Department of Energy and Energy Technologies of the NAS of Ukraine

Report on the scientific and organisational activities of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine in 2025

Speaker: Director of the Institute
Academician of the National Academy of
Sciences of Ukraine Andriy ZHARKIN

Meeting of the Bureau of VEET NAS of Ukraine

24.02.2026

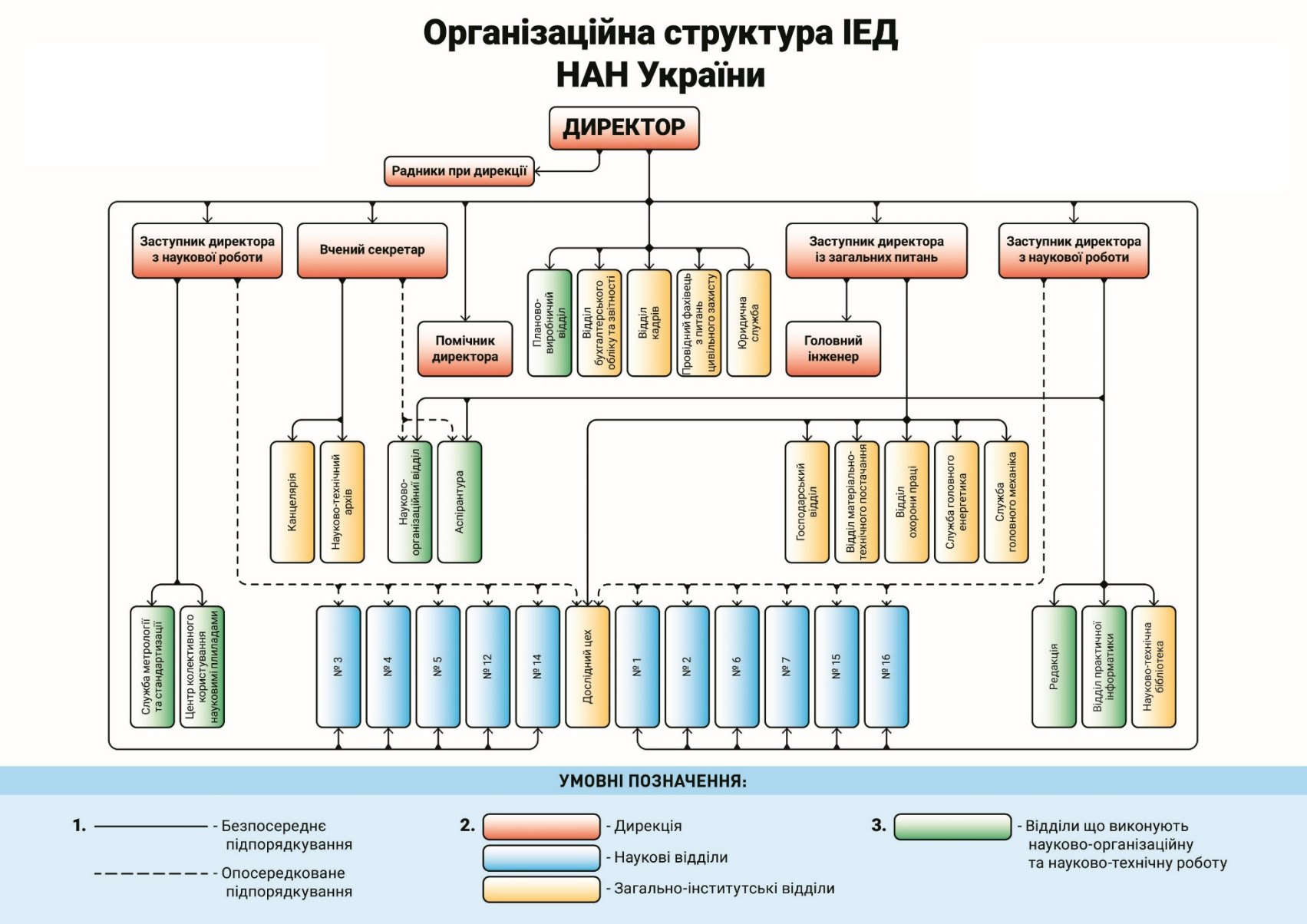
1. General information about the institute

Main scientific areas

- Operating modes of power systems and facilities, and their control
- Electromechanical energy conversion systems and complexes
- Conversion and stabilisation of electromagnetic energy parameters
- Information and measurement systems and metrological support




Structure of the Institute



The Institute operates a Centre for the shared use of scientific equipment.

