

KHMELNITSKOBLENERGO: THE POWER OF INNOVATIVE SOLUTIONS

WE OFFER
EQUIPMENT TO CARRY OUT ENERGY AUDIT
AND REDUCE LOSSES OF ENERGY RESOURCES
WITH A FOCUS ON

■ CUSTOMERS ■ DEALERS ■ CO-PRODUCTION PARTNERS



ПУБЛІЧНЕ АКЦІОНЕРНЕ ТОВАРИСТВО

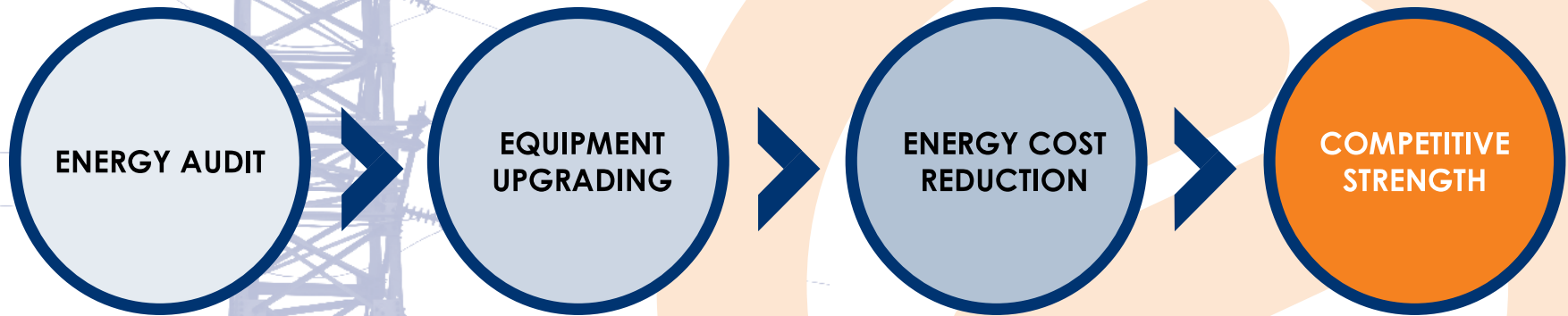
ХМЕЛЬНИЦЬКОБЛЕНЕРГО

енергопостачальна компанія





ENERGY AUDIT IS YOUR WAY TO COMPETITIVE STRENGTH



YOUR ENERGY AUDIT encompasses:

- diagnostics of energy- and heating systems of the company;
- evaluation of electric power and heat losses;
- turnkey solutions to prevent losses;
- true energy saving;
- cost saving as a RESULT



YOU SAVE WITH OUR EQUIPMENT!

OUR EQUIPMENT

mobile energy
laboratory
Mobile Test Lab Hi-teKH



mobile energy
laboratory
Mobile Test Lab HQ



Activity	Net profit on replacement, UAH (for the period of 10 years)	Cost of a transformer with an amorphous core, UAH
Troubleshooting and replacement of a 400 kVA transformer (year of manufacture: 1978)	249,677	85,000
Troubleshooting and replacement of a 400 kVA transformer (year of manufacture: 1990)	482,090	85,000



MOBILE ENERGY LABORATORY

MOBILE TEST LAB HI-TEKH

Mobile Test Lab Hi-teKH – is a complex laboratory, proprietary solution of PJSC Khmel'nitskoblenergo

Purpose of use: to carry out an audit within the 10 (6) kV power distribution network equipment

The laboratory is mainly geared to perform measurements of:

- the open-circuit and short circuit losses based on the three-phase diagram and nominal values of current and voltage of the 10(6)/0,4 kV transformers;
- the transformer ratio;
- resistance of transformer's electric windings to direct-current

Mobile Test Lab Hi-teKH also allows to:

- perform heat monitoring;
- perform energy audit of heat and power supply units and networks

Key advantages:

- the latest equipment technologies;
- herforming of various checks at any site;
- the most accurate measurement of the parameters





MOBILE ENERGY LABORATORY

MOBILE TEST LAB HI-TEKH

Configuration of Mobile Test Lab Hi-teKH...

