



## 10 KV GRID AUTOMATION



# 10 KV GRID AUTOMATION SUMMARY OF THE PROJECT



## Objectives

Reducing the duration of interruptions in the power supply of customers during a power outage

Localization of places of damage, increasing the visibility of network parameters

Decreasing search time for damaged network sections

## 1 PROJECT SCOPE

10 kV grids automation of Kyiv, Odesa, Dnipro regions and the city of Kyiv

## 2 PROGRESS TO-DATE

Detailed technological grid development concept and plan on 10 kV grids automatization created to meet the future challenges in the energy sector. Standard designs / technical requirements for the installation of reclosers, reconstruction of MV/LV substations have been developed

## 3 TIMEFRAME

10-year investment plan to automate the regional grid

## Overview of current parameters

### DTEK Kyiv Grids

Total length of grids– 15 102 km  
Number of SS 6-10kV – 4 028  
10,5 TW\*h of distributed electricity

### DTEK Kyiv Regional Grids

Total length of grids– 47 355 km  
Number of SS 6-10kV – 11 876  
8,1 TW\*h of distributed electricity

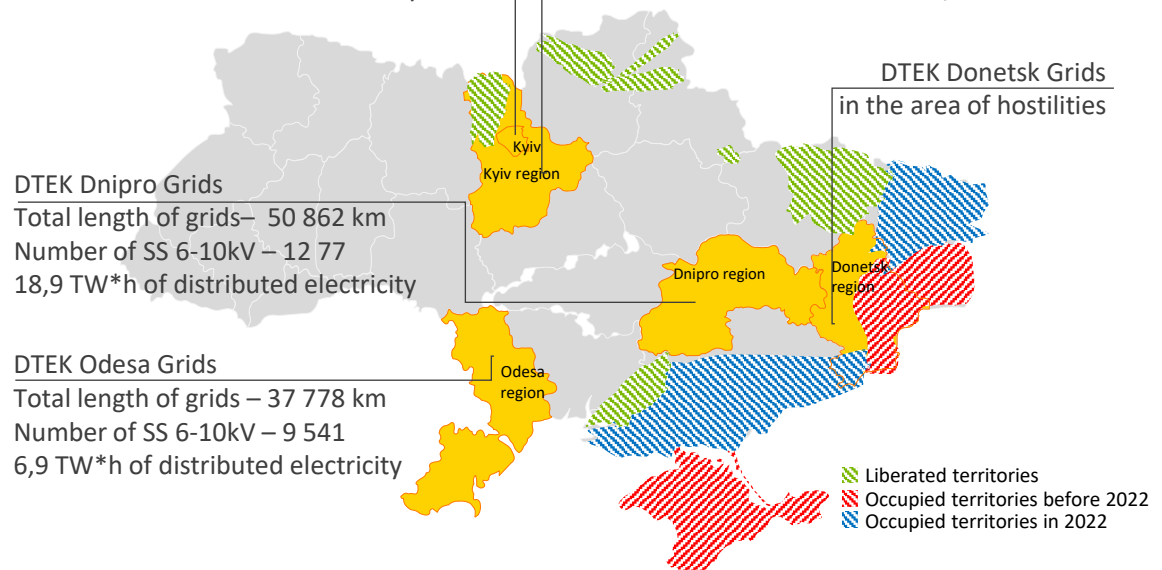
### DTEK Dnipro Grids

Total length of grids– 50 862 km  
Number of SS 6-10kV – 12 77  
18,9 TW\*h of distributed electricity

### DTEK Odesa Grids

Total length of grids – 37 778 km  
Number of SS 6-10kV – 9 541  
6,9 TW\*h of distributed electricity

### DTEK Donetsk Grids in the area of hostilities



## Project KPI

SAIDI reduction

-152 min.

