



REPLACEMENT OF OVERLOADED POWER TRANSFORMERS



REPLACEMENT OF OVERLOADED POWER TRANSFORMERS

SUMMARY OF THE PROJECT



Issues / prerequisites

- The lack of capacity reserve at substations limits the connection of new capacities, restrains the development of RES and distributed generation
- 7% of the power transformers on the 35-150 kV substations and 15% of transformers on the 6-10 kV secondary substations are overloaded

- High level of actual losses in the DSO grid (9,24 %)
- The impact of overloading of power transformers on the grid losses, the quality of electricity and the risk of additional accidents and shortening the service life of power transformers

Objectives

1

Replacement of overloaded power transformers on the 35-150kV and 6-10kV substations with ones with a higher capacity without the need for reconstruction of the structural part of the substation

2

Implementation of power transformers with eco-design in accordance with the requirements of Ukrainian legislation and European standards

1 PROJECT SCOPE

Replacement of overloaded transformers in the 6(10)-110(150) kV power grids of Kyiv, Odesa, Dnipro regions and the city of Kyiv

2 PROGRESS TO-DATE

A detailed concept of automation and modernization of 6(10)-110(150)kV networks was formed in order to meet future challenges in the energy sector. Typical projects / technical requirements for replacing power transformers on 35-150kV and 6-10kV substations have been developed

3 TIMEFRAME

A 10-year investment plan for the replacement of the power transformers. Annual volumes are based on the availability of internal staff and external contractors

Overview of current parameters

DTEK Kyiv Grids

Number of PS 35-150kV – 67
Number of SS 6-10kV – 4 028
10,5 TW*h of distributed electricity

DTEK Kyiv Regional Grids

Number of PS 35-150kV – 251
Number of SS 6-10kV – 11 876
8,1 TW*h of distributed electricity

DTEK Dnipro Grids

Number of PS 35-150kV – 342
Number of SS 6-10kV – 12 77
18,9 TW*h of distributed electricity

DTEK Odesa Grids

Number of PS 35-150kV – 281
Number of SS 6-10kV – 9 541
6,9 TW*h of distributed electricity

DTEK Donetsk Grids in the area of hostilities

- Liberated territories
- Occupied territories before 2022
- Occupied territories in 2022

Project KPI

GOAL

Losses decreasing

-66 mln kW*h annually

New capacity creation

- Primary substations 35-150 kV
- Secondary substations 6-10 kV

+421 MW
+1 133 MW

Improvement of ESG rating





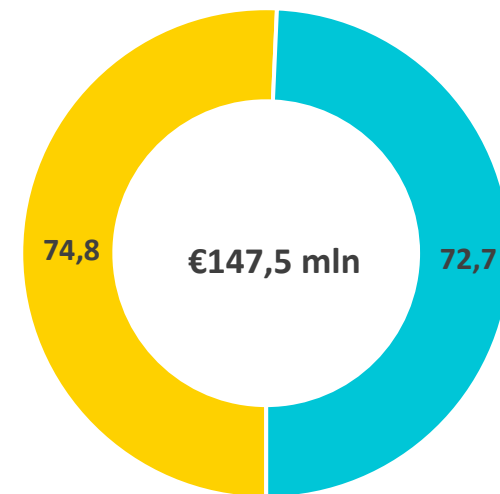
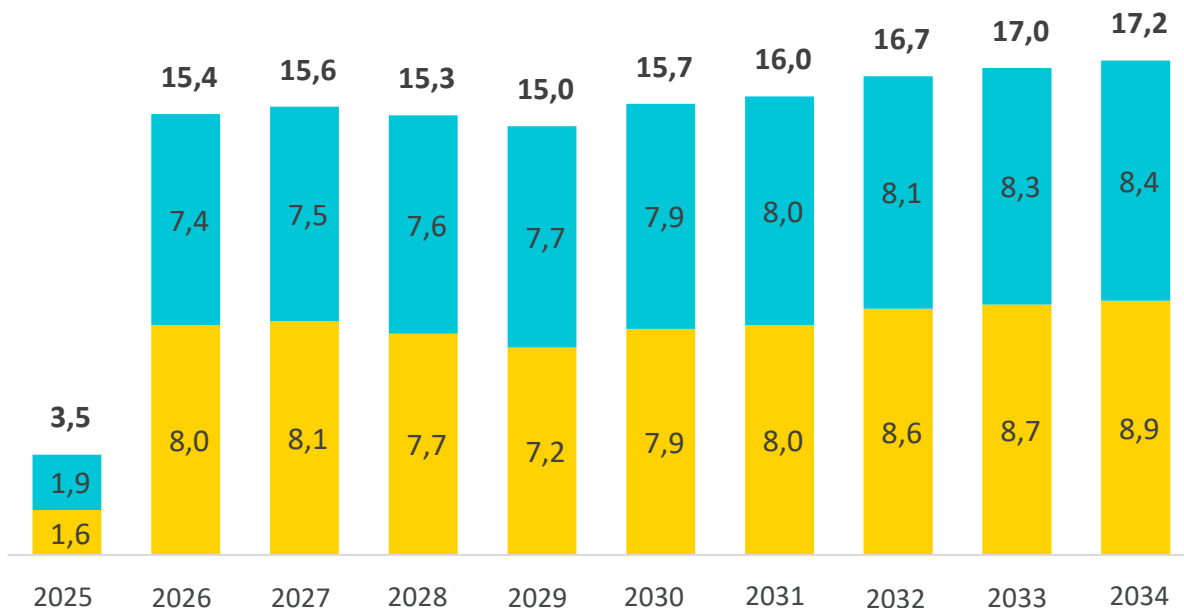
INVESTMENT PROFILE

