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PROJECT PAPER
ON A
PROJECT RESTRUCTURING
AND A
PROPOSED ADDITIONAL GRANT
IN THE AMOUNT OF EUR 37,738,750.00
(US\$39.18 MILLION EQUIVALENT)
TO
UKRAINE
FOR THE
SECOND POWER TRANSMISSION PROJECT
July 18, 2023

Energy & Extractives Global Practice
Europe and Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective November 27, 2022)

Currency Unit = EUR (Euro)

EUR 0.963= US\$1

US\$ 1.038= EUR 1

FISCAL YEAR

January 1 - December 31

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Country Director: Arup Banerji

Regional Director: Charles Joseph Cormier

Practice Manager: Sudeshna Ghosh Banerjee

Task Team Leader(s): Koji Nishida, Sandu Ghidirim

ACRONYMS

AF	Additional Financing
AM	Accountability Mechanism
BMWK	Bundesministerium für Wirtschaft und Klimaschutz (German Federal Ministry for Economic Affairs and Climate Action)
CE	Citizen Engagement
CTF	Clean Technology Fund
E&S	Environmental and Social
EIA	Environmental Impact Assessments
EMP	Environmental Management Plan
ENTSO-E	European Network of Transmission System Operators for Electricity
EPC	Engineering, Procurement and Construction
EPCU	Energy Program Coordination Unit
ERW	Explosive Remnants of War
ESMP	Environmental and Social Management Plans
FACTS	Flexible Alternating Current Transmission Systems
FIT	Feed-in Tariff
FM	Financial Management
GDP	Gross Domestic Product
GHG	Green House Gas
GRM	Grievance Redress Mechanism
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFIs	International Financial Institutions
IFRs	Interim Financial Reports
IPF	Investment Project Financing
IPS	Integrated Power System
IT	Information Technology
LULUCF	Land Use, Land-Use Change and Forestry
MoE	Ministry of Energy
MoECI	Ministry of Energy and Coal Industry
MW	Megawatt
NDC	Nationally Determined Contribution
NPP	Nuclear Power Plant
OHS	Occupational Health and Safety
OP	Operations Policy
PDO	Project Development Objective
POM	Project Operations Manual
PPSD	Project Procurement Strategy for Development
PRAMS	Procurement Risk Assessment and Mitigation

PTP2	Second Power Transmission Project
SS	Substation
STATCOM	Static Synchronous Compensator
TPP	Thermal Power Plants
UE	Ukrenergo
UPS	Unified Power System of Russia
USD	United States Dollar
WAMS	Wide Area Monitoring System

Ukraine

Additional Financing for the Second Power Transmission Project

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BASIC INFORMATION – PARENT (Second Power Transmission Project - P146788)

Country	Product Line	Team Leader(s)		
Ukraine	IBRD/IDA	Koji Nishida		
Project ID	Financing Instrument	Resp CC	Req CC	Practice Area (Lead)
P146788	Investment Project Financing	IECE1 (9261)	ECCEE (1607)	Energy & Extractives

Implementing Agency: National Power Company Ukrenerg (UE), Ministry of Energy of Ukraine

Is this a regionally tagged project?	
No	

Bank/IFC Collaboration
No

Approval Date	Closing Date	Expected Guarantee Expiration Date	Original Environmental Assessment Category	Current EA Category
22-Dec-2014	31-Dec-2023		Partial Assessment (B)	Partial Assessment (B)

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach [MPA]	<input type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a Non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Expanded Implementation Support (HEIS)



Development Objective(s)

To improve the reliability of power transmission system and support implementation of the Wholesale Electricity Market in Ukraine.

Ratings (from Parent ISR)

	Implementation					Latest ISR
	30-Jun-2020	21-Jan-2021	22-Jun-2021	22-Dec-2021	30-Jun-2022	28-Feb-2023
Progress towards achievement of PDO	MS	MS	MS	MS	MS	MU
Overall Implementation Progress (IP)	MS	S	S	S	S	MS
Overall Safeguards Rating	S	S	S	S	S	S
Overall Risk	M	M	M	M	M	S
Financial Management	MS	MS	MS	MS	MS	MS
Project Management	MS	MS	MS	MS	MS	MS
Procurement	MS	MS	MS	MS	MS	MS
Monitoring and Evaluation	S	S	S	S	S	S

BASIC INFORMATION – ADDITIONAL FINANCING (Additional Financing for the Second Power Transmission Project - P180418)

Project ID	Project Name	Additional Financing Type	Urgent Need or Capacity Constraints
P180418	Additional Financing for the Second Power	Cost Overrun/Financing Gap	Yes






	Transmission Project		
Financing instrument	Product line	Approval Date	
Investment Project Financing	Recipient Executed Activities	18-Jul-2023	
Projected Date of Full Disbursement	Bank/IFC Collaboration		
31-Dec-2023	No		
Is this a regionally tagged project?			
No			

Financing & Implementation Modalities

<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a Non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input checked="" type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Expanded Implementation Support (HEIS)
<input type="checkbox"/> Contingent Emergency Response Component (CERC)	

Disbursement Summary (from Parent ISR)

Source of Funds	Net Commitments	Total Disbursed	Remaining Balance	Disbursed
IBRD	270.00	182.67	87.33	 68 %
IDA				 %
Grants	48.43	13.53	34.89	 28 %

PROJECT FINANCING DATA – ADDITIONAL FINANCING (Additional Financing for the Second Power Transmission Project - P180418)

FINANCING DATA (US\$, Millions)



SUMMARY (Total Financing)

	Current Financing	Proposed Additional Financing	Total Proposed Financing
Total Project Cost	318.43	106.25	424.68
Total Financing	318.43	100.00	418.43
Financing Gap	0.00	6.25	6.25

DETAILS - Additional Financing

Non-World Bank Group Financing

Trust Funds		39.18
Trust Funds		39.18

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any other Policy waiver(s)?

Yes No

Explanation

The waiver to the paragraph 28 of the IPF policy is required to the AF given that the project was downgraded to MU at the latest ISR.

Has the waiver(s) been endorsed or approved by Bank Management?

Approved by Management Endorsed by Management for Board Approval No

Explanation

The approvals to process the AF to the MU rated project are obtained by OPSVP and LEGVP.

