarily due to the complex nature of these acquisitions. Many of the required items were not readily available in the market and had to be either customized to meet specific site requirements or sourced from international suppliers. These factors significantly complicated the procurement process, as customization required additional

[6] Actual numbers may vary and will need to be sourced from Quantum System by the end of the financial year.

manufacturing time, and international procurement involved navigating global supply chains, shipping logistics, and customs processes. These challenges highlighted the difficulties of acquiring specialized energy infrastructure components in a tight timeframe, particularly in a conflict-affected context where urgent delivery is essential. Despite these setbacks, the project continued to progress by actively managing procurement workflows, liaising with vendors, and coordinating with stakeholders to mitigate delays as much as possible.

Project Management

This project was implemented under the framework of the UNDP Country Program Document for Ukraine, using the Direct Implementation (DIM) modality, with UNDP Ukraine serving as the Implementing Partner. The project adhered to UNDP's Programme and Operations Policies and Procedures, ensuring that progress and achievements were monitored and reported in line with the reporting requirements of the respective donors.

UNDP provided effective project management and coordination through the engagement of a programme manager and specialists based in the Country Office in Kyiv and at Regional Hubs. In addition, technical experts were deployed to support various aspects of the project. The implementation team also benefited from the support services of the Operations Team of UNDP Ukraine, which provided assistance with procurement, human resources, finance, and other administrative functions. This comprehensive support structure enabled efficient project delivery while ensuring compliance with operational standards.

Recruiting a specialized procurement team has been essential for managing the complex procurement processes in this project. Given the technical nature of energy infrastructure components and the challenging conditions in conflict-affected areas, a team with expertise in high-stakes procurement was critical to navigating the complexities of sourcing, contracting, and logistics. This specialized team brought in-depth knowledge of procurement best practices, enabling the project to handle the detailed requirements of sourcing unique and often customized energy equipment. Their expertise helped streamline negotiations with suppliers, ensure compliance with procurement regulations, and mitigate risks associated with supply chain disruptions and high-risk deliveries.

To ensure efficient use of resources, the project actively coordinated with other UNDP initiatives wherever possible, pooling expertise, capacity, and resources to maximize impact. This collaborative approach helped avoid duplication of efforts and ensured that technical and operational synergies were fully utilized. In particular, close coordination was established with the project "Promoting Human Security in Response to the Multi-Dimensional Crisis in Ukraine," which is also funded by the Government of Japan. This partnership allowed the two projects to share logistics, technical expertise, and procurement processes, enhancing the overall effectiveness of both initiatives. By leveraging the strengths of multiple projects, the effort contributed to a more streamlined response to the critical energy infrastructure needs in Ukraine, ensuring better resource management and faster implementation.

As a project implemented under the PIP (Project Initiation Plan) modality, the winterization project was not required to have a formal project board. However, in preparation for the upcoming Green Energy Recovery Program, a project steering committee was established. This new committee has taken on the role of a primary decision-making platform for the program, providing strategic oversight and guidance on project direction, resource allocation, and risk management. By forming this steering committee early, the project has created a foundation for effective governance and continuity as it transitions to the larger Green Energy Recovery Program.

Monitoring and evaluation (M&E)

M&E design: As a PIP project, a brief M&E plan was included in the project initiation phase. This plan focused on tracking project progress, monitoring risks, providing progress reports to donors, and conducting a final evaluation. Given the project's scale and urgency, this streamlined M&E approach was assessed as suitable for the PIP stage. However, as the project transitions into the larger Green Energy Recovery Program, a more comprehensive M&E framework will be essential. A robust M&E plan for the new program is expected to include detailed indicators for both outputs and outcomes, regular impact assessments, stakeholder feedback mechanisms, and an enhanced risk management component. This will enable more precise tracking of long-term impacts, improve accountability, and ensure the program's alignment with both donor expectations and sustainable development goals.

M&E implementation

The winterization project has consistently submitted progress reports to UNDP Headquarters Funding Windows, which then reviews and consolidates these reports into a single comprehensive update for the multi-donor group. This streamlined approach helps maintain consistency and coherence in reporting, allowing donors to receive a unified overview of project progress. Additionally, the project has provided separate progress reports to the Japanese Embassy, given Japan's role as the largest donor for this project phase. This direct communication with the primary donor has ensured that Japan receives detailed, timely updates on how its contributions are being utilized, strengthening donor relations and accountability.

The winterization project has maintained an updated risk profile by actively identifying emerging risks and documenting corresponding mitigation measures. This ongoing risk management process has allowed the project team to adapt to changes in the operating environment and address potential challenges proactively. Risks have been systematically documented and regularly updated within the Quantum system, ensuring that all project risks and mitigation efforts are clearly recorded and accessible.

This Final Evaluation is being conducted after the project has transitioned into the broader Green Energy Recovery Program. While ideally, the evaluation would have taken place before this transition, there is still a valuable opportunity to apply its insights. Lessons learned from this evaluation can directly inform the Green Energy Recovery Program, enabling the implementation of adaptive management practices. By integrating feedback and recommendations from the evaluation, the program can refine its strategies, improve operational efficiency, and enhance its impact. This approach ensures that insights from the winterization project contribute to more effective planning, risk management, and stakeholder engagement in the ongoing energy recovery efforts.

