

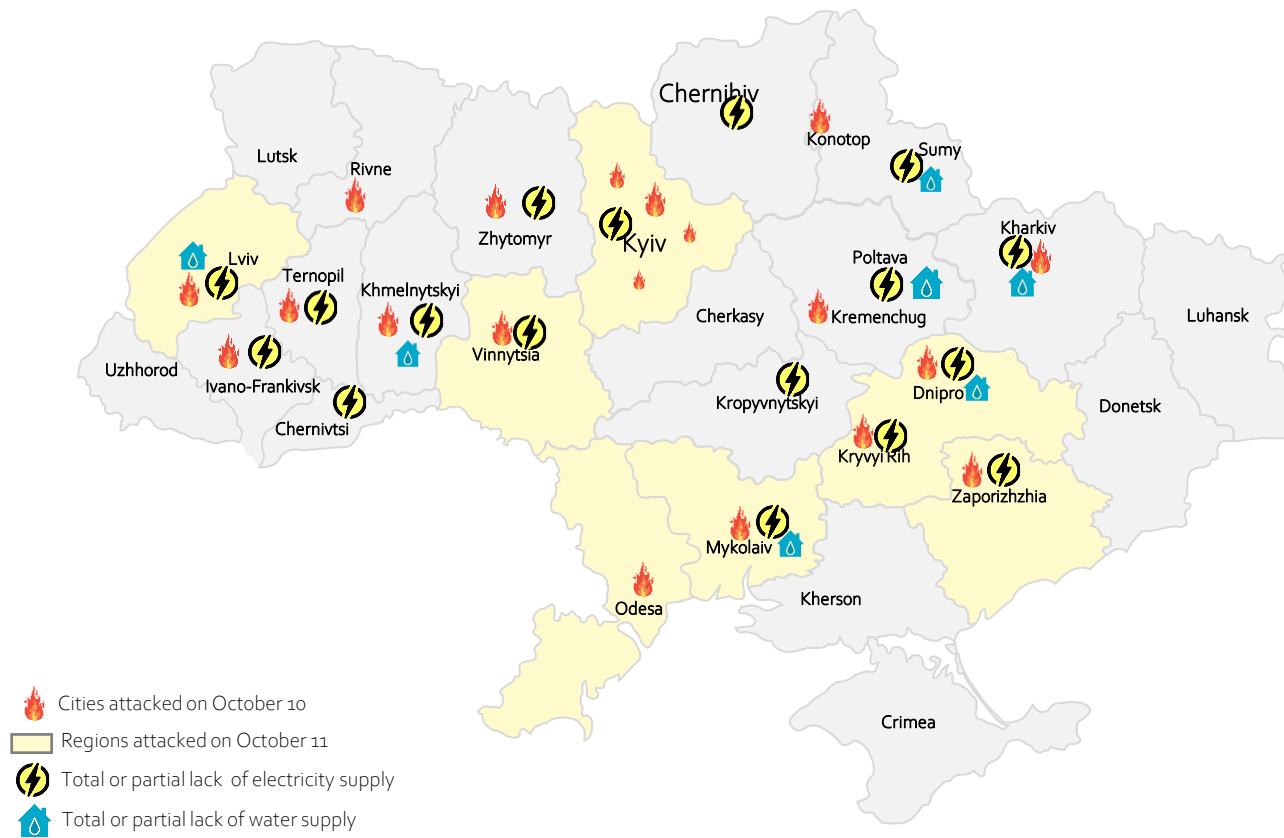
## DTEK Humanitarian and Technical Aid Needs



# Actual Situation in Ukraine



## Up to 30% of Ukrainian Energy Facilities Damaged by russian Shelling



Starting from 10<sup>th</sup> of October, Russia launched hundreds of missiles and unmanned aerial vehicles (UAVs) over Ukraine

Tens of people killed

Hundreds of people injured

Significant damage was caused to the energy system, so Ukraine is forced to stop exporting electricity to the EU