PROJECT IMPLEMENTATION IN DTEK GRIDS



Project investment plan

mln EURO



- 35-150 kV Overloaded transformers replacement
- 6-10 kV Overloaded transformers replacement

The volumes in terms of capacity ratings of new power transformers

New capacity, MVA	2,5	4	6,3	10	16	25	40	63	Total
Transformers on 35-150 kV Subs.	5	13	19	22	3	24	9	16	111
New capacity, MVA	0,063	0,1	0,16	0,25	0,4	0,63	1	1,6	
Transformers on 6-10 kV Subs.	149	368	970	1633	1356	1155	636	206	6 473



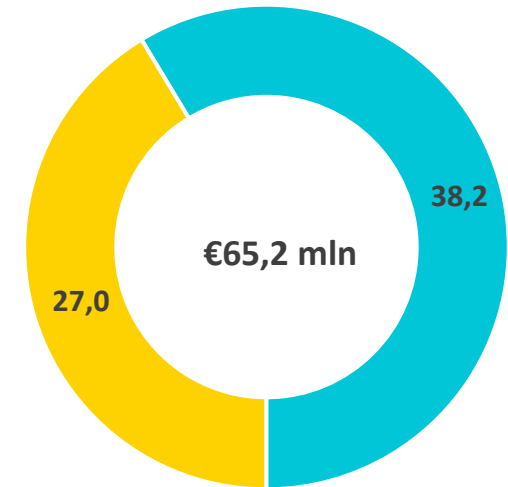
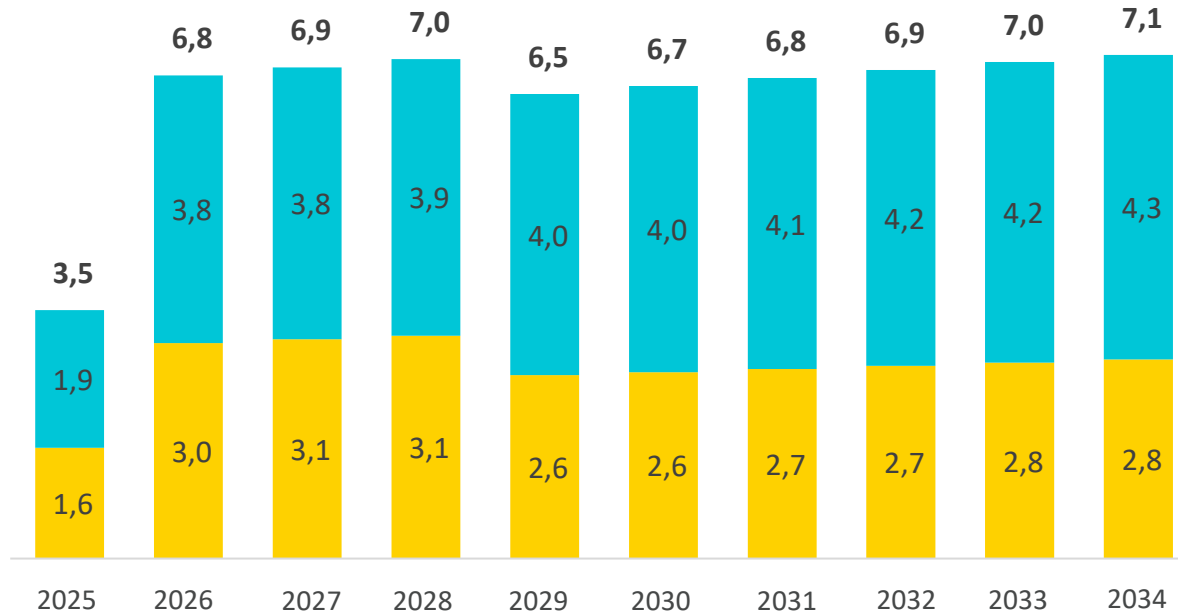
INVESTMENT PROFILE