4.5 Sustainability

Findings

The sustainability of the winterization project faces significant risks due to the ongoing war, as energy infrastructure remains a likely target for renewed attacks. To mitigate these risks, local authorities have implemented protective measures, such as constructing attack-proof shelters at critical sites like the Pivnychna substation, enhancing the resilience of the infrastructure and maintaining energy services under challenging circumstances. Despite these threats, the technical capacities of participating authorities are sufficient to

ensure the long-term maintenance of the new equipment, supported by skilled engineers and existing resources, which alleviates financial pressures and ensures performance standards are upheld.

The long-term financial sustainability of the winterization project depends on the capacity of local authorities to maintain the newly installed equipment and ensure it continues to meet performance standards. Local authorities are well-prepared for this responsibility, having prior experience in maintaining similar infrastructure, supported by skilled engineers and technical personnel who are familiar with the equipment and operational processes. However, the availability of funding for the installation of the procured equipment remains a critical factor for the project's success.

The project is expected to have significant positive socio-economic impacts on vulnerable Ukrainian communities once the installation and operation of the new energy systems are completed. Stable access to electricity and heating will enhance the provision of essential services such as healthcare, education, and water supply, improving overall quality of life.

The replacement of energy equipment potentially poses environmental risks, particularly the potential exposure to hazardous materials such as polychlorinated biphenyls (PCBs) found in older electrical transformers. While Ukrainian authorities have reported adherence to national legislation and applied environmental safety protocols to comply with international guidelines for PCB disposal, the project team has not conducted direct inspections or received detailed reports on these processes.

Institutional sustainability

The ongoing war poses significant risks to the sustainability of the winterization project, as energy infrastructure remains a potential target for renewed attacks. The possibility of damage to the newly installed equipment is high, given that energy facilities have been targeted throughout the conflict, and similar attacks are likely to occur again. In response, local authorities have implemented preventive measures to mitigate the impact of future attacks. One key strategy has been the construction of attack-proof shelters that are being implemented at key sites (e.g., Pivnychna substation) to prevent damage from future attacks on critical energy equipment. These physical barriers aim to shield the infrastructure from direct damage, enhancing its resilience and helping to maintain energy services even under challenging circumstances. While these protective measures are crucial, the persistent threat of attacks underscores the need for ongoing risk assessments, adaptive strategies, and contingency plans to ensure the uninterrupted functioning of the energy infrastructure.

The technical capacities of the participating authorities benefiting from the new infrastructure appear to be sufficient to ensure the sustainable maintenance of the energy equipment in the future. These authorities have experienced engineers and technical personnel who are well-versed in operating and maintaining similar energy systems. Their familiarity with infrastructure management, along with the availability of skilled staff, provides confidence that they can maintain the equipment to the required performance standards. This level of preparedness reduces the risk of equipment downtime and ensures that the restored infrastructure will continue to function effectively over the long term. The ability of these local authorities to handle maintenance also alleviates some financial pressures, as they can manage upkeep with existing resources and expertise, supporting the project's sustainability beyond its immediate implementation phase.

UNDP reported that the Ukrainian government authorities have demonstrated strong ownership over the newly provided energy equipment. This is reflected in their active involvement throughout the project, including preparing installation sites, removing damaged infrastructure, constructing protective structures, and managing the recycling and disposal of old equipment.

Financial sustainability

The long-term financial sustainability of the winterization project is closely tied to the financial and technical capacities of local authorities to maintain the newly installed equipment and ensure it continues to meet performance standards. Encouragingly, local authorities appear well-positioned to manage the long-term maintenance, as they have experience in performing similar tasks prior to the war. These authorities are already equipped with engineers and technical personnel who specialize in maintaining energy infrastructure. Their familiarity with the equipment and operational processes provides a solid foundation for sustaining the project's outcomes. This existing capacity reduces the risk of future performance issues and ensures that the infrastructure can remain functional and reliable, contributing to the stability of essential energy services over the long term.

Another important element of the financial sustainability of the winterization project is the availability of funding for the installation of the procured equipment. As noted earlier, the installation costs were not factored into the original project design, requiring UNDP to mobilize additional resources to cover these expenses. While UNDP has successfully secured partial funding for the installation, funding gaps still persist, preventing the full completion of all installations. This shortfall creates challenges in realizing the full benefits of the procured infrastructure and ensuring the timely restoration of essential energy services. To address these challenges, UNDP will need to continue and intensify its resource mobilization efforts, engaging with existing donors and seeking new funding sources. Ensuring that all installations are completed is critical to maximizing the project's impact and ensuring the infrastructure functions effectively to meet the energy needs of communities.