**INSTITUTIONAL DATA****Practice Area (Lead)**

Energy & Extractives

Contributing Practice Areas**PROJECT TEAM****Bank Staff**

Name	Role	Specialization	Unit
Koji Nishida	Team Leader (ADM Responsible)		IECE1
Sandu Ghidirim	Team Leader	Co-Task Team Leader	IECE1
Anjani Kumar	Procurement Specialist (ADM Responsible)		EECRU
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Yuliia Samoslied	Team Member		ECCUA
Extended Team			
Name	Title	Organization	Location



I. BACKGROUND AND RATIONALE FOR ADDITIONAL FINANCING

1. **The Second Power Transmission Project (PTP2, P146788) was initiated to help Ukraine overcome the challenges of strategic planning, implementation, and financing of transmission system rehabilitation and upgrade in a way that ensures stable operation of the system.** The project was approved on December 22, 2014, with an IBRD loan of US\$330 million as well as a Clean Technology Fund (CTF) loan of US\$48.425 million. It became effective on June 9, 2015. The Project Development Objective (PDO) is to improve the reliability of the power transmission system and support implementation of the Wholesale Electricity Market in Ukraine. The project consists of three components: Component 1: Rehabilitation of Transmission Substations; Component 2: Electricity Market Enhancement; and Component 3: Improving of Institutional Capacity of Ministry of Energy for Reform Implementation. The Project has been supporting Ukraine's strategic agenda: "Integration of the Ukrainian Power System to European transmission network of ENTSO-E¹ (European Electricity Grid)" through Component 2. More specifically in Component 2, the Project has been supporting the transmission company, Ukrenergo (UE), in fulfilling the requirements for the ENTSO-E integration through financing reactive power compensation devices and smart grid technologies. The project's closing date has been extended twice from the original closing date of June 30, 2020, to June 30, 2022, and then to December 31, 2023. In the first restructuring, part of the IBRD loan in the amount of US\$60 million was cancelled due to some savings identified then. The project's disbursement rate as of June 2023 is 67.6 percent for the IBRD loan and 27.9 percent for the CTF loan out of the loan amounts of US\$270 million and US\$48.425 million respectively. Out of the undisbursed amounts of US\$87 million IBRD and US\$35 million CTF, only US\$7 million and US\$17 million are uncommitted respectively. Due to additional costs of materials, logistics and insurances caused by the war, contract prices particularly for substation rehabilitation and telecommunication packages are expected to be increased and thus the uncommitted amounts are expected to be fully utilized.

2. **Overall Implementation Progress is rated as Moderately Satisfactory and Progress towards achievement of the PDO as Moderately Unsatisfactory given the suspended implementation of the substation rehabilitation component caused by the military activities.** As with other World Bank financed projects in Ukraine, the Project has been severely affected by the Russia's invasion of Ukraine. For all major contracts in Component 1 for substation rehabilitation, Force Majeure was declared right after the beginning of the war and those contracts have been suspended. Due to military activities, one of the project substations (SSs) was damaged in March 2022 even though the rehabilitation was completed in October 2021. Furthermore, due to targeted attacks from October 2022 till March 2023, some of Ukrenergo's substations were damaged, causing supply disruptions throughout the country. In the meantime, the Project has been supporting the stable supply of electricity in Ukraine through technical assistance and Information Technology (IT) packages. Particularly the Project has financed the Feasibility Study for European Network of Transmission System Operator for Electricity (ENTSO-E) synchronization, Wide Area Monitoring System (WAMS), and upgrade of Ukrenergo's telecommunication network, all of which were critical to enable ENTSO-E synchronization, which started on March 16, 2022. The back-up data center created under the Project has played a critical role in ensuring stable and secured data exchange for power supply. Furthermore, Component 3, technical assistance to the Ministry of Energy for market reform, keeps providing support to the Ministry to respond to the sector's critical situation.

Rationale for Additional Financing

¹ European Network of Transmission System Operators for Electricity



3. **Before the targeted attacks started in October 2022, the energy facilities had maintained stable operations and even exported electricity to Europe.** Amidst the war, Ukraine started synchronized operation of its power system with the European network (European Network of Transmission System Operators, or ENTSO-E) on March 16, 2022, after disconnection from the Russian Integrated Power System and Unified Power System (IPS/UPS). Emergency synchronization was authorized by ENTSO-E upon the successful completion of isolated mode tests (required as part of the synchronization protocol). Synchronization of the Ukraine power system has been a strategic long-term goal that had been prepared thoroughly for many years since Ukraine's expression of interest in the implementation of synchronization with ENTSO-E back in 2006. Synchronization allowed Ukraine and Europe to stabilize the entire synchronized power grid and make electricity exchanges between the regions. Since then and until the recent targeted attacks in October and November in 2022, the transmission grid has maintained its stability despite local disturbances incidental to indiscriminate shelling.

4. **Ukraine has been gradually increasing its electricity export capacity to ENTSO-E. Electricity exports have provided significant benefits to both sides, however an installation of Static Synchronous Compensator (STATCOM) is required by ENTSO-E for further increase in the trade capacity.** The drop in electricity demand in Ukraine caused by the war has created an attractive opportunity to generate additional revenues for the sector through electricity exports and partially compensate for sectoral deficits. Following completion of the power system synchronization with ENTSO-E in March 2022, which was accelerated by the war, from June 30, 2022, UE started exporting electricity from Ukraine's IPS at the level of 100 MW, with subsequent stepping up of the allowed exports to 400 MW. The additional revenue generated through exports in the amount of approximately US\$80 million per month is critical for Ukraine, given that the sector is accumulating financial deficits in the amount of US\$50-100 million per month due to extremely low payments. European countries also need alternative electricity supply from Ukraine to overcome the energy crisis. On the other hand, in winter Ukraine could potentially need some electricity imports from European countries due to disruptions on the domestic electricity generation including the disconnection of Zaporizhzhia Nuclear Power Plant (NPP) and recent targeted attacks on the electricity infrastructures. Therefore, further increases in the electricity trade capacity is critical for Ukraine but is limited due to concerns about grid stability. Additional research on the static and dynamic stability of interconnection of the power systems of Ukraine and ENTSO-E revealed the possibility of occurrence of inter-zonal low-frequency power oscillations when exporting electricity from Ukraine's IPS to the EU countries, therefore ENTSO-E requested UE to complete several measures to improve grid stability: (i) adjustments on power system stabilizers on thermal and hydro power plants; (ii) adjustments on voltage control systems on nuclear power plants; and (iii) installation of a reactive control device called STATCOM. Among other required measures completed by UE and generation companies, an installation of STATCOM is the final remaining measure required by ENTSO-E to stabilize the grid.² STATCOM is one of the most sophisticated smart grid solutions and could enhance the power system's dynamic stability by regulating the reactive power.

5. **Due to targeted attacks started from October 2022, Ukraine had to halt electricity exports to ENTSO-E, but the installation of STATCOM remains necessary to increase the electricity exchange's capacity.** The recent attacks targeting mostly civilian energy infrastructure have caused devastating damages and led to supply disruptions in many regions in Ukraine. In particular, intense military attacks conducted since early October

² Ukraine power system started synchronous operation with European ENTSO-E in March 2022. While this is a great achievement despite the war, its electricity trade capacity was not allowed in the beginning and was increased gradually in very small increments. At the moment, it is limited to 300 MW as opposed to its technical capacity of 1,600 MW due to concerns about the grid stability of the entire European power system.



2022 have damaged approximately 50 percent of Ukrainian power infrastructure, particularly on Ukrenergo's transmission substations. This led to serious supply capacity constraints in the entire country. Accordingly, Ukrenergo started rolling blackouts to manage the constraints, causing outages for millions of customers. Moreover, the electricity exports to ENTSO-E have also been halted since October 11, 2022. Despite the current difficult situation, it remains necessary to install STATCOM to enable Ukraine to export electricity at full capacity for the mutual benefit of both Ukraine and ENTSO-E, when the supply constraints are addressed. Even though from a purely technical perspective STATCOM is needed to avoid inter-zonal low-frequency power oscillations when exporting electricity from the IPS of Ukraine to the EU countries in order to increase the electricity export's capacity, the ENTSO-E requirement does not distinguish between exports and imports, so STATCOM is necessary to increase both export and import capacities, except in the case of emergency electricity imports.