Information on the state attestation of the institute by the Ministry of Education and Science, and evaluation of the activities of the National Academy of Sciences of Ukraine

Following the results of the performance evaluation of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine (in 2025) covering a six-year period, the institute has been classified as ‘Category A’

In 2025, following the results of the state accreditation of research institutions conducted by the Ministry of Education and Science of Ukraine (Order No. 1360 of 15 October 2025), the institute was classified in Group A

TRAINING OF SCIENTIFIC PERSONNEL

- The Institute is licensed by the Ministry of Education and Science of Ukraine (Order of the Ministry of Education and Science of Ukraine dated 17.03.2017 No. 51-l) of the third (educational and scientific) level according to the ONP "Electric Power Engineering, Electrical Engineering and Electromechanics" in the speciality G3 - Electrical Engineering and the ONP "Information and Measurement Technologies" in the speciality **G6 - Information and Measuring Technologies.**

- By the decision of the National Agency for Quality Assurance of Higher Education dated 27.07.2021, the institute received a certificate of accreditation of the educational program in the specialty 141 - "Electric Power Engineering, Electrical Engineering and Electromechanics" for a period until 01.07.2027, which was reissued on 26.06.2025 as a certificate under No. 16989 on the accreditation of the educational program "Electric Power Engineering, Electrical Engineering and Electromechanics" in the specialty **G3 - Electrical Engineering** (third educational and scientific level) valid until 01.07.2027.

- By the decision of the National Agency for Quality Assurance of Higher Education dated 14.04.2022, the institute received a certificate of accreditation of the educational program in the specialty 152 "Metrology and Information and Measuring Equipment" for a period until 01.07.2027, which was reissued on 26.06.2025 as a certificate for
No. 16990 on the accreditation of the educational program "Information and Measuring Technologies" in the specialty **G6 - Information and Measuring Technologies** (third educational and scientific level) with a validity period until 01.07.2027.

- The Institute has doctoral studies in the specialties 141 -
"Electric Power Engineering, Electrical Engineering and Electromechanics" and 152 - "Metrology and Information and Measuring Equipment".

Specialized Academic Councils for the Defense of Dissertations for the Degree of Doctor of Sciences/Candidate of Sciences:

- D 26.187.01 "Technical Sciences" (Order of the Ministry of Education and Science of Ukraine dated 10.10.2022, No 894, for a period of 3 years)

05.09.03 – Electrical Complexes and Systems

05.09.05 – Theoretical Electrical Engineering

05.09.12 – semiconductor power converters

- D 26.187.03 "Technical Sciences" (Order of the Ministry of Education and Science of Ukraine dated 10.10.2022, No. 894 for a period of 3 years)

05.09.01 – electrical machines and apparatus

05.14.02 – power plants, networks and systems

PUBLISHING ACTIVITY

Journal "Technical Electrodynamics"

ISSN 1607-7970, e-ISSN 2218-1903

The journal "TECHNICAL ELECTRODYNAMICS" is a scientific professional publication of Ukraine in the field of technical sciences, included in the List of scientific professional publications of Ukraine category "A" (24.05.2018).

The journal publishes research results in the following areas: theoretical electrical engineering and electrophysics; conversion of electrical energy parameters; electromechanical energy conversion; electric power systems and electrotechnological complexes; and information and measurement systems in the electric power industry.

The journal is abstracted in the Abstract Journal "Dzherelo" (Ukraine, Kyiv). The electronic edition of the journal is stored in the National Library of Ukraine named after V.I. Vernadsky, included in the OPEN UKRAINIAN CITATION INDEX database and international databases: SCOPUS, COMPENDEX, EBSCO, PROQUEST, CROSSREF, INDEX COPERNICUS.

Scientometric indicators of the journal "Technical Electrodynamics" in the international database SCOPUS

	H-index	SNIP	IPP	SJR	
2024	20	0,669	0,43	0,225	Q3

Proceedings of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine

ISSN 1727-9895, e-ISSN 2786-7064

The journal “Proceedings of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine” is an open-access scientific journal in the field of technical sciences; it is included in the List of Ukrainian Scientific Journals in Technical Sciences under Category “B” in accordance with Order No. 975 of the Ministry of Education and Science of Ukraine dated 11 July 2019.