Socio-economic and environmental sustainability

The project is expected to have positive impacts on the socio-economic status of vulnerable Ukrainian communities once the installation and operation of the new energy systems are completed. Reliable access to electricity and heating will enhance the delivery of essential services, including healthcare, education, and water supply, improving the overall quality of life. Households will benefit from more stable energy access, reducing the hardships caused by power outages, particularly during harsh winter conditions. In addition, the restoration of energy infrastructure will support local businesses and industries, promoting economic recovery by enabling productive activities to resume. Access to energy will also create opportunities for employment and foster entrepreneurship in affected communities. Furthermore, stable energy services will reduce dependence on emergency interventions, contributing to long-term resilience and improving the capacity of communities to withstand future disruptions. Overall, the project is positioned to play a key role in enhancing the socio-economic well-being and stability of war-affected communities in Ukraine.

One of the potential environmental risks associated with the replacement of energy equipment is the potential exposure to hazardous materials, particularly polychlorinated biphenyls (PCBs), which are commonly found in older electrical transformers. PCBs are toxic substances that pose significant risks to human health and the environment, including risks of contamination to soil, water, and air if not handled properly during the removal and disposal processes.

The project team reported that the Ukrainian government authorities have adhered to national legislation to mitigate the environmental risks associated with the dismantling, transportation, and disposal of old transformers. They applied environmental safety protocols to ensure compliance with both national and international guidelines for the safe disposal of PCB-contaminated waste. However, the project team has not directly inspected these

processes nor received detailed reports on how this critical risk has been managed. The absence of thorough monitoring or comprehensive documentation raises concerns about the effectiveness of the mitigation measures and leaves some uncertainty regarding full compliance with safety standards. To ensure proper oversight, it may be necessary for the project team to engage further with the authorities, conduct follow-up inspections, or request detailed reporting to confirm that environmental risks have been adequately addressed.

Proper management of these environmental risks is critical to prevent exposure and contamination, ensuring that the replacement of energy infrastructure not only restores essential services but also aligns with environmental protection standards. This would also reflect a responsible approach to infrastructure development and contribute to Ukraine's broader goals of sustainable recovery and environmental stewardship.

5. Conclusion

Coherence and Relevance

1. The winterization project effectively utilized the PIP format to address urgent energy needs rapidly, enabling the immediate procurement of critical infrastructure while laying the foundation for the broader Green Energy Recovery Programme.
2. While the simplified PIP design allowed for rapid deployment, it limited the ability to comprehensively evaluate outcomes and introduced risks due to its reliance on a brief project design.
3. The winterization project is highly relevant to the urgent energy needs of vulnerable Ukrainian communities while empowering local and national stakeholders to restore and manage critical infrastructure

Progress Towards Results

4. The procurement of essential equipment and services is advancing, with delivery and installation expected to continue throughout 2024, potentially benefiting over 5.4 million people in key regions once installations are completed.
5. The winterization project laid a strong foundation for the Energy Green Recovery Program by initiating critical procurement, conducting technical assessments, engaging stakeholders, and aligning proposals with donor expectations, ensuring long-term energy recovery efforts are well-supported.
6. All planned procurements within the winterisation project have been completed as planned, some of which have advanced to delivery and installations stages while others are progressing. challenges included complex procurement processes, funding gaps for installation, and security challenges in targeted areas.

Effectiveness

7. The project has been effective, successfully procuring key energy equipment and laying a foundation for the Green Energy Recovery Programme, but lacked clearly defined targets to fully assess its outcomes, which is expected to be evaluated under the new Green Energy Program.
8. Despite significant procurement challenges faced, the project has successfully implemented all procurments. Procurement challenges included the complexity of sourcing non-standard components, customization requirements, and reliance on international suppliers, with some contracts taking up to nine months to finalize.
9. The ongoing war created a volatile environment, necessitating frequent reallocations of resources and adjustments to plans, which hindered progress and added complexity to implementation.
10. Security concerns further challenged procurement and installation, as suppliers were reluctant to operate in high-risk areas, resulting in higher costs and logistical challenges.
11. Misaligned stakeholder expectations regarding project timelines and complexities led to frustration, emphasizing the importance of clear, ongoing communication to manage expectations effectively.
12. The Project Initiation Plan (PIP) did not explicitly incorporate a gender mainstreaming approach, as the primary focus was on procuring critical energy infrastructure to address the urgent needs on the ground. However, the project laid the foundation for the Green Energy Recovery Program, which integrates gender-sensitive practices into planning, implementation, and monitoring.
13. A significant volume of work was required to procure large-scale equipment, addressing the complexities of sourcing, meeting customization requirements, and adhering to fast delivery timelines. Additionally, extensive efforts and time were invested in finalizing the legal terms of the contract between UNDP and the supplier to accommodate the high-risk context, ensuring all provisions were appropriately aligned with the challenging operational environment.

Efficiency

14. The project's cost efficiency lies in its programmatic approach, where the PIP served as a preparatory phase for the Green Energy Recovery Program, leveraging early investments to address urgent energy needs while minimizing service disruptions and avoiding higher costs from prolonged outages.