6. Procurement of STATCOM has been added to the Second Power Transmission Project to enable early delivery of the equipment, leading to a cost overrun of the Project. Following discussions with UE, the Bank team assessed the proposed procurement of STATCOM and agreed that the STATCOM is covered under the scope of Component 2, more specifically "Smart-grid technologies"; therefore, it can be procured under the Project without the need for a restructuring. The Procurement Plan was updated and the contract for installation of the STATCOM was signed by UE and an EPC contractor (Engineering, Procurement and Construction) on August 29, 2022, allowing for early manufacturing. The scope of the Contract includes the design, supply, and installation of four sets of STATCOM devices for up to four selected substations. The signature of this contract was key for ENTSO-E to authorize further increases in exports to ENTSO-E (and a significant revenue stream for UE), since it showed commitment by Ukraine to meet the technical requirements despite the war. However, as a result of the need to procure the STATCOM under the project and following a revision of the Procurement Plan, a cost overrun was incurred under the Project, which would not allow the financing of the originally anticipated scope in full, particularly considering the increase in costs to finance substation packages due to an increase in the price of materials, logistics and insurances since the war started.

7. The proposed grant from Germany has been discussed, in parallel to the procurement of STATCOM under the PTP2 project. The German Federal Ministry for Economic Affairs and Climate Action (Bundesministerium für Wirtschaft und Klimaschutz: BMWK) committed to the Ukrainian Government to provide a grant to cover the STATCOM expenses. Due to issues of timing, administration, and urgency of this commitment to Ukraine, BMWK evaluated a variety of options for channeling its support by end-2022. BMWK and UE determined that the World Bank's PTP-2 project was a good option for channeling its support, allowing UE to address the cost overrun due to the updated technical requirements for the ENTSO-E integration, while helping UE reduce its financing costs in the short term given that the financing source is grant. The Administration Agreement between BMWK and the World Bank for the Ukraine Second Power Transmission Project Co-financing Single-Donor Trust Fund (Trust Fund No. TF073881) was signed by both parties on December 13, 2022.

8. The proposed Additional Financing (AF) aims at addressing the cost overrun by adding the proposed BMWK grant, given that the alternative option - processing a new project - is not feasible due to the urgency of the needs. The cost overrun was created by the revised technical needs and increased cost of Component 2 to fulfill the requirements for ENTSO-E integration, while the scope and activity of Component 2 remains the same as when the project was appraised. The proposed AF does not create any substantial E&S risks and impacts except the war related impacts and risks given that the equipment will be installed within UE's substation areas. STATCOMs will be installed in high voltage substations, which are not in the eastern part of the country. Once



STATCOMs are installed and operated, no substantial E&S risks and impacts are envisaged given the nature of the equipment: no moving parts and no SF6/PCB, etc. The proposed AF will remain under the Safeguards Policies and Procedures since based on the Bank Procedures for Additional Financing of Investment Project Financing, in cases where the AF is addressing a cost overrun or financing gap, the AF will apply the same Environmental and Social (E&S) policies as the original Project. The alternative option of processing a new project was also considered but this would be extremely difficult and time-consuming given the current circumstances in the country and Ukrainian procedural constraints.

9. The proposed AF is consistent with Ukrainian Updated Nationally Determined Contribution (NDC) from 2021. Namely, based on geographical, economic, and social circumstances, Ukraine has committed itself to achieving the target of reducing Green House Gas (GHG) emissions of 65% by 2030, compared to 1990 (including LULUCF), reaching carbon neutrality until 2060 as foreseen in the National Economic Strategy until 2030, approved by the Decree of the Cabinet of Ministers of Ukraine of March 3, 2021.

II. DESCRIPTION OF ADDITIONAL FINANCING

10. **The PDO of the original project will remain unchanged with the AF.** As initially envisaged, the project seeks to improve the reliability of the power transmission system and support the implementation of the Wholesale Electricity Market in Ukraine. This objective remains same with the additional funding for Component 2 to improve the stability performance of the transmission network through the dynamic reactive power compensation provided by STATCOM - a mandatory requirement to integrate the Ukrainian Power System to ENTSO-E.

11. **The implementation arrangements remain unchanged.** The Ministry of Finance provides the IBRD and CTF loans to the Project Implementing Entity (PIE) through Subsidiary Agreement, Ukrenergo as the implementing entity of Components 1 and 2. There is only one implementing entity responsible for the carrying out of Parts 1, 2.1, 2.3, and 2.4 of the Project under the IBRD Loan and Part 2.2 under the CTF Loan. Energy Program Coordination Unit (EPCU) established by the then-Ministry of Energy and Coal Industry (MoECI) is implementing Part 3 of the Project, whereas the PIU established within the PIE is implementing Part 2.2 of the Project along with the PIE under the CTF Loan. The newly added package, the procurement of STATCOM, falls under Component 2. UE will continue to use the Financial Management system which is in place under the Project. Project records will be maintained by UE in a set of accounts segregated from its other activities. The grant will use traditional disbursement mechanisms, including direct payments, reimbursements, and use of Designated Account. It is envisaged that UE will open a separate Designated Account and Transit Account for the purposes of channeling the grant funds. However, processes and procedures for their use will be similar to those under the parent project. The Project Operations Manual (POM) will be updated to reflect the grant funds by no later than 60 days after the Effective Date.

12. **The cost of Component 2 “Electricity Market Enhancement” is increased due to the updated requirement for ENTSO-E integration.** The additional grant funding by BMWK will provide joint co-financing primarily for procurement of the static synchronous compensator (STACOM) devices under sub-Component 2.2. STATCOM, one of the most sophisticated smart grid solutions, will enhance the power system’s stability through



dynamically regulating reactive power. The scope includes the design, supply, and installation of up to four sets of STATCOM devices. Given the modular structure of the equipment, final locations could be adjusted based on the war situation at the timing of the delivery.

13. **No changes in the Results Framework.** The Results Framework remains unchanged as the scope of the project remains the same. The installation of STATCOMs is captured in the existing Intermediate Results Indicator “Implementation progress of Smart Grid”.

14. **Changes in Financing.** The proposed grant from BMWK in the amount of €37,738,750 is added to the Project to address the cost overrun due to the increased cost of Component 2. The total financing of the Project is now US\$357.609 million, which consists of US\$270 million in IBRD loan, US\$ 48.425 million in CTF loan, and approximately €37.74 million (US\$39.18 million) in BMWK Grant. During the current AF process, the cost of Component 1 was reduced from US\$268 million to US\$208 million, as the reduction of US\$60 million was not captured by the system during the last restructuring of the parent project (P146788) due to a technical issue. It should be noted that the component 1 cost reduction is not related with the current AF but should have been processed during the previous restructuring.

15. **Changes in the existing CTF Loan Agreement.** The existing CTF loan agreement will be amended to update the Borrower’s safeguard obligations applicable to the Project.