PROJECT IMPLEMENTATION IN DTEK KYIV REGION GRIDS



Project investment plan

mln EURO



- 35-150 kV Overloaded transformers replacement
- 6-10 kV Overloaded transformers replacement

The volumes in terms of capacity ratings of new power transformers

New capacity, MVA	2,5	4	6,3	10	16	25	40	63	Total
Transformers on 35-150 kV Subs.	3	5	8	13	-	9	4	2	44
New capacity, MVA	0,063	0,1	0,16	0,25	0,4	0,63	1	1,6	
Transformers on 6-10 kV Subs.	119	273	641	1 137	675	339	198	117	3 499



FINANCIAL PROFILE

PROJECT IMPLEMENTATION IN DTEK GRIDS



Target regulatory assumptions

Rate of return (UAH) equals **WACC, 19,9% from 2026 to 2030; and 14,9% from 2031 and further**

In contrast to current regulatory regime, **amortization of project assets will be allowed to use on loan payment**

Potential usage of the mechanism of state guarantees will help to further decrease risks of the project

Financial assumptions

Schedule	Pilot in 2025 amount €3,5 mln Full project €147,5 mln in 2025-2034
Debt period	10 years
Interest rate (EUR)	7%
leverage	Debt: expected at the level of 70%
Electricity prices	According to DTEK macro forecast

IRR (EUR)

Levered

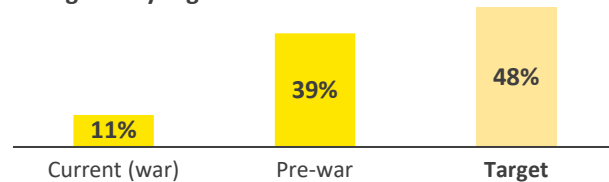
48%

Unlevered

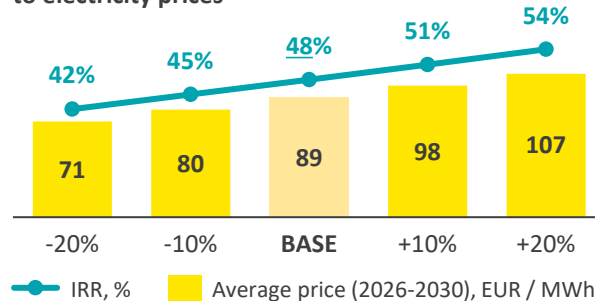
20%

Levered IRR sensitivity

to regulatory regime



to electricity prices



Financial indicators (pilot)

		2025	2026	2027	2028	2029	2030	2031	2036	2041	ΣHTL
Losses saving	MWh	-	3 961	3 961	3 961	3 961	3 961	-	-	-	19 804
RoR (UAH)	%	3,0%	19,9%	19,9%	19,9%	19,9%	19,9%	14,9%	14,9%	14,9%	-
Electricity price	EUR/MWh	97,0	88,8	86,2	90,3	90,3	91,5	96,6	111,9	122,2	-
EBITDA	EUR mln	-	1,2	1,2	1,2	1,2	1,1	0,6	0,3	0,2	10,5
RAB profit	EUR mln	-	0,7	0,6	0,6	0,5	0,5	0,3	0,2	0,2	6,1
Losses saving	EUR mln	-	0,4	0,3	0,4	0,4	0,4	-	-	-	1,8
OPEX efficiency	EUR mln	-	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1
Other tariff sources*	EUR mln	-	0,1	0,3	0,3	0,3	0,3	0,2	0,0	0,0	2,6
Income tax	EUR mln	-	(0,2)	(0,2)	(0,2)	(0,2)	(0,2)	(0,1)	(0,0)	(0,0)	(1,7)
Investment cash flow	EUR mln	(3,5)	-	-	-	-	-	-	-	-	(3,5)
FCFF	EUR mln	(3,5)	1,0	1,0	1,0	1,0	0,9	0,5	0,2	0,2	5,3
Loan	EUR mln	2,5	(0,2)	(0,2)	(0,2)	(0,2)	(0,2)	(0,2)	-	-	(0,0)
Interest	EUR mln	(0,1)	(0,2)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	-	-	(0,9)
FCFE	EUR mln	(1,1)	0,6	0,6	0,7	0,6	0,6	0,2	0,2	0,2	4,4

*tax and amortization in tariff