-21%

OPEX saving

-4,157 mln Euro

-4%

Losses reduction

-74 million kWh

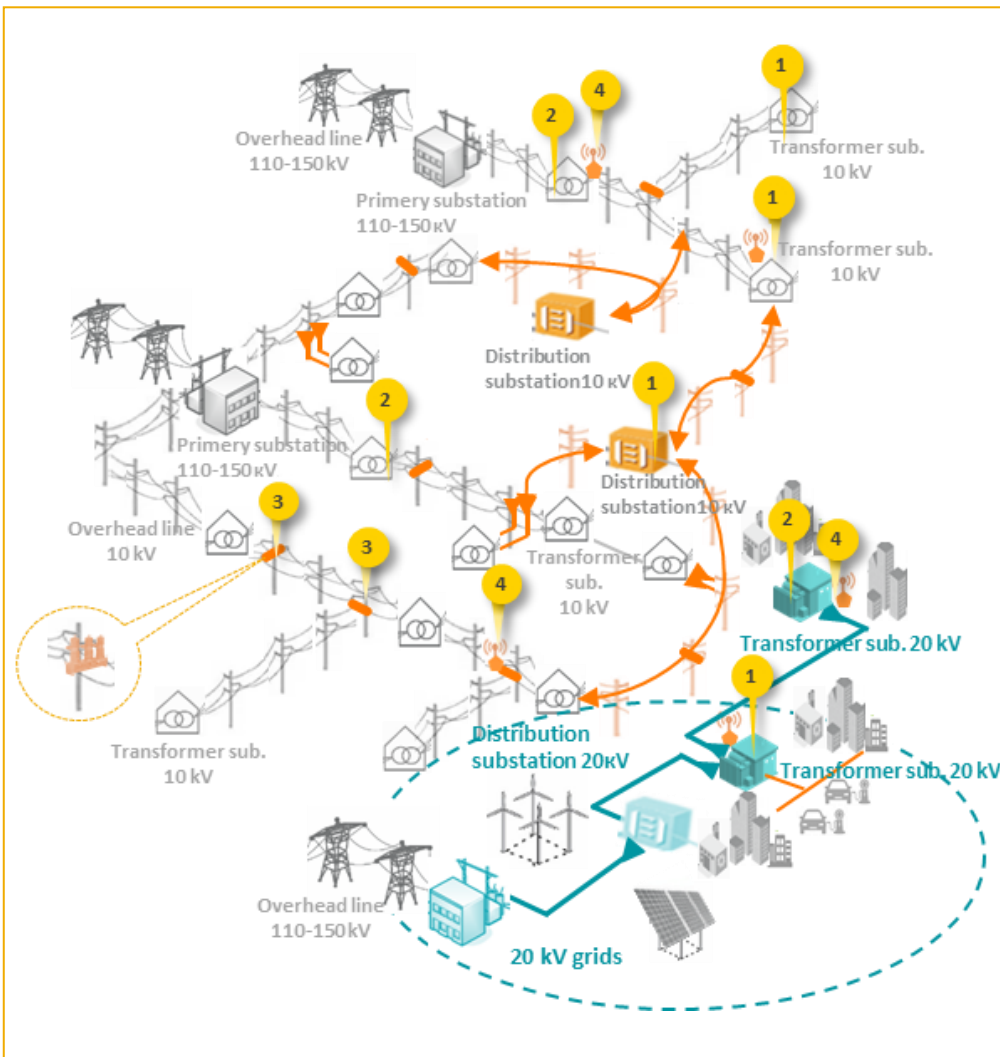
-0,1%

New reserve capacity creation

+222 MW



# 10 KV GRID AUTOMATION TECHNICAL CONCEPT AND SCOPE OF IMPLEMENTATION



## Target approach of the project

Apply technological solutions depending on the territory:  
"URBAN" or "RURAL"

The URBAN category (city grids) includes:

- Localities with more than 25,000 inhabitants.
- All settlements within a 15 km zone from Kyiv