16. **Change in disbursement category.** Tables 1 and 2 show the current disbursement tables, which have no changes. Table 3 shows the disbursement table for the BMWK grant under the proposed AF.

Table 1: Disbursement Table of IBRD Loan (USD) (no change)

Category	Amount of the IBRD Credit Allocated (expressed in USD)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consultants’ services, and Training for Part 1 and 2.1, 2.3 and 2.4 of the Project	266,675,000	100%
(2) Goods, works, non-consulting services, consultants’ services, and Training for Part 3 of the Project	2,500,000	100%
(3) Front-end Fee	825,000	Amount subject to payment in accordance with Section 2.03 of the Loan Agreement in accordance with Article 2.07 (b) of General Conditions
(4) Interest Rate Cap or Interest Rate Collar premium		Amount subject to payment in accordance with Section 2.08(c) of the Loan Agreement
Amount Canceled as of April 2, 2019	60,000,000	
TOTAL AMOUNT	330,000,000	



Table 2: Disbursement Table of CTF Loan (USD) (no change)

Category	Amount of the CTF Credit Allocated (expressed in USD)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, services (except for consultants' services), consultants' services and training of the personnel in the framework of Component 2.2 of the Project	48,207,087.50	100%
(2) Fee for the management of funds	217,912.50	Amount, subject to payment in accordance with Article 2.04 of the Loan Agreement in accordance with Section 4.01 (a) of Standard Conditions
TOTAL AMOUNT	48,425,000	

Table 3: Disbursement Table of BMW Grant (EUR) (new)

Category	Amount of the Grant Allocated (expressed in EUR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, services (except for consultants' services), consultants' services and training of the personnel in the framework of Part 2.2 of the Project	37,738,750	100 %
TOTAL AMOUNT	37,738,750	

17. **Procurement.** Procurement for the proposed AF will be carried out in accordance with the WB Procurement Regulations for IPF Borrowers for Goods, Works, Non-Consulting and Consulting Services, dated July 1, 2016, revised in November 2017, August 2018, November 2020, hereafter referred to as Procurement Regulations. The project will be subject to the World Bank's Anticorruption Guidelines, dated July 1, 2016, revised January 2011, and July 2016 (Guidelines on Preventing and Combatting Fraud and Corruption in Projects financed by IBRD Loans and IDA Credits and Grants). The World Bank's Standard Procurement Documents including standard contract forms shall be used for international procurement procedures-shall be used. The Client already uses the World Bank's online procurement planning and tracking tools (Systematic Tracking of Exchanges in Procurement [STEP]) to prepare, clear, and update its Procurement Plans and conduct all procurement transactions.

18. **A Waiver of Provisions of paragraph 28, Section III of the IPF Policy is applied to the AF operation.** The Section III, paragraph 28 proposed to be waived requires in pertinent part that allows the Bank to provide



additional financing to an ongoing well-performing project. The PTP2 PDO was downgraded to Moderately Unsatisfactory, given the suspended implementation of the substation rehabilitation under Component 1 caused by the military activities and limited time left before the project's closing date on December 31, 2023. Since the project closing date extension is already in process, the waiver was processed to allow the project to proceed with the additional financing.

19. **Environmental and Social Management Plans (ESMPs) as well as Emergency Preparedness and Response Plans will be prepared for the activities proposed under the AF.** Given that the original project envisaged rehabilitation of high-voltage substations and introduction of reactive power compensation devices, the project was classified as Environmental Category B and project-level Environmental Impact Assessments (EIA), as well as site-specific ESMPs were developed throughout the lifetime of the project. The new AF envisages installation of STATCOM devices within the footprint of existing infrastructure, these activities are not expected to affect the population or lead to conversion or degradation of natural habitats or forest ecosystems. Considering that designs for the STATCOM installations are to be developed in the later stage and available information is not sufficient for preparation/update of site-specific ESMPs, the ESMPs will be prepared/finalized by PIU and Contractors prior to start of civil works. Emergency Preparedness and Response Plans for each activity would have to be developed and included in the bidding documentation.

20. **Functionality of Grievance Redress Mechanism (GRM).** A GRM Focal Point was appointed. Ukrenergo has started the work on each site and created big boards at the sites for rehabilitation of six substations that have the contact information for project affected people to file their grievances and complaints. Ukrenergo has provided evidence which was confirmed by the Bank's Social Safeguards Team.

21. **Citizen Engagement (CE).** The PIU will conduct consultations with beneficiaries on the added activity in the framework of the CE mechanism established under the parent project.

III. KEY RISKS

22. **The overall risk of the proposed operation is Substantial** The original project's overall risk was rated as Substantial in the latest Implementation Support Report (ISR). Due to the ongoing war, there is a widespread and unpredictable security, political, social, and macroeconomic instability. With the Project's limited scope and its design kept lean and simple to mitigate some of the risks, the overall risk rating is kept as Substantial.

23. **Political and Governance risk is High.** The original project's political and governance risk was rated as High in the last ISR. The ongoing war and the declaration of state of emergency on February 24, 2022, poses a significant risk to the political and governance landscape. Before preparing this operation, the conflict was concentrated in and around the eastern part of the country, but its target has been spread to all over the country focused on energy infrastructure. Its evolution and the potential impact on the ability of the Government to perform core functions remains highly uncertain as the war continues.

24. **Macroeconomic risk is High.** The Macroeconomic risk was rated as High in the last ISR. Rising geopolitical tensions and the ongoing war have led to a severe deterioration of the macroeconomic situation in the country. Macroeconomic and financing pressures have intensified, and conditions continue to worsen. Disruptions to economic activity and the resulting decline in tax revenue are constraining fiscal space at a time when the



spending pressure on the government to provide essential services and repair damaged infrastructure is increasing. Even with the Bank's significant financing and the development partners' pledge to continue supporting Ukraine, the country's financial needs are enormous, and will indeed remain so in the foreseeable future.

25. **Sector Strategies and Policies risk is rated Substantial.** In the last ISR, the Sector Strategies and Policy risk was rated as Substantial. The Government is strongly committed to the integration of the country's energy system with the EU system. ENTSO-E synchronization and further market coupling will ensure competitive and transparent electricity markets and improve energy security both in Ukraine and Europe. There is also a strong need from European countries for imports of cheap electricity from Ukraine to overcome electricity price spikes in European countries. On September 14, 2022, in the State of the Union, European Commission President Ursula von der Leyen stressed the need to significantly expand the electricity trade between EU and Ukraine. The installation of STATCOM is one of the most critical conditions to allow ENTSO-E to expand the electricity export capacity. Germany is willing to support implementation of the measure through providing the grant. With the recent supply shortages caused by attacks on substations from October 2022 till March 2023, the cross-border capacity expansion enabled by STATCOM is even more critical to increase electricity trades between Ukraine and ENTSO-E, particularly for potential electricity imports from ENTSO-E.

26. **Technical design risk is rated Moderate.** The Technical Design risk was rated as Low in the last ISR. STATCOM is a mature and well proven technology implemented in many countries with successful operations. The manufacturer already has a ready-made design for the STATCOM for Ukraine and hence can immediately start production of the devices. The proposed locations for the devices were considered as safe. However, due to recent targeted attacks on various substations, the locations need to be flexible. Given the modular nature of the technology, the location change can be made. Based on the war situation at the timing of the installation, locations will be reassessed at the timing of the detailed design and the equipment delivery.