15. The project demonstrated high efficiency, delivering outputs within budget and agreed disbursement limits while leveraging additional investments and in-kind contributions from partners, effectively optimizing resource use and establishing a foundation for long-term impacts.
16. The Ukrainian government significantly supported the project by covering insurance costs, preparing installation sites, constructing attack-proof shelters, and recycling old energy equipment, highlighting its commitment to ensuring the sustainability of project investments.
17. To date, 75% of the total financial resources have been utilized, with a remaining balance of US$ 23,093,744 reallocated to the Green Energy Recovery Program. The expenditure of $69 million in one year reflects the scale and urgency of procurement activities necessary for addressing critical energy infrastructure needs.

Sustainability

18. The sustainability of the winterization project faces significant risks from the ongoing war, with energy infrastructure remaining a likely target for renewed attacks. Protective measures, such as attack-proof shelters at critical sites, have been implemented to enhance resilience and maintain energy services under challenging conditions.
19. Local authorities possess the technical capacities and experience needed to ensure the long-term maintenance of the new equipment, supported by skilled engineers and established resources, which alleviates financial pressures and ensures infrastructure reliability.
20. The availability of funding for the installation of procured equipment remains critical for the project's success, as it directly impacts the timely realization of benefits and restoration of energy services.
21. Once fully operational, the project is expected to deliver significant socio-economic benefits, enhancing access to electricity and heating, which are vital for healthcare, education, water supply, and overall community well-being.
22. The replacement of energy equipment involves potential environmental risks, particularly exposure to hazardous materials like polychlorinated biphenyls (PCBs). While Ukrainian authorities report adherence to safety protocols and international guidelines, the project team has not conducted direct inspections or received detailed reports on compliance, highlighting the need for enhanced oversight.

6. Recommendations & Lessons

6.1 Recommendations

With the broader Green Energy Programme already started, the recommendations provided by this FE are expected to play an important role to inform the implementation of the programme. The FE insights can help refine strategies, address potential gaps, and strengthen project execution as it progresses over the next few years.

1. **Engage further with the relevant authorities to ensure that environmental risks, particularly those related to hazardous waste, have been properly managed**. This can be achieved by conducting follow-up inspections at project sites to verify compliance with environmental safety protocols and by requesting detailed reporting on the handling, transportation, and disposal of hazardous materials, such as PCBs from old transformers. Proper documentation and inspection will also help mitigate potential environmental risks, ensuring that hazardous waste does not pose a threat to human health or the environment. Strengthening collaboration with authorities and enhancing monitoring efforts will not only improve accountability but also demonstrate a responsible approach to infrastructure restoration, aligning with sustainability and safety goals. **Responsibility: UNDP-PMU.**
2. **Showcase project successes to donors and stakeholders for resource mobilisation**. In addition to the current efforts for publicity and donor visibility and once the energy assets are fully installed and operational, they will have a direct, transformative impact on vulnerable Ukrainian communities by enhancing energy access and restoring essential services such as healthcare and education, which are heavily reliant on a stable energy supply. This milestone will be a powerful opportunity to demonstrate the tangible impacts of the project to donors, highlighting both immediate benefits and the strengthened resilience and stability of these communities in the long term. Communicating these successes can foster greater confidence among existing donors and attract new funding to further support the energy sector. By emphasizing how a fully operational infrastructure not only addresses urgent energy needs but also builds a foundation for sustainable development, the project can effectively advocate for expanded investment in Ukraine's energy recovery and resilience initiatives. Responsibility: UNDP.
3. To resolve the ongoing issue of international companies being unable to enter Ukraine to assemble procured equipment due to the security situation, it is recommended to **Explore a wide range of methodologies to ensure installation support from the suppliers which are facing the difficulties to enter Ukraine. One possible option is to train Ukrainian engineers by facilitating their travel to the supplier's facilities abroad**. This would provide them with direct, hands-on experience in the assembly process under the guidance of the manufacturers. Upon their return to Ukraine, these engineers could spearhead the on-site assembly efforts, supported by remote consultations from the supplier's technical teams. To enhance this approach, the project should continue to arrange for real-time online guidance, enabling supplier experts to provide step-by-step instructions and troubleshooting during the assembly process. These combined efforts would build local capacity, reduce dependence on international contractors, and ensure that the equipment can be operationalized despite the challenging security environment. **Responsibility: UNDP-PMU.**
4. **Document and share insights and best practices gained from the procurement processes applied in this project with UNDP-HQ**. It is essential to document and disseminate the insights, challenges, and best practices gained from the unique procurement processes employed in this project. The procurement of energy infrastructure represents non-traditional procurement activities for UNDP. These experiences offer valuable lessons that could benefit future stages of this project and other complex, high-risk projects within UNDP. The documentation should cover key aspects such as market research, vendor negotiations, risk mitigation strategies, and insurance. It should also highlight how unforeseen challenges—such as price volatility, legal complexities, and geopolitical constraints—were addressed. These lessons could serve as a

reference for future projects that require unconventional procurement approaches, including those involving high-value assets or specialized technical services. **Responsibility: UNDP-PMU.**