...basic version:

- a measurement unit with an SA-540 instrument a notebook and a 380 V/20 A three-phase controller;
- connecting cables;
- standalone power supply unit with not less than 5 kW



... individual version including additional options:

- the laboratory can be completed with a 0,38/11 kV three phase transformer and a 380 V/40 A controller installed;
- the audit labs can be extended with the thermal monitoring devices, allowing to carry out the energy audit of the heat and power supply units and networks (boilers, heating mains, steam mains, air ducts, steam, condensed, hot and cold water)





MOBILE ENERGY LABORATORY

MOBILE TEST LAB HQ

Mobile energy laboratory Mobile Test Lab HQ

Purpose of use: diagnostics of the parameters of measurement transformers

- current transformers of 0,4-100 kV voltage rating with rated primary currents ranging 15-3,000 A at the site,
- transformers with 6, 10, 35, 110 kV voltages that are used within the supplier networks

Key advantages of the labs

Mobile Test Lab HQ:

- the pinpoint accuracy of measurements;
- wide range of tested parameters;
- know-how equipment





MOBILE ENERGY LABORATORY

MOBILE TEST LAB HQ

Basic configuration of the Mobile Test Lab HQ...

- a gauge to measure current, voltage and angle errors;
- the working calibration standards to inspect current transformers up to 3,000 A and 5,000 A;
- the working calibration standards to inspect voltage transformers of 6, 10, 35, 110 kV;
- an adjustable current source up to 3,600 A and 6,000 A;
- an adjustable source of three phase voltage to inspect NOM, NTMI, NAMI, ZNOL 4,8-12 kV units;
- an adjustable source of one phase voltage to inspect the measurement transformers NOM, ZNOM 4,8-42 kV, NKF-7 76,2 kV
- connecting cables

Extra configuration options:

- a three phase transformer 0,38/11 kV;
- a 380 V/40 A controller'
- the devices to measure the open-circuit and short current losses for the transformers of higher voltage (35 and 110 kV)





ENERGY LABS DESIGNED FOR CUSTOMERS, DEALERS, AND PARTNERS

We offer supply of labs as:

1
TURNKEY PROJECT –
the labs on **RENAULT** and **Sobol**
chassis including all the equipment
required

2
EQUIPMENT SET
of labs (see pp. 6-7
above)

3
**EQUIPMENT SET + TECHNICAL
DOCUMENTATION**
to install on the customer's
chassis

We offer cooperation:

1
TO CUSTOMERS

- large enterprises where we'll reduce energy consumption and ensure energy audit on a constant basis;
- middle and small businesses where we'll keep costs down and lower production costs;
- non-profit organisations where we'll reduce spending of budget funds

2
TO DEALERS

- we'll ensure export supplies of equipment. It's possible to deliver non-standard versions depending on the preferences of foreign buyers

3
TO PARTNERS

- we'll get you involved in coproduction of the unique and state-of-the-art equipment, a true know how

4
TO GLOBAL BRANDS

- we'll provide an opportunity to manufacture our equipment under your trademark. We'll increase your competitive strength in international markets



ENERGY LABS – SERVICES AND BENEFITS

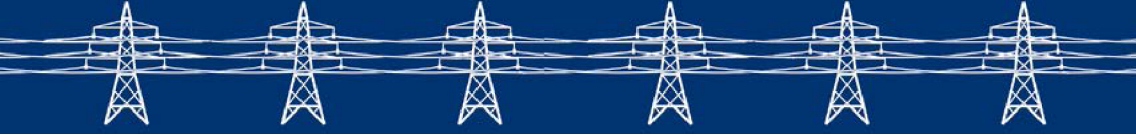
We provide massive service opportunities:

- flexible conditions of production: modifications as required by customer;
- training of your personnel to effective use of the equipment;
- sale of the unit purchase to sale and install it at the other buyer's site;
- long warranty period: 1,5 years;
- after-sales service



Our advantages:

- partnership in development with the country's leading scientific centres: the Institute of Electrodynamics of the National Academy of Sciences of Ukraine, the NTU «KPI», the Lviv Politechnic, the Khmelnytskyi National University, the Kyivporybor Manufacturing Group and others;
- experience of more than 20 years in electrical equipment installing and operating;
- Ukrenergo, Kyivoblenergo, Odesoblenergo, Dniproblenergo, Cherkasystandartmetrologiia, Homelenergo, Brestenergo are among our customers



TRANSFORMATION ENERGY SAVE

We offer a unique spatial three phase transformer **MaxEF**

It's our own solution and design, unique technology!