The RURAL (local grids) category includes all other territories

|       |   |                                                                                                                                                                                                                                                                                                                 |
|-------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| URBAN | 1 | ▪ Replacement of <b>4 179</b> transformer substations with 10-20 kV automated modular PTS or 10-20 kV MPTS with 10-20 kV modular switchgear with GIS and motor-driven load disconnectors, replacement of <b>8 976</b> power transformers and installation of <b>2 040</b> remotely controlled switching devices |
|       | 2 | ▪ Reconstruction of <b>991</b> transformer substations with installation of <b>15 654</b> remotely operated switchgear with subsequent automation (for self-recovery)                                                                                                                                           |
| RURAL | 3 | ▪ Installation of <b>2 556</b> reclosers <b>5 894</b> Sectionalizers                                                                                                                                                                                                                                            |
|       | 4 | ▪ Installation of <b>18 878</b> short-circuit indicators transferring information to SCADA                                                                                                                                                                                                                      |



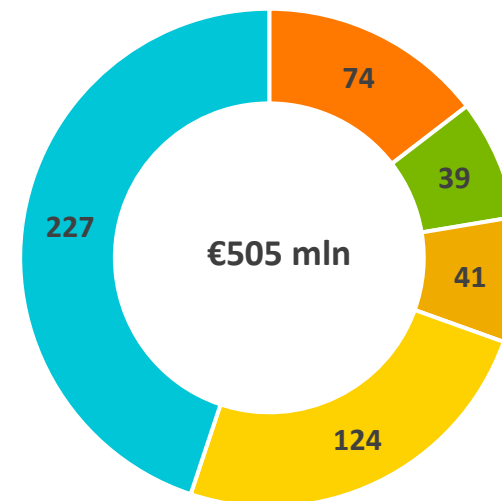
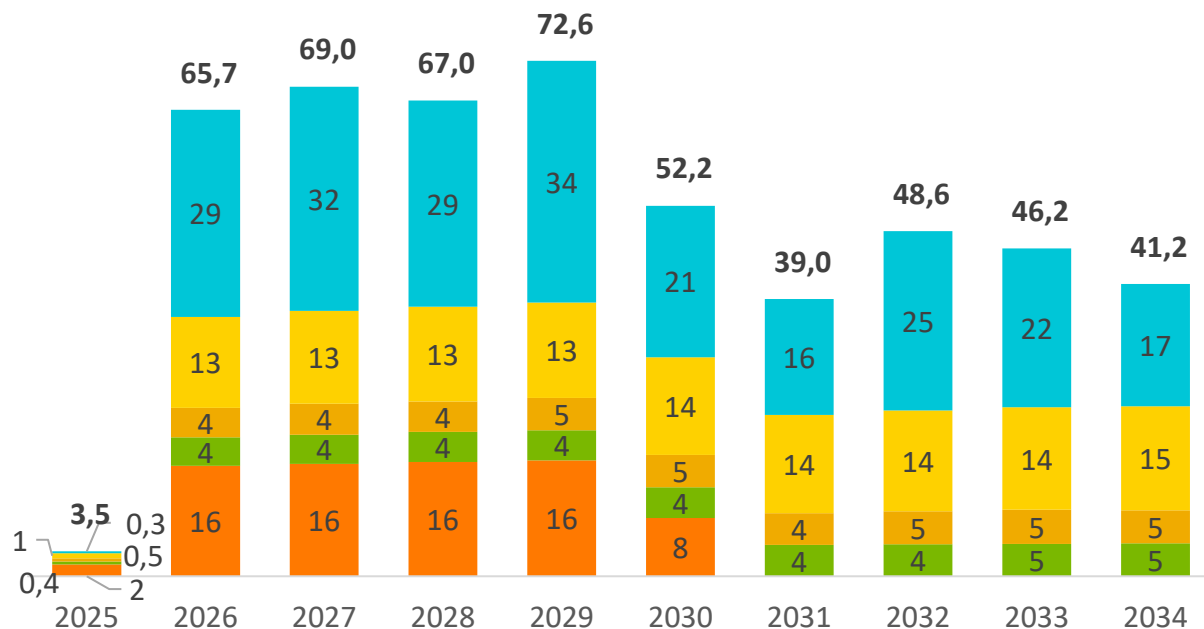
# INVESTMENT PROFILE