5. **Develop and implement a targeted communication strategy with two key objectives**: 1) Demonstrate Project Impacts: by highlighting the tangible benefits of the project through regular updates, case studies, and success stories that showcase how the restored energy infrastructure is directly enhancing access to essential services like healthcare, education, and heating for vulnerable communities. And 2) Manage Stakeholder Expectations: by providing transparent and consistent updates on project timelines, anticipated delays, and logistical challenges inherent to large-scale infrastructure projects, especially in conflict-affected regions. Clearly communicate the complexities of procurement, installation, and operationalization phases, using briefings, newsletters, and meetings to keep stakeholders informed. This approach can help align expectations with project realities, reduce misunderstandings, and foster trust and patience among stakeholders throughout the project lifecycle.
6. **Develop and implement an Impact Evaluation Framework for the Green Energy Recovery Program.** This will be essential to assess how effectively the program improves energy access for vulnerable Ukrainian communities and restores critical services, such as healthcare, education, and water supply. This framework should include clearly defined impact indicators to measure progress in energy access, reliability, and the operational status of restored services. Establishing baseline data for pre-intervention conditions will allow for meaningful comparisons, enabling the program to assess its impact on energy security and service recovery over time. Regular data collection and analysis will further track ongoing changes, ensuring that the program remains aligned with its objectives and adapts to emerging needs. This approach will not only highlight the program's tangible impacts but also inform future resource allocation, ultimately contributing to the program's long-term goals of resilience and sustainability.
7. **Future project designs should encompass the entire lifecycle of energy infrastructure deployment, from procurement and delivery through to installation, commissioning, and setting the basis for operation**. This comprehensive approach is essential to ensure that the project delivers its intended benefits and long-term impacts. Limiting the project scope to procurement alone introduces significant sustainability risks, as there is a possibility that the equipment may remain unused if additional funding for installation is not secured. This could result in valuable assets being stored without functioning, delaying critical services and undermining the project's objectives. Incorporating all phases—procurement, delivery, installation, and operation—into the project design will ensure seamless execution and maximize the impact of the infrastructure. It will also minimize the risk of interruptions by aligning funding and resources across all stages. Additionally, The project should carefully assess the capacity of the recipients to handle the design, installation and commissioning of equipment, and in light of the dynamically changing circunustance on the ground these assessments need to be updated regularly.. **Responsibility: UNDP.**

6.2 Lessons learned

In addition to those lessons learned captured earlier in this report (for example, see challenges and success factors under effectiveness section), the following are additional lessons learned synthesized through the evaluation process.

- **Agile project planning and management is essential when operating in conflict zones**. The dynamic and unpredictable nature of the conflict in Ukraine has demonstrated the need for continuous adjustments to priorities based on rapidly changing conditions on the ground. For example, infrastructure that was initially identified as a priority may suddenly become inaccessible or suffer further damage from attacks, requiring the reallocation of resources and a shift in focus to other critical areas. Projects in such environments must adopt flexible frameworks that allow them to respond swiftly to emerging challenges, whether it be disruptions in supply chains, security threats, or unexpected changes in energy demands. This requires close monitoring of the evolving situation and the ability to make real-time decisions without jeopardizing the project's overall objectives. Agile management involves regular stakeholder consultations, iterative planning cycles, and the use

of contingency plans to minimize delays and risks. It also requires effective communication channels between field teams, suppliers, donors, and local authorities to coordinate actions efficiently. Additionally, incorporating a degree of operational flexibility in budgets, timelines, and procurement strategies ensures that projects can pivot when needed while maintaining progress. Ultimately, in volatile environments like Ukraine, agility ensures that critical interventions remain relevant, resources are optimally utilized, and projects can still deliver meaningful impact despite unforeseen challenges. This approach helps balance immediate humanitarian needs with long-term recovery goals, ensuring that efforts remain aligned with both ground realities and strategic objectives.