27. **Institutional Capacity for Implementation and Sustainability risk is rated Moderate.** The Institutional Capacity risk was rated as Low in the last ISR. The implementing agency, UE, has implemented many projects funded by the Bank and other IFIs including Second Power Transmission Project. The PIU is considered as one of the best PIUs in Ukraine in terms of implementation capacity. Moreover, before the war, UE had already addressed many procedural issues, which prevented the smooth and timely implementation of their projects. While the capacity of UE will still be dependent on the scale and duration of the conflict, implementation of the scope added through this AF will not be an issue for the PIU given its experience in implementation of similar contracts.

28. **Environmental and Social Risk is Moderate.** The Environment and Social risk was rated as Moderate in the last ISR. The activities supported by the Project are not expected to have any direct adverse social and environmental risks or impacts, as all activities take place within the territory of UE primarily within substations. The Project is expected to bring social benefits directly to the entire country continuity of vital electricity services. However, UE employees as well as contractors may be working in areas where occupational health, safety and security risks are posed by the Russia's invasion. These are highly contextual and beyond the immediate control of the project and not caused by the activities supported by the bank financing.

29. **Fiduciary risk is rated Substantial.** In the last ISR, the Fiduciary risk was rated as Substantial. UE's financial management system and disbursements remain unchanged, and still mostly operate effectively despite the



current situation. However, the war could affect such systems at a short notice and in unpredictable ways. The World Bank team will closely monitor the situation. Where areas/cities have come under heavy attack, Ukraine has made provisions to relocate its system to neighboring oblasts or territories (e.g., as it has been the case in Mariupol).

IV. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

30. **The installation of STATCOM devices is aimed at enhancing the stability of parallel operation of the power systems of Ukraine, Moldova and the synchronous zone of Continental Europe (ENTSO-E).** In October 2021, ENTSO-E completed additional studies on the static and dynamic stability of the interconnection of power systems of Ukraine and ENTSO-E. The studies revealed the possibility of inter-zonal low-frequency power oscillations during the export of electricity from Ukraine's IPS to the EU countries. To eliminate such oscillations, ENTSO-E proposed a set of countermeasures to improve the interconnection. One of those measures is the installation of STATCOM devices at Ukraine's IPS substations. At the plenary meeting of the Regional Group Continental Europe (RG CE) held on February 15, 2022, it was determined that in order to switch the IPS of Ukraine to permanent synchronous operation with ENTSO-E power system, it is necessary to install 50 MVA STATCOM devices at substations. The transition to permanent synchronous operation of Ukraine's IPS with ENTSO-E system will allow unlocking the full export potential of the IPS of Ukraine. Prior to the transition to full-fledged synchronous operation, only a gradual increase in exports is possible based on appropriate observations of the system behavior and relevant calculations. Given the current financial difficulties in the sector due to low consumption and low collection rates, it is crucial to secure revenues from electricity exports to stabilize the sector. The economic analysis shows that unlocking the full export potential of Ukraine's IPS would increase UE revenues by up to UAH 800 million (USD 22 million) per month. Even under a potential supply deficit scenario given the disconnection of Zaporizhzhya NPP from the grid and other damages inflicted to generation plants, electricity exports can be made during low domestic demand seasons. It can be concluded that the investment in STATCOM will pay off in the short period - within one year of its commissioning.

B. Technical

29. **In October 2021, ENTSO-E completed additional studies on the static and dynamic stability of interconnection of the power system of Ukraine and ENTSO-E.** The studies revealed the possibility of inter-zonal low-frequency power oscillations during the export of electricity from Ukraine's IPS to the EU countries. To eliminate such oscillations, ENTSO-E proposed a set of countermeasures to bolster the interconnection stability. The countermeasures include (i) reconfiguration of power system stabilizers at TPPs and hydroelectric units of HPPs and PSPPs, (ii) reconfiguration of excitation systems at NPP units and (iii) installation of STATCOM devices. At the plenary meeting of the Regional Group Continental Europe held on June 7, 2022, it was decided that in order to start commercial exchange of electricity between Ukraine and neighboring EU countries, partial implementation of measures (i) and (ii) is necessary. Following the implementation of these measures, starting from June 30, 2022, electricity exports from the IPS of Ukraine were launched at the level of 100 MW. Subsequently, the authorized exports were gradually increased to 400 MW. One of the preconditions for unlocking the full export potential of the IPS of Ukraine (approximately 1700-2000 MW) is the installation of STATCOM devices.



30. **STATCOM is one of the most sophisticated smart grid technologies.** Rapid advancements in power electronics technology in the past decades led to a new generation of Flexible Alternating Current Transmission Systems (FACTS) devices, among which STATCOM is the most advanced technology. STATCOM is a fast-acting device capable of providing or absorbing reactive current and thereby regulating the voltage at the point of connection to a power grid. The technology is based on Voltage Source Converter (VSC) with semi-conductor valves in a modular multi-level configuration. The dynamic reactive current output range is symmetrical; however, non-symmetrical designs are possible by introducing mechanically or thyristor switched shunt elements with unified control systems to cover most conventional applications. The STATCOM design and fast response makes the technology very convenient for maintaining voltage during network faults (as STATCOMs can provide fast fault current injection limited to the rated current), enhancing short term voltage stability. In addition, STATCOM can provide power factor correction, reactive power control, damping of low-frequency power oscillations (usually by means of reactive power modulation), active harmonic filtering, flicker mitigation and power quality improvements.

31. **The smart grid technology fits to the project's scope, particularly subcomponent 2.2.: "Introduction of Smart Grid through purchase and installation of Smart Grid solutions,"** and directly contributes to the project's PDO: "improve the reliability of the power transmission system and support the implementation of the Wholesale Electricity Market in Ukraine." The Project's AF will utilize a ready-made design, which allows a manufacturer to deliver the equipment in the earliest timeline.

32. **The operation is aligned with the goals of the Paris Agreement on both mitigation and adaptation.** Investments under this additional financing are considered universally aligned regarding climate change mitigation, as the activities aim at integrating more renewable energy and supporting electrification of the economy. Ukraine is highly vulnerable to climate risks such as flooding and wildfires. Team assessed that infrastructure (smart grid technology) being financed under this AF is not vulnerable to existing or future climate hazards. However, in case project activities will be implemented in locations specifically exposed to any of extreme weather events, System Protection Schemes will be designed to prevent propagation of large disturbances through the grid system. In this way, resilience of the grid and transmission lines will be ensured thus adaptation risks for this project are assessed as acceptable.

C. Financial Management

33. The Financial Management (FM) and disbursements arrangements in the parent project are mostly in place, operational despite the ongoing war. The additional grant will use the same FM and disbursement procedures as in the ongoing project. Given that it would be a separate grant agreement, UE will also open a new set of accounts, and keep track of the use of grant funds separately. The recent online FM monitoring of the parent project showed that the project is in compliance with the reporting and auditing requirements, both quarterly Interim Financial Reports (IFRs) and annual audit reports were submitted on time and were acceptable. The additional grant will also require quarterly IFRs and annual audits, that would be prepared separate from those in the parent project. There are currently small delays in signing and processing of the project Withdrawal Applications, however, delays are not excessive and reasonable given the overall situation in the country. Most of the project FM staff works online, and only one person from FM unit of UE left the company since the onset of the war.