## **DTEK Energy**

War impact: damaged power equipment replacement





1. Starting from 10<sup>th</sup> of October, Russia performs missile and drone strikes on Ukrainian energy infrastructure
2. 3 out of 9 DTEK TPPs have been destroyed, triggering blackouts
3. 2 TPPs were captured in February / March, and cut off the grid
4. Other 4 TPPs have suffered severe damages and operating in a limited power mode
5. Due to the shelling of energy infrastructure:
  - Country rolling blackouts and power cuts applied
  - Some of the cities and towns were totally blackout and left without internet / mobile connection, water and heating supply for the days



# Key Needs for DTEK Energy (1/2)



| Equipment                               | Description   | Amount | Vendors  |
|---|---|--------|--|
| Power, current and voltage transformers | Three-phase autotransformer 240000/330/220, or similar (Rated voltage of windings, HV - 330 kV, MV - 220 kV, LV - 38.5kV, Rated power: 240 MVA, Frequency, Hz: 50, with forced circulation of oil and air, lightning-proof, outdoor)  | 1 pc   |  |
|   | Single phase autotransformer 210000/400/330-73, or similar (Rated voltage of windings, HV - 400 kV, MV - 330 kV, LV - 35 kV, Rated power: 240 MVA. Frequency, Hz: 50, with forced circulation of oil and air and on-load tap-changer) | 2 pcs  | ABB, Siemens, HPL, GE, Trench Germany GmbH                                       |
|   | Single phase autotransformer 133000/400/220, or similar (Rated voltage of windings, HV - 400 kV, MV - 220 kV, LV - 35 kV, Rated power: 133 MVA. Frequency, Hz: 50, with forced circulation of oil and air, lightning-proof)           | 1 pc   |  |
|   | Current transformer 2000/1, U=330 kV, accuracy class 0.2S, IEC 61869  | 27 pcs | ABB Siemens, HPL, GE, Trench Germany GmbH, KONCAR - Instrument transformers Inc. |
|   | Current transformer 1200/1, U=220 kV, accuracy class 0.2S, IEC 61869  | 10 pcs |  |
|   | Current transformer 1200/5, U=154 kV, accuracy class 0.2S, IEC 61869  | 16 pcs |  |
|   | Current transformer 1200/5, U=110 kV, accuracy class 0.2S, IEC 61869  | 19 pcs |  |
|   | Voltage transformer U1=400/V3 kV, U2=100/V3 V, accuracy class 0,2, IEC 61869  | 3 pcs  | ABB, Siemens, HPL, GE, KONCAR  |
|   | Voltage transformer U1=330/V3 kV, U2=100/V3 V, accuracy class 0,2, IEC 61869  | 6 pcs  |  |
|   | Voltage transformer U1=220/V3 kV, U2=100/V3 V, accuracy class 0,2, IEC 61869  | 3 pcs  |  |
|   | Voltage transformer U1=150/V3 kV, U2=100/V3 V, accuracy class 0,2, IEC 61869  | 3 pcs  |  |
|   | Voltage transformer U1=110/V3 kV, U2=100/V3 V, accuracy class 0,2, IEC 61869  | 3 pcs  |  |



## Key Needs for DTEK Energy (2/2)



| Equipment                          | Description   |        | Vendors                                 |
|------------------------------------|---|--------|---|
| Circuit Breakers and Disconnectors | SF6 LTB-420E2/400kV/3150/40 kA, or similar                                      | 13 pcs | ABB, Siemens, HPL, GE                   |
|                                    | SF6 HPL245B1/220kV/4000/50kA  | 5 pcs  |   |
|                                    | SF6 HPL145B1/110kV/4000A/40kA   | 17 pcs |   |
|                                    | SF6 LTB 420E2/330kV/4000/50kA   | 13 pcs |   |
|                                    | SF6 LTB 170D1/154kV/3150/40kA   | 6 pcs  |   |
|                                    | 4000 A - 160 kA peak - 63 kA/3sec, 52 pcs                                       | 52 pcs | Hapam, ABB-Hitachi, Siemens, GE         |
|                                    | 3150 A - 125 kA peak - 50 kA/3sec., 20 pcs                                      | 20 pcs |   |
| Other positions:                   | Coupling capacitor 110/V3 2100 F (line 238), 1 pc                               | 1 pc   | -                                       |
|                                    | Bushings for AT (RIP bushings with silicone composite insulator): 400 kV, 9 pcs | 9 pcs  | ABB-Hitachi, Siemens, HSP, GE, ChinSun, |
|                                    | Bushings for AT (RIP bushings with silicone composite insulator): 245 kV, 7 pcs | 7 pcs  |   |
|                                    | Transformer Oil (T-1500 or similar oil), 60000 kg                               | -      | -                                       |