- **For large-scale energy infrastructure projects, "segmenting" contract design is proven to be more effective than 'all in one of "design and build' contract**. Combining both the design and construction phases into a single contract can lead to inefficiencies, as critical specifications may not be fully understood or anticipated early on, resulting in delays, added costs, or incomplete planning. A more effective approach is to separate these stages. Initiating with a dedicated design phase allows for thorough assessment of requirements, including technical specifications and all necessary auxiliary components. This phase ensures that the project team and stakeholders have a comprehensive understanding of the infrastructure needs and site conditions. Once the design is finalized and fully detailed, a second contract can be issued for supply and installation, with specifications clearly outlined and agreed upon. UNDP procurement rules have been emphasizing the need for such segregation which is a good practice. This staged approach improves accuracy in planning, minimizes the likelihood of unexpected changes, and promotes a smoother procurement and installation process. It also enables the project to better manage timelines and budgets, resulting in a more efficient and successful project execution.
- **The combined focus on restoration and decentralization enhances the management of power networks, reduces vulnerabilities to disruptions, and ensures a continuous supply of energy**. Restoring damaged infrastructure alongside developing decentralized power systems provides flexibility, allowing regions to maintain operations independently if the main grid is compromised. Improved manoeuvrability ensures that energy generation and distribution can be adjusted quickly to meet fluctuating demands and respond to emergencies. This integrated approach not only addresses immediate energy needs but also positions the restored infrastructure to align with Ukraine's broader energy recovery goals. By supporting decentralized systems and adaptable networks, the project fosters greater resilience, making the energy sector less susceptible to future crises.
- **Comprehensive project design is essential:** Although the scope of UNDP's support focuses on the provision of the equipment, it is important to design its support in line with the entire process from procurement to operation with the respective Ukrainian recipient and authorities. Future projects must account for the entire process—from procurement to operation—to ensure intended outcomes are achieved.
- **Agile Project Management in Dynamic and Conflict-Affected Contexts:** The rapidly changing circumstances on the ground, as seen with energy infrastructure needs in Ukraine during the ongoing war, highlight the critical importance of agile project management. In such volatile environments, project teams must adopt flexible frameworks that enable swift adaptations to shifting priorities and emergent needs. For instance, the unpredictability of attacks on energy infrastructure required frequent reallocation of resources, adjustment of plans, and expedited responses to urgent requests for restoration services in affected areas. Agile management practices, including iterative planning cycles, continuous stakeholder engagement, and robust risk assessment mechanisms, ensure that projects remain relevant and effective even in unstable conditions. Additionally, leveraging real-time data and maintaining open communication with partners and stakeholders allows for proactive decision-making and efficient re-prioritization of activities. This approach not only mitigates risks but also enhances the project's ability to achieve its objectives amidst dynamic challenges.
- **Collect data once, report multiple times**: In a multi-donor project like the winterization project, the project team faced the challenge of reporting to various donors, each with different templates and reporting requirements. A key lesson learned is the importance of implementing an efficient monitoring and reporting approach: collecting data once and adapting it to meet the specific reporting needs of each donor agency. This strategy minimizes the duplication of effort, reduces the administrative burden on project teams, and ensures

consistency across all reports. By centralizing data collection and streamlining the reporting process, the project team can focus more on implementation while still meeting the diverse expectations of donors. It also promotes better data management, improves the accuracy of reports, and ensures that all stakeholders receive timely and relevant updates. Adopting this approach in future projects will enhance efficiency and allow for smoother coordination across multi-donor frameworks.

7. Annexes

7.1 Annex 1: FE ToR (excluding ToR annexes)

TOR is provided separately.

7.2 Annex 2: Evaluation matrix and data collection instruments

Evaluation matrix is important to identifying the key evaluation questions and how they will be answered through the selected methods. The evaluation matrix is a tool that evaluators create as a map and reference in planning and conducting an evaluation. It also serves as a useful tool for summarising and visually presenting the evaluation design and methodology for discussions with stakeholders. It details evaluation questions that the evaluation will answer, data sources, data collection and analysis tools or methods appropriate for each data source, and the standard or measure by which each question will be evaluated.

Table 3: Evaluation Matrix

Evaluative Criteria Questions	Indicators/evidence	Sources	Methodology
Relevance: How does the project relate to the development priorities a the local, regional and national level?			
· Country context: How relevant is the Project to the interventions target groups, including Government's needs and priorities and the current evolving country context? · Target groups: To what extent is the Project relevant to address the needs of government partners, notably the newly emerging priorities in the crisis settings? What type of needs and priorities is the Project unable to tackle (if any)? To what extent is the Project tackling the needs of vulnerable groups (IDPs, elderly, and others as per Project Document) and gender issues in the critical infrastructure energy rehabilitation? · To what extent were perspectives of men and women who could affect the outcomes, and those who could contribute information or other resources to the attainment of stated results, taken into account during project design processes? · To what extent does the project contribute to gender equality, the empowerment of women and the human rights-based approach?	· Stakeholders' perceptions on the relevance of PROJECT's activities to their needs · Level of alignment of PROJECT's activities with key country priorities and stakeholders' plans · Degree of alignment of the PROJECT activities with the UN Sustainable Development Cooperation Framework · Degree to which the project design identifies and address gender and human rights issues · .	· PROJECT documentations · national policies or strategies, · PROJECT stakeholders feedback · UN strategies	· Desk review · Stakeholders' interviews ·

· Were the Project objectives and outputs' indicators pertinent in the current country context? · How the Project goals and objectives could be reviewed, adjusted and scaled up to improve the Green Energy Recovery Programme and support the government partners targeting their newly emerging needs in consideration of the ongoing war and post-war recovery? · To what extent did UNDP adopt gender-sensitive, human rights-based and conflict-sensitive approaches? · To what extent was the Project aligned with the policies and strategies of the Government, the UN 2030 Agenda for Sustainable Development as well as the UNDP Country Programme Document / UN Partnership Framework / UN Transitional Framework? Is the Project in line with · Ukraine's Recovery and Development Plan1 and UNDP Resilience Building and Recovery Framework for Ukraine2 developed after the onset of the full-scale war? · To what extent has the Project contributed to the SDGs, the UNDP Strategic Plan, the Country Programme Document, UNDP Resilience Building and Recovery Framework for Ukraine outcomes and outputs? · Have there been sufficient cooperation and exchange of information between the partners of the Project? How do they correspond to each other and contribute to the achievement of the UN 2030 Agenda for Sustainable Development? · Is the Project building upon/seeking synergies with existing programmes, projects and strategies in order to maximize impact, efficiently allocate resources and avoid duplications?			
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
			· Desk review