34. The grant will use traditional disbursement mechanisms, including direct payments, reimbursements, and use of Designated Account. It is envisaged that the UE will open a separate set of Designated Account and Transit Account for the purposes of channeling grant funds. However, processes and procedures for their use will be similar to those under the parent project.

D. Procurement

35. **Procurement procedures.** Procurement will be carried out in accordance with the WB Procurement Regulations for IPF Borrowers for Goods, Works, Non-Consulting and Consulting Services, dated July 1, 2016, revised in November 2017, August 2018, November 2020, hereafter referred to as Procurement Regulations. The project will be subject to the World Bank's Anticorruption Guidelines, dated July 1, 2016, revised January 2011, and July 2016 (Guidelines on Preventing and Combatting Fraud and Corruption in Projects financed by IBRD Loans and IDA Credits and Grants). The World Bank's Standard Procurement Documents shall be used. The WB team will assist the Borrower and guide on the use of Procurement Regulations. A short form Project Procurement Strategy for Development (PPSD) for the AF will be prepared. The World Bank procurement team would provide the necessary support and guidance.

36. **Procurement Risk Assessment and Mitigation (PRAMS).** As part of the proposed AF preparation process, an updated assessment of procurement capacity of UE will be conducted and completed using PRAMS and accordingly, risk mitigation measures would be developed and agreed. A preliminary assessment of UE procurement capacity indicates that procurement capacity is satisfactory as, through the implementation of the ongoing World Bank project, they have built experience. However, due to ongoing war in Ukraine, there is a risk that procurement outcomes could be hampered by force majeure circumstances and suppliers and manufacturers not willing to produce and supply equipment in such an unstable environment. The risks will be mitigated through higher advance payments and appropriate risk allocations among foreign and local contractors. For the delivery of the equipment, UE will engage a local company to transport the equipment from the border to the site and its cost will be financed under the proposed Project.

37. **World Bank oversight and monitoring.** All contracts not covered under prior review by the World Bank will be subject to post-review during implementation support missions. The World Bank may, at any time, conduct independent procurement reviews of all the contracts financed under the proposed Project.

38. **Project implementation arrangements.** On behalf of the Borrower, the existing PTP2 PIU within UE will have day-to-day responsibility for overseeing and monitoring the procurement arrangements.

39. **Procurement risk.** Due to ongoing conflict and force majeure circumstances the overall procurement risk associated with the project is proposed as Substantial.

E. Social (including Safeguards)



40. **The Project is expected to have positive impacts on society.** The Project will entail on-site civil works, which are expected to have the following limited environmental and social impacts: (i) dust and noise and emission of pollutants during construction activities; and (ii) occupational health and safety risks. All civil works needed for the AF will take place in existing facilities. As a result, related impacts are likely to be short-term and site-specific and can be mitigated by applying internationally recognized best construction practices as well as by implementing the mitigation measures to be specified in the site-specific ESMPs. Considering the scope of the AF, it is proposed to qualify project environmental and social risks collectively as “Moderate.”

F. Environment (including Safeguards)

41. **The Project’s environmental impacts are mostly site-specific and temporary; hence its risk is being rated as Moderate.** Based on previous experience with similar investments, the rehabilitation / replacement works are not expected to generate any hazardous materials that will require special disposal. The risks associated with the Project activities include both the usual construction-related risks such as dust, noise, disturbance, construction-related pollution and waste as well as war-related enhanced occupational health and safety risks, such as potential for community and worker health and safety incidents, Explosive Remnants of War (ERW) and demining concerns. Construction-related risks include potential increased pollution due to improper care, handling and storage of construction material and waste; temporary impact on cross drainage; water/soils quality impacts in case of construction pollution as well as pressures on the environment caused by the material sourcing; generation of excessive noise and dust levels from trucks and other construction machinery; soil disturbance during earth works; tree-cutting and loss of vegetation; negative impact on ecosystems (through disturbance); traffic safety issues; community and workers’ health and safety incidents. These risks are site-specific and temporary and can be mitigated by existing construction and OHS management best practices. There are no indirect and/or long-term impacts due to anticipated future activities in the project area. The types of activities to be implemented will have either minor or no adverse environmental impacts and provide significant environmental benefits (reductions in local pollution such as dust and sulfur dioxide emissions and/or reductions in emissions of greenhouse gases such as carbon dioxide). Negative environmental impacts are primarily associated with construction activities (e.g., dust, noise, disposal of non-hazardous waste) and they will be mitigated through good construction and housekeeping practices.

V. WORLD BANK GRIEVANCE REDRESS

42. The AF will use the existing **Grievance Redress Mechanism (GRM)**, which has been established based on the mechanism required by the World Bank’s Operational Policy (OP) 4.12 on Involuntary Resettlement to address grievances related to the process of land acquisition and resettlement. The GRM will continue to encompass the range of issues related to overall Project implementation.

43. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank’s Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank’s independent Accountability Mechanism (AM). The AM houses the Inspection



Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit <https://accountability.worldbank.org>.



VI. SUMMARY TABLE OF CHANGES

	Changed	Not Changed
Components and Cost	✓	
Implementing Agency		✓
Project's Development Objectives		✓
Results Framework		✓
Loan Closing Date(s)		✓
Cancellations Proposed		✓
Reallocation between Disbursement Categories		✓
Disbursements Arrangements		✓
Safeguard Policies Triggered		✓
EA category		✓
Legal Covenants		✓
Institutional Arrangements		✓
Financial Management		✓
Procurement		✓
Implementation Schedule		✓
Other Change(s)		✓

VII. DETAILED CHANGE(S)

COMPONENTS

Current Component Name	Current Cost (US\$, millions)	Action	Proposed Component Name	Proposed Cost (US\$, millions)
Rehabilitation of Transmission Substations	268.00	Revised	Rehabilitation of Transmission Substations	208.00



Electricity Market Enhancement	107.92	Revised	Electricity Market Enhancement	147.10
Improving of Institutional Capacity of MoECI for Reform Implementation	2.50		Improving of Institutional Capacity of MoECI for Reform Implementation	2.50
TOTAL	378.42			357.60

Expected Disbursements (in US\$)

Fiscal Year	Annual	Cumulative
2015	0.00	0.00
2016	0.00	0.00
2017	12,476,749.21	12,476,749.21
2018	4,068,499.71	16,545,248.92
2019	12,512,990.63	29,058,239.55
2020	36,686,195.27	65,744,434.82
2021	73,262,598.23	139,007,033.05
2022	25,546,464.77	164,553,497.82
2023	30,451,046.78	195,004,544.60
2024	74,995,455.40	270,000,000.00

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Latest ISR Rating	Current Rating
Political and Governance	● High	● High
Macroeconomic	● High	● High
Sector Strategies and Policies	● Substantial	● Substantial
Technical Design of Project or Program	● Low	● Moderate
Institutional Capacity for Implementation and Sustainability	● Low	● Moderate
Fiduciary	● Substantial	● Substantial
Environment and Social	● Moderate	● Moderate



Stakeholders	● Low	● Low
Other		
Overall	● Substantial	● Substantial

LEGAL COVENANTS – Additional Financing for the Second Power Transmission Project (P180418)

Sections and Description

No later than two months after the Effective Date, cause the Project Implementing Entity to update the PIE POM in form and substance acceptable by the Bank;

Conditions

Type	Financing source	Description
Effectiveness	Trust Funds	The execution and delivery of this Agreement on behalf of the Recipient has been duly authorized or ratified by all necessary governmental and corporate action.
Effectiveness	Trust Funds	The Subsidiary Agreement referred to in Section I.B of Schedule 2 to this Agreement has been executed on behalf of the Recipient, through the MoE and MoF, and the Project Implementing Entity.
Effectiveness	Trust Funds	The existing ESMPs have been updated to include the Emergency Preparedness Response Plans.