## DTEK Grids

Impact of the war and needs



# DTEK Grids Update

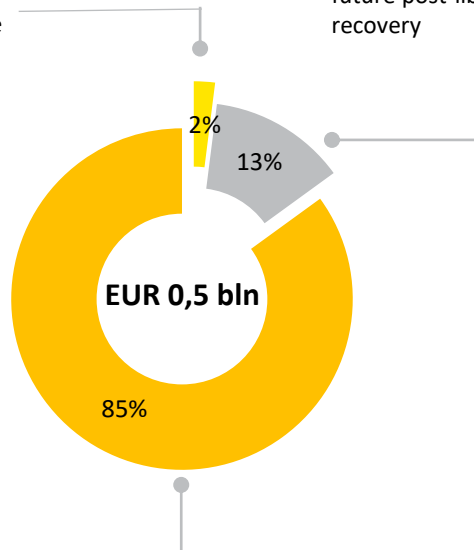
Required scope of assistance for restoration of DTEK GRIDS  
(financing, supply of equipment and materials)

**EUR 10 m**

urgent need for  
restoration after the  
liberation

**EUR 66,4 m**

medium-term need for  
future post-liberation  
recovery



**EUR 431,5 m**

long-term need for post-liberation development of  
electricity grids



## International support of the company's activity in the conditions of war

- DTEK GRIDS received more than EUR 15 m of materials and necessary equipment to restore electricity supply.
- After 24 February DTEK GRIDS' team together with international partners and state agencies have elaborated effective logistic routes and mechanisms of receiving equipment
- Restoration of grids is provided in two stages:
  - **Restoration of electricity supply** to those customers who were left without electricity after the hostilities.
  - **Restoration of the normal mode scheme** to have the characteristics of the grid as we had before the start of full-scale war. Exclusion of bottlenecks, increasing / ensuring the reliability of power supply, and grid capacity.







## Key Needs for DTEK Grids



Mobile substation 154 kV, with transformer 40,000 kVA and set of equipment for 110, 35, 10, and 6 kV

The period of restoration/reconstruction/construction of a destroyed substation is a rather long process (takes more than 1 year), during which considerable areas and many customers may remain without electricity supply. A mobile substation will solve this problem by replacing the main substation during its recovery.

**Power cables and joints to connect it are one of the most urgent needs.**

For example, we require it to connect 10 units of complete secondary substations. We have currently purchased these secondary substations, but the power cable is still needed. These complete secondary substations must be installed to replace damaged or destroyed ones as a result of armed aggression in the territories of the Kyiv region. These measures will improve the reliability of the power supply to about 5,000 customers in Irpin.

- Mobile substation 110 kV, 40 MVA – 3 pcs
- Power transformer 110 V, 10 MVA – 6 pcs
- Circuit breaker 110 kV, SF6 – 10 pcs
- Conical pole for OHL (22m) – 16 pcs
- Wires (Aluminum steel) 120-300 mm<sup>2</sup>, 20 tone
- Complete secondary substation (2x630 kVA) with transformers, 30 pcs
- Power Cable 6-10 kV with XLPE Isolation 1x120 - 1x800 mm, 102 km
- Medium Voltage Transition Joint (POLJ 24) 1x120 - 1x800 mm, 754 pcs
- Power Cable Termination (POLT 24) 1x120 - 1x800 mm, 502 pcs

# Thank you for your attention!



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DTEK has experience in solving logistic, custom, tax and legal issues related to the import of humanitarian aid from Europe to Ukraine (including, but not limited - cooperation with the Polish State Agency *RARS*)