· Assess the overall performance of the Project with reference to its respective Project document / cost-sharing agreement, strategy, objectives (or lack of thereof) and indicators, and identify key issues and constraints that affected the achievement of Project objectives including per individual Project components. Were the planned objectives and outcomes achieved according to the results framework? Are the set targets feasible in the current country context? To what extent have the results at the outcome and output levels generated results for gender equality, empowerment of women involved? What are the results achieved beyond the logical framework? How can the Project build on or expand the achievements, particularly focusing on the government's response to the war? · Was the cooperation with Project beneficiaries and key Project partners, including but not limited to the Ministry of Communities, Territories, and Infrastructure Development of Ukraine, State Emergency Service of Ukraine ; Ministry of Energy of Ukraine, NEC "Ukrenergo", NAT "Ukrgasvydobuvannya" successfully achieved and contributed to the achievement of the Project's goals? How the role of the state partners in the project could be enhanced? · How have stakeholders been involved in the Project implementation? · In which areas does the project have the greatest achievements? Why and what have been the supporting factors? How can the project build on or expand these achievements? ▪ In which areas does the project have the fewest achievements? What have been the constraining factors and why? How can or could they be overcome? · Are the project objectives and outcomes clear, practical and feasible within its frame? Do they clearly address women, men and vulnerable groups? · To what extent has the project been appropriately responsive to the needs of the national	· Delivery on project targets defined in the PROJECT results framework · Output assessments · Assessment of outputs' gender sensitivity · Stakeholders' perspective on the outcomes/outputs delivery and effectiveness · Extent to which stakeholders patriation planned and implemented appropriately and effectively	· PROJECT documentations () · Progress reports · PROJECT deliverables · PROJECT stakeholders feedback	· Stakeholders' interviews ·

constituents (men, women, other groups) and changing partner priorities?			
Efficiency: Was the project implemented efficiently, in line with international and national norms and standards?			
· To what extent was the project management structure as outlined in the project document efficient in generating the expected results? · Has the Project demonstrated cost-effectiveness? Have resources (funds, human resources, time, expertise, etc.) been strategically allocated to achieve the intended outputs, outcomes and to address inequalities and gender issues? · Were the Project's activities aligned with the schedule of activities as defined by the Project team and annual work plans? Were the disbursements and Project expenditures in line with budgets? Did the adjustments in Project's activities and budget revisions adequately reflected the changes in operational circumstances and the programmatic environment? Have the project activities been coordinated and implemented in a timely manner? · Was the Project management, coordination and monitoring efficient and appropriate? · Did the monitoring consider gender equality and women empowerment issues? To what extent project monitoring results and clients' feedback were incorporated in project design and delivery?	· Effectiveness of the PROJECT coordination and interlinkages · Stakeholders feedback on the effectiveness of the project management · Frequency and effectiveness of the board in decision making and strategic guidance · Stakeholders feedback on the effectiveness of their participation · Number, and type, of engagements with stakeholders · Extent to which stakeholders are aware of the project and its activities · Documented adaptive management actions to accommodate the changing priorities · Extent to which project targets are met on time and on budget · Effectiveness of the M&E functions · Evidence of adaptive management actions where alternative strategies have been identified and addressed	· PROJECT documentations · board MoM · Progress reports · PROJECT deliverables · PROJECT stakeholders feedback	· Desk review · Stakeholders' interviews

	· Stakeholders feedback on project implementation strategies and alternatives · Cost in view of results achieved compared to costs of similar projects from other organisations · Level of discrepancy between planned and utilised financial expenditures · Planned vs. actual funds leveraged · Timeliness of activities delivery · Co-financing data and evidence · Existence, quality and use of M&E, feedback and dissemination mechanism to share findings, lessons learned and recommendation. · Quality of M&E at the design stage and throughout the implementation		
Sustainability: To what extent are there financial, institutional, socio-political, and/or environmental risks to sustaining long-term project results?			
· Are the measures applied by the Project ensure that Project results (impact, if any, and outcomes) are likely to continue after the Project ends? Define the most promising areas requiring further support and scaling-up in the course of future interventions, considering the current evolving country context. · Is there sufficient public/stakeholder awareness in support of the Project's long-term objectives?	· Evidence of commitments from government or other stakeholder to financially support relevant sectors of activities after PROJECT end · Level of project stakeholders ownership · Level of capacities at the country level to continue	· PROJECT documentations · board MoM · Progress reports · PROJECT deliverables	· Desk review · Stakeholders' interviews