VIII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Ukraine

Additional Financing for the Second Power Transmission Project

Project Development Objective(s)

To improve the reliability of power transmission system and support implementation of the Wholesale Electricity Market in Ukraine.

Project Development Objective Indicators by Objectives/ Outcomes

Indicator Name	PBC	Baseline	Intermediate Targets								End Target	
			1	2	3	4	5	6	7	8		
Improve reliability of the power transmission system and support implementation of the WEM												
Number of outages at rehabilitated SSs is reduced (Number)		253.00									60.00	
Sumy (Number)		27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	7.00	7.00	7.00
Cherkaska (Number)		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	3.00	3.00	3.00
Novokyivska (Number)		35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	8.00	8.00	8.00
Kremenchuk (Number)		37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	9.00	9.00	9.00
Nyvky (Number)		23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	5.00	5.00	5.00



Indicator Name	PBC	Baseline	Intermediate Targets								End Target	
			1	2	3	4	5	6	7	8		
Zhytomyrska (Number)		28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	7.00	7.00	7.00
Kalush (Number)		18.00	18.00	18.00	18.00							4.00
Bohorodchany (Number)		15.00	15.00	15.00	15.00	15.00						4.00
Boryslav (Number)		6.00	6.00	6.00	6.00	6.00						1.00
Rivne (Number)		21.00	21.00	21.00	21.00	21.00						5.00
Ivano-Frankivsk (Number)		17.00	17.00	17.00	17.00	17.00						4.00
Kovel (Number)		14.00	14.00	14.00	14.00	14.00						3.00
Share of electricity traded on bilateral basis and day ahead market in WEM of Ukraine (Percentage)		0.00	0.00	0.00	0.00	77.00	81.00	85.00	85.00	85.00		85.00
Decrease in power usage for own needs of Substations which were reconstructed (Megawatt hour(MWh))		8,951.00	8,951.00	8,951.00	8,951.00	8,823.00	8,823.00	8,823.00				8,324.00
North Region SS Kremenchuk, Sumy (Megawatt hour(MWh))		3,299.00	3,299.00	3,299.00	3,299.00	3,230.00	3,230.00	3,230.00	3,091.00	3,091.00		3,091.00
Central Region: SS Novokyivska,		3,863.00	3,863.00	3,863.00	3,863.00	3,735.00	3,735.00	3,735.00	3,546.00	3,546.00		3,546.00



Indicator Name	PBC	Baseline	Intermediate Targets								End Target	
			1	2	3	4	5	6	7	8		
Nyvki, Cherkaska, Zhytomyrska (Megawatt hour(MWh))												
Western Region: SS Kalush, Bohorodchany, Boryslav, Rivne, Ivano-Frankivsk, Kovel (Megawatt hour(MWh))		5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,414.00	5,132.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets								End Target	
			1	2	3	4	5	6	7	8		
Rehabilitation of Transmission Substations												
Reduced operating and maintenance costs at the rehabilitated SSs: Novokyivska, Nyvky, Kremenchuk, Zhytomyrska, Cherkaska, Sumy, Kalush, Bohorodchany, Boryslav, Rivne, Ivano, Frankivsk, Kovel, Pivnichnoukrainska etc (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00				50.00



Indicator Name	PBC	Baseline	Intermediate Targets								End Target
			1	2	3	4	5	6	7	8	
Novokyivska (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Nyvky (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Kremenchuk (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Zhytomyrska (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Cherkaska (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Sumy (Percentage)		0.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
Kalush (Percentage)		0.00									50.00
Bohorodchany (Percentage)		0.00									50.00
Boryslav (Percentage)		0.00									50.00
Rivne (Percentage)		0.00									50.00
Ivano-Frankivsk (Percentage)		0.00									50.00
Kovel (Percentage)		0.00									50.00
Electricity losses per year in the Project area (Percentage)		1.90	1.70	1.70	1.70	1.60	1.60	1.60	1.60	1.60	1.40
Implementation progress of SS Rehabilitation		0.00	Bidding Document Ready	Contract Signed	Detailed design by the contractor	Works on High Voltage Unit 110 – 150 kV	The works at 110-150 kV high-voltage	The works at 110-150 kV high-voltage	Continuation of works on high-voltage units	Continuation of works on high-voltage units	Contracts Completed



Indicator Name	PBC	Baseline	Intermediate Targets								End Target
			1	2	3	4	5	6	7	8	
in:Novokyyivska,Nivki ,Kremenchuk,Zhytom yrska,Cherkaska,Sum y,Kalush,Bohorodcha ny,Boryslav,Rivne,Iva no-Frankivsk,Kovel (Text)					ready and expertise review approved	start/ Contract Signed and detailed design by the contractor ready and expertise review approved	facilities continue	facilities continue	330 kV	330 kV/Contracts completed	
Voltage at bus bars 35kV at the rehabilitated SSs are within operating limits +-5% (Volts)		0.00	0.00	0.00	0.00						0.00
Kamianets-Podilska (Volts)		42.00	42.00	42.00	40.00	40.00	40.00	40.00	36.00	36.00	36.00
Shepetivka (Volts)		41.00	41.00	41.00	40.00	40.00	40.00	40.00	36.00	36.00	36.00
Kovel (Volts)		40.00	40.00	40.00	39.00	39.00	39.00	39.00	36.00	36.00	36.00
Novovolynsk (Volts)		40.00	40.00	40.00	39.00	39.00	39.00	39.00	35.00	35.00	35.00
Lutsk Pivdenna (Volts)		40.00	40.00	40.00	39.00	39.00	39.00	39.00	35.00	35.00	35.00
Energy Not Served reduced (Gigawatt-hour (GWh))		0.00	0.00	0.00	0.00						0.00
North Region (Gigawatt-hour (GWh))		7.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00