A space magnetic system surrounds the windings, and not vice versa as it is the case with all standard transformers

Benefits **MaxEF** to the standard models:

- no forced cooling system;
- no energy radiation escaping into the environment;
- the highest coefficient of performance (COP): 99%;
- more robust and longer life (running time);
- convenient repair, it's sufficient to replace 1 of 3 modules



Standard transformer	MacEF	Effect MacEF
Radiates energy into the environment	Does not radiate energy into the environment	Energy saving (extra power)
Costs associated with the forced cooling system operation	Not equipped with the forced cooling system	Savings on operating costs
If repaired, on have to deal with or replace the whole transformer The COP is 95-96%	1 module from 3 is to be repaired or replaced The COP is 99!	Saving of time and costs
Operational life amounts to 30 years	Operational life amounts to 40 years	Electricity saving
You save 20%!		



TO PARTNERS – LET’S MAKE TRANSFORMER MacEF TOGETHER

We invite you to participate in manufacturing the globally competitive solution, a spatial three phase transformer **MaxEF**

In cooperation with us you’ll additionally obtain competitive advantages:

Note, that MacEF is:

- the innovation product having different variants to be used by enterprises of various sectors;
- the highest safety standards;
- the considerably longer operating life compared to the standard models;
- the most energy efficient model compared to the existing counterparts

We offer the most favourable terms of joint production of the transformers **MaxEF!**





TRANSFSTANDART – THE HIGHEST ACCURACY INSPECTING

We offer the standard transformers **TransfStandart** which ensure the highest accuracy in electrical equipment inspection

The key functions include investigations as to deviations from the standard values of:

- current measurement transformers from 3000 A to 5000 A;
- voltage transformers, operating in the electrical installations with nominal voltage of 6–10–35–110 kV

Key advantages:

- unique metrological parameters;
- usability – interface;
- compact size;
- the possibility to measure the wide range of primary currents;
- the warning system actuated in case any deviations from the standard parameters occur

1. Reference current transformers TS(p)-05, TS(p)-06, TS(p)-012

The transformers are designed to be used as the working calibration standards during calibration of current measurement transformers.

Accuracy class	- 0,05
Rated value of primary current, A	
- TS(p)-05	- 15-600
- TS(p)-06	- 200-3.000
- TS(p)-012	- 15-3.000
Rated value of secondary current, A	- 5
Rated value of secondary burden, VA	- 2,5
Rated load power factor	- 0,8



TRANSFSTANDART – THE HIGHEST ACCURACY INSPECTING

2. Reference current transformers

TN(p)-6/10, TN(p)-35

The transformers are designed to calibrate the current transformers used in the electrical installations 6-35 kV

Rated primary voltages, kV	- 6, 10, 35 ($35/\sqrt{3}$)
Range of measurement, % U_H	- 80÷120
Nominal voltage, V	- 100, ($100/\sqrt{3}$)
Accuracy class	- 0,1
Current measurement error, %	- not exceeding $\pm 0,1$
Angle measurement error, ' 	- not exceeding $\pm 5'$ (3')
Capacity in accuracy class, VA	- 0÷5
Maximum capacity, VA	- 100

Reference current transformer TN(p)-110

The transformer is designed to be used as a working calibration standard during error estimation in the measurement voltage transformers, operating in the electrical installations with nominal voltage of 110 kV

Measurement winding accuracy class	
- a1-x - a2-x	- 0,1 - 0,2
Rated primary voltage, kV	- $110/\sqrt{3}$
Rated voltages in secondary windings, V	
- a1-x - a2-x	- $100/\sqrt{3}$ - 100
Primary voltage range, kV	- 50-77
Secondary winding voltage range, V	
- a1-x - a2-x	- 45-70 - 80-120
Secondary winding rated capacity, VA	
- a1-x - a2-x	- 2.5 - 10
Load power factor	- 0,8-1,0



YOUR ENERGY STANDARD!



PRODUCTIVE PARTNERSHIP

Our unique equipment will maximise your competitive strengths!

Our solutions and the most advanced electrical equipment will allow your enterprise to:

Cooperation
with us:

- achieve the most optimal mode of power consumption;
- be energy efficient;
- reduce production costs



- **large enterprises** where we'll reduce energy consumption and ensure energy audit on a constant basis;
- **middle and small businesses** where we'll keep costs down and lower production costs;
- **foreign dealers and manufactures** where we'll ensure export and joint production of the state-of-the-art equipment, true know-how;
- **non-profit organisations** where we'll reduce spending of budget funds.

Looking forward to partnership proposals!

It's we that can offer you the most flexible and favourable cooperation conditions!





ПУБЛІЧНЕ АКЦІОНЕРНЕ ТОВАРИСТВО
ХМЕЛЬНИЦЬКОБЛЕНЕРГО
енергопостачальна компанія

WE WOULD VERY MUCH APPRECIATE YOUR RESPONSE AND FURTHER COOPERATION!

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