· What are the financial, social or political risks that may jeopardize the sustainability of Project results? Define the possible risks/challenges mitigating approaches. · Has the Project contributed to gender equality, women's empowerment, promotion of human rights and social inclusion? To what extent were capacity development initiatives adequate to ensure sustainable improvements for women, men and vulnerable groups, and promote responsible practices and HRBA-oriented principles? What can additionally be done to improve the sustainability of the Project? · What could be potential priority areas of engagement and corresponding recommendations for further UNDP's interventions in terms of energy, taking into account emerging needs and priorities of the Project beneficiaries? Findings, conclusions and recommendations should reflect gender equality, women empowerment and social inclusion. · To what extent do UNDP interventions have well-designed and well-planned exit strategies which include a gender dimension? · To what extent do mechanisms, procedures and policies exist to allow primary stakeholders to carry forward the results attained on gender equality, empowerment of women, human rights and human development? · To what extent are lessons learned documented by the project team on a continual basis and shared with appropriate parties who could learn from the project?	delivering on the project results · Existence of financial and institutional settings to support long term benefits · Likelihood of financial sustainability of the financial solutions/instruments · Efforts to support the development of relevant policies at the country level · Identification of emerging risks · Risk log updates · Exit strategy in place and actively operationalisation · Stakeholders feedback on the upscaling and replication potential · Stakeholders feedback on unintended results · Stakeholders feedback pm the transformative changes · Evidence of transformative change attributed to the PROJECT	· PROJECT stakeholders feedback ·	

7.3 Annex 3: List of individuals or groups interviewed or consulted.

1. Mr. Andrii Vedmid, Deputy Head of the Communcal services department, Head of heating supply unit
2. Mr. Sergii Horoshko, Manager of International coopertaion projectsKyivTeploEnergo Municipal Company
3. Mr. Niqola kolisnyk, Ministry of Energy – Ukraine.
4. Mr. Volodymyr Pulov, Deputy Director. Kyiv City State Administration
5. Mr. Amdrii Vedmid. Deputy Head of the Communal services department, Head of heating supply unit. Ministry for Communities, Territories and Infrastructure Development of Ukraine.
6. Mr. Sergei Horoshko. Manager of International cooperation projects. Ukrenergo State Company.
7. Mr. Vyachislav Bind. KyivTeploEnergo Municpal Company.
8. Mr. Kwangik Park. Chief Assistant for Economic and Development Cooperation. Embassy of Republic of Korea.
9. Mr. Sai-Jeung Oh, Consul of the Embassy of the Republic of Korea in Ukraine
10. Mr. Tanaka Kotaro, Embassy of Japan.
11. Mr. Roman Shakhmatenko, Energy and Environmental Lead, UNDP Ukraine.
12. Mr. Ievgen Spivakovskyi, Programme Analyst (Energy & Environment) UNDP Ukraine.
13. Ms. Mizuho Yokoi, Programme Manager. UNDP Ukraine.
14. Mr. Prashant Kumar, International Technical Advisor Energy. UNDP Ukraine.
15. Mr. Maksym Ganzha, Engineering Specialist. UNDP Ukraine.
16. Mr. Volodymyr Tonkogolosiuk, Engineering Analyst (Heat). UNDP Ukraine.
17. Mr. Bohdan Moloko, Engineering Analyst (Water). UNDP Ukraine.
18. Ms. Yuliia Rybak, Green Energy Recovery Progamme Manager. UNDP Ukraine.

18.1 Annex 4: List of supporting documents reviewed.

List of documents that have been reviewed includes, but not limited to:

- All technical deliverables
- Final Project Initiation Plan (PIP) with all annexes
- The Project Document of Promotion of human security in Ukraine through responding to the multidimensional crisis caused by the war
- Green Energy Programme Document
- UNDP Social and Environmental Screening Procedure (SESP)
- Progress reports (quarterly, semi-annual or annual, with associated work plans and financial reports)
- Annual Work Plans
- M&E plan
- Notes from meetings (LPAC and Board) meetings
- Risk register
- Grant agreements with bilateral donors
- Workshops reports
- Minutes of Project Board Meetings and of other meetings (i.e., Project Steering Committee meetings, Head of Agencies Meeting)
- Financial data, including actual expenditures by project outcome, including management costs, and including documentation of any significant budget revisions
- Audit reports (if any) and management responses
- Project communications materials
- The project governance structure (for example a ToR of a steering committee)
- Risk management report (Quantum Auto-generated)
- Memorandum of understanding (if any)
- Update on the status of the social and environmental risks identified in the SESP

18.3 Annex 5: Pledge of ethical conduct in evaluation signed by evaluators.

Independence entails the ability to evaluate without undue influence or pressure by any party (including the hiring unit) and providing evaluators with free access to information on the evaluation subject. Independence provides legitimacy to and ensures an objective perspective on evaluations. An independent evaluation reduces the potential for conflicts of interest which might arise with self-reported ratings by those involved in the management of the project being evaluated. Independence is one of ten general principles for evaluations (together with internationally agreed principles, goals, and targets: utility, credibility, impartiality, ethics, transparency, human rights and gender equality, national evaluation capacities, and professionalism).

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings, and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.
8. Must ensure that independence of judgement is maintained, and that evaluation findings and recommendations are independently presented.
9. Must confirm that they have not been involved in designing, executing or advising on the project being evaluated and did not carry out the project's Mid-Term Review.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Evaluator: _____Mohammad Alatoom _____

Name of Consultancy Organization (where relevant): _____ _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at ____October 2024_____ (Place) on _____ (Date)

Signature: _____e-signed: Mohammad Alatoom _____

DocuSigned by:
Mohammad Alatoom
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