## PROJECT IMPLEMENTATION IN DTEK GRIDS



### Project investment plan

mln EUR



- Installation of remotely controlled switching devices
- Reconstruction of transformer substations
- Installation of reclosers
- Installation of short circuit indicators
- Installation of sectionalizers

### Висновки:

**2,556**

Reclosers

**18,878**

Short circuit indicators

**5,894**

Sectionalizers

**7,717**

10 kV substations

**4,479**

Power transformers  
MV/LV

**17,694**

Remotely controlled  
switching devices

### Implementation period:

Installation of reclosers - 5 years;  
Installation of sectionalizers, short circuit indicators - 10 years;  
Reconstruction of transformer substations with replacement by MPTS and installation of remotely controlled switching devices - 10 years.

The plan provides for the availability of internal personnel and external contractors, as well as carrying out design and survey work on transformer substations` reconstruction



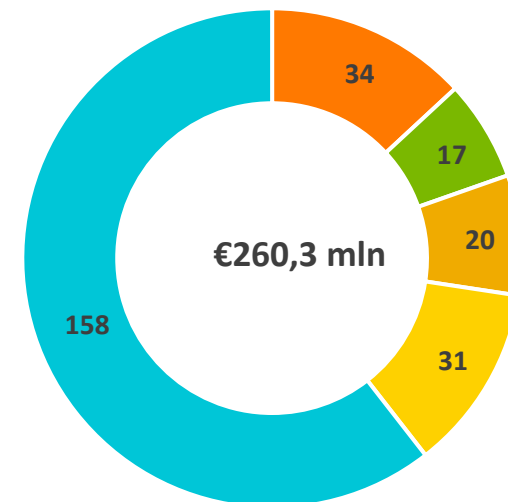
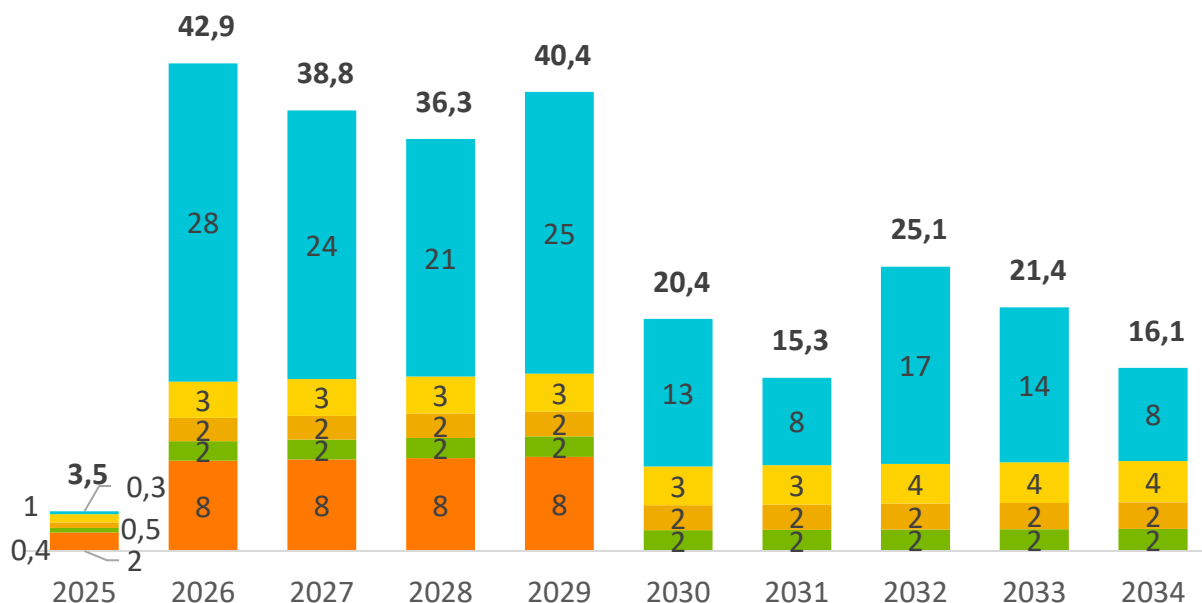
# INVESTMENT PROFILE