Indicator Name	PBC	Baseline	Intermediate Targets								End Target
			1	2	3	4	5	6	7	8	
Central Region (Gigawatt-hour (GWh))		35.00	0.00	0.00	0.00	25.00	25.00	25.00	50.00	50.00	50.00
West Region (Percentage)		25.00	0.00	0.00	0.00	0.00	0.00	0.00			50.00
Tons of GHG emissions reduced or avoided based on Electricity Savings (Tons/year)		0.00	344,199.00	734,427.00	1,000,464.00	1,579,257.00	1,579,257.00	1,579,257.00	1,579,257.00	1,579,257.00	2,804,407.00
Annual energy savings (MWh/year)		0.00	1,500.00	8,000.00	47,000.00	220,000.00	220,000.00	220,000.00	220,000.00	220,000.00	430,000.00
Increased installed RE capacity in Ukraine ES (Megawatt)		0.00	180.00	395.00	500.00	680.00	680.00	680.00	680.00	680.00	1,100.00
Electricity Market Enhancement											
Implementation progress of Smart Grid (Text)		Feasibility study completed	Bidding Documents preparation	Bidding Documents preparation	Bidding Documents ready, Tender Procedure opened	Contract Signed	The contract under implementation	The contract under implementation			Detailed Design ready
Implementation of Balancing Market (Text)		Feasibility study completed	Contract signed for hard and software	Bidding Documents preparation	Contract Signed for software	Contract Signed for hardware. Software are Fine-tuned for the launch.	The hardware contract is under implementation	The hardware contract is under implementation			Modifications to BM (software)/ Balancing Market Operational / Balancing Market Operational



Indicator Name	PBC	Baseline	Intermediate Targets								End Target
			1	2	3	4	5	6	7	8	
Implementation progress of MIS (Text)		Feasibility study completed	Bidding Documents ready for hardware. Bidding Documents ready for software	Bidding Documents ready for hardware. Bidding Documents ready for software	Contract Signed for software.	Contract Signed for hardware. Detailed Design Completed for software.	Contract under implementation	Contract under implementation			MIS Operational

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Number of outages at rehabilitated SSs is reduced	This indicator measures the improvement in the transmission system reliability by the reduction in the number of outages in the rehabilitated SSs.	UE PIU	Semi-annualy progress reports of UE		Semi-annual progress report, Midterm review, and Completion
Sumy		UE PIU	UE		Semi-annualy
Cherkaska		UE PIU	UE		Semi-annualy
Novokyivska		UE PIU	UE		Semi-annualy



Kremenchuk		UE PIU	UE		Semi-annually
Nyvky		UE PIU	UE		Semi-annually
Zhytomyrska		UE PIU	UE		Semi-annually
Kalush					
Bohorodchany					
Boryslav					
Rivne					
Ivano-Frankivsk					
Kovel		Semi-annual progress report, Midterm review, and Completion	Semi-annual progress reports of UE	Semi-annual progress reports of UE	PIE PIU
Share of electricity traded on bilateral basis and day ahead market in WEM of Ukraine	This indicator measures the share of the electricity traded on bilateral basis in the Wholesale Electricity Market of Ukraine.	UE PIU	UE		Semi-annually
Decrease in power usage for own needs of Substations which were reconstructed	This indicator measures reduction in power used for own needs of the Substation. Substation internal power consumption is	UE PIU	UE		Semi-annually



	monitored and recorded by UE				
North Region SS Kremenchuk, Sumy		UE PIU	UE		Semi-annually
Central Region: SS Novokyivska, Nyvki, Cherkaska, Zhytomyrska		Semi-annual progress report, Midterm review, and Completion	Semi-annual progress reports of UE		PIE PIU
Western Region: SS Kalush, Bohorodchany, Boryslav, Rivne, Ivano-Frankivsk, Kovel					

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Reduced operating and maintenance costs at the rehabilitated SSs: Novokyivska, Nyvki, Kremenchuk, Zhytomyrsk, Cherkaska, Sumy, Kalush, Bohorodchany, Boryslav, Rivne, Ivano, Frankivsk, Kovel, Pivnichnoukrainska etc	This indicator reports on reduction in operation and maintenance costs of the rehabilitated SSs.	UE PIU	UE		Annual
Novokyivska		Annual	Semi-annual progress reports of UE		PIE PIU



Nyvky					
Kremenchuk					
Zhytomyrska					
Cherkaska					
Sumy					
Kalush					
Bohorodchany					
Boryslav					
Rivne					
Ivano-Frankivsk					
Kovel					
Electricity losses per year in the Project area	This indicator is calculated by dividing total electricity losses (i.e. the sum of technical and non-technical losses) by the total net injected generation in the project area. The baseline is the actual electricity losses in the project area at the beginning of the project.	UE PIU	UE		Annual
Implementation progress of SS Rehabilitation in:Novokyyivska,Nivki,Kremenchuk,Zhyto	This indicator monitors progress in SS rehabilitation of:	UE PIU	UE		Annual



<p>myrska,Cherkaska,Sumy,Kalush,Bohorodchany,Boryslav,Rivne,Ivano-Frankivsk,Kovel</p>	<ol style="list-style-type: none"> 1. Novokyyivska 2. Nivki 3. Kremenchuk 4. Zhytomyrska 5. Cherkaska 6. Sumy 7. Kalush 8. Bohorodchany 9. Boryslav 10. Rivne 11. Ivano-Frankivsk 12. Kovel 13. Pivnichnoukrainska 14. Konotop 15. Poltava 16. Loseve 17. Bilotserkivska 18. Poliana 19. Chernihivska 20. Nizhynska 21. Slavutych 				
<p>Voltage at bus bars 35kV at the rehabilitated SSs are within operating limits +-5%</p>	<p>This indicator measures the off peak voltage level at bus bars 35kV within the limits after installation of shunt reactors and is acalculated based off peak load flow modeling.</p>	<p>UE PIU</p>	<p>UE</p>		<p>Annual</p>
<p>Kamianets-Podilska</p>					



Shepetivka		UE PIU	UE		Annual
Kovel		UE PIU	UE		Annual
Novovolynsk		UE PIU	UE		Annual
Lutsk Pivdenna		UE PIU	UE		Annual
Energy Not Served reduced	This indicator measures the electricity losses in two project areas (Central and North Regions of Ukrainian Power Grid) and is calculated based on the amount of power transited in the Region divided by amount of total loses and represent indirect losses (power used for the own needs of the substations).	UE PIU	UE		Annual
North Region		UE PIU	UE		Annual
Central Region		UE PIU	UE		Annual
West Region		Annual	Semi-annual progress reports of UE		PIE PIU
Tons of GHG emissions reduced or avoided based on Electricity Savings	This indicator measures the GHG emissions avoided annually due to increase generation og existing RE and by new RE generation plants due to smart grid	UE PIU	UE		Annual



	investment.				
Annual energy savings	CTF Indicator	Annual	Semi-annual progress reports		PIE PIU
Increased installed RE caapacity in Ukraine ES	CTF Indicator	Annual	Semi-annual progress reports of UE	Semi-annual progress reports of UE	PIE PIU
Implementation progress of Smart Grid	This indicator measures progress in implementation of the Smart Grid program financed by the Project	UE PIU	UE		Annual
Implementation of Balancing Market	This indicator monitors progress in implementation of the Balancing Energy Market System.	UE PIU	UE		Annual
Implementation progress of MIS	This indicator monitors progress in implementation of installation of the new MIS at UE.	UE PIU	UE		Annual