## PROJECT IMPLEMENTATION IN DTEK KYIV REGIONAL GRIDS



### Project investment plan

mln EUR



- Installation of remotely controlled switching devices
- Reconstruction of transformer substations
- Installation of reclosers
- Installation of short circuit indicators
- Installation of sectionalizers

### Висновки:

**1,185**

Реклоузерів

**8,140**

Індикаторів КЗ

**2,914**

Sectionalizers

**3,859**

ТП 10 кВ

**3,150**

Силових  
трансформаторів СН-НН

**4,290**

Дистанційно керованих  
комутаційних апаратів

### Implementation period:

Installation of reclosers - 5 years;

Installation of sectionalizers, short circuit indicators - 10 years;

Reconstruction of transformer substations with replacement by MPTS and installation of remotely controlled switching devices - 10 years.

The plan provides for the availability of internal personnel and external contractors, as well as carrying out design and survey work on transformer substations` reconstruction



# 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

|                            |                                                                    |
|----------------------------|--------------------------------------------------------------------|
| <b>Schedule</b>            | Pilot in 2025 amount €3,5 mln   Full project €505 mln in 2025-2034 |
| <b>Debt period</b>         | 10 years                                                           |
| <b>Interest rate (EUR)</b> | 7%                                                                 |
| <b>leverage</b>            | Debt: expected at the level of 70%                                 |
| <b>Electricity prices</b>  | According to DTEK macro forecast                                   |

### IRR (EUR)

**Levered**

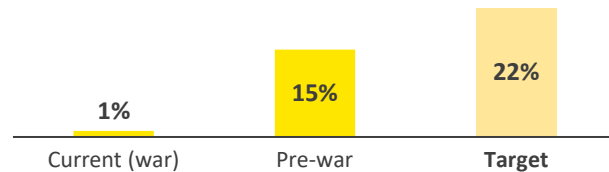
**22%**

**Unlevered**

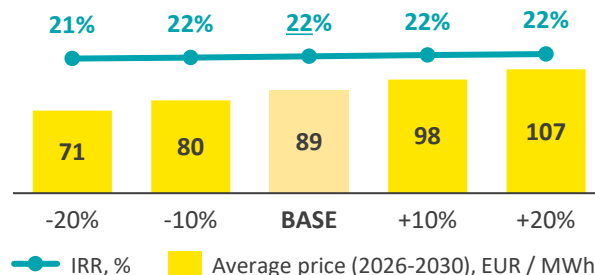
**12%**

### 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            | -            | 216        | 216        | 216        | 216        | 216        | -          | -          | -          | 1 082      |
| 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        | -            | 0,8        | 0,9        | 0,8        | 0,8        | 0,7        | 0,5        | 0,3        | 0,2        | 8,5        |
| 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        | -            | 0,0        | 0,0        | 0,0        | 0,0        | 0,0        | -          | -          | -          | 0,1        |
| 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        | 0,2        | 0,2        | 0,2        | 0,2        | 0,0        | 0,0        | 2,3        |
| Income tax            | EUR mln        | -            | (0,1)      | (0,1)      | (0,1)      | (0,1)      | (0,1)      | (0,1)      | (0,0)      | (0,0)      | (1,3)      |
| Investment cash flow  | EUR mln        | (3,5)        | -          | -          | -          | -          | -          | -          | -          | -          | (3,5)      |
| <b>FCFF</b>           | <b>EUR mln</b> | <b>(3,5)</b> | <b>0,7</b> | <b>0,8</b> | <b>0,7</b> | <b>0,7</b> | <b>0,6</b> | <b>0,4</b> | <b>0,2</b> | <b>0,2</b> | <b>3,7</b> |
| 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)      |
| <b>FCFE</b>           | <b>EUR mln</b> | <b>(1,1)</b> | <b>0,3</b> | <b>0,4</b> | <b>0,3</b> | <b>0,3</b> | <b>0,3</b> | <b>0,1</b> | <b>0,2</b> | <b>0,2</b> | <b>2,7</b> |

\*tax and amortization in tariff