The collection is indexed in the national repository ‘Scientific Periodicals of Ukraine’ and the national database ‘Ukrainica Naukova’ (the abstract journal ‘Dzherelo’). The electronic version of the collection is held at the V.I. Vernadsky National Library of Ukraine and is included in the OpenUkrainianCitationIndex and Crossref databases.

The journal “Proceedings of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine” is listed in the Ulrich’s Periodical Directory (New Jersey, USA) and, as of September 2022, in the DOAJ database.

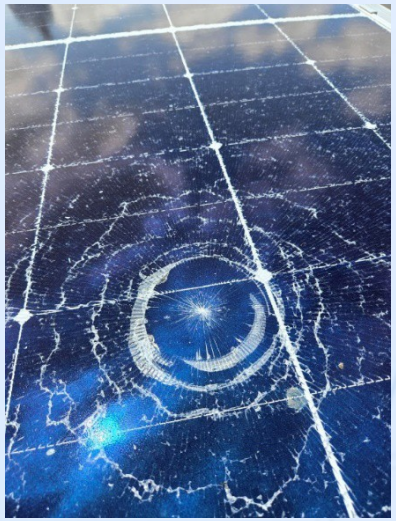
2. Consequences of armed aggression

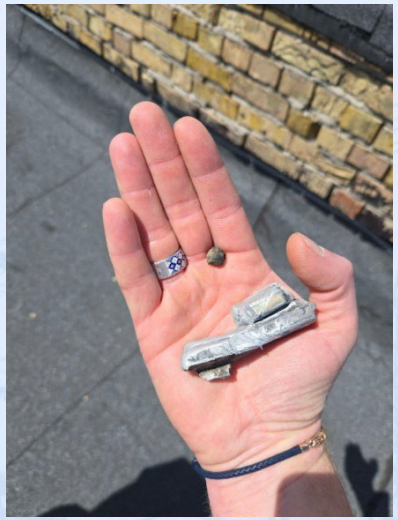
Personnel changes:

- In 2025, 11 employees (including 9 scientists) were abroad due to hostilities without dismissal;
- 4 employees were drafted into the ranks of the Armed Forces of Ukraine (including 1 scientific);
- One employee died in 2022.

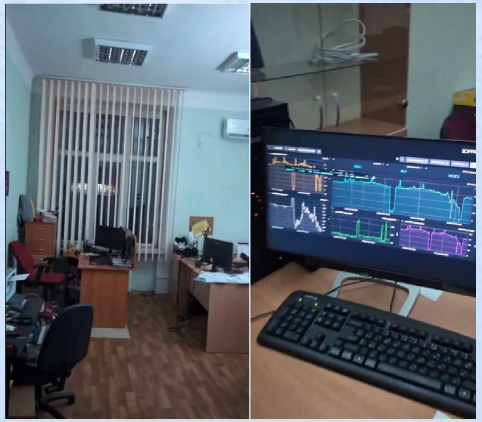
Consequences of armed aggression: Material damage

As a result of shelling, particularly on 06.06.2025, part of the solar power plant's panels was damaged, reducing expected generation. The replacement of employees in scientific departments was carried out at their own expense.





During the blackouts during the autumn-winter period, thanks to the installed energy storage unit, the work of the Institute's critical departments was ensured.



Consequences of armed aggression: Material damage

The estimated amount of damage is about UAH 7 million.
Financial assistance of the Presidium of the National Academy of Sciences of Ukraine – UAH 520 thousand.
In addition, voluntary contributions of the Institute's employees and sponsorship were involved in the recovery.

3. Statistics for 2025

Research projects by subject area

	Type of research topics	Number of R&D carried out in the reporting year				Volumes of financing thousand UAH		% of the total amount of funding Snoop
		Total		including completed in reporting year				
		GF	SF	GF	SF	GF	SF	
1	**State topics**	**0**	**4**	**0**	**2**	**0,00**	**6 085,46**	**6,08**
1.2.	Project of the National Research Foundation of Ukraine		4		2		6 085,46	6,08
2	**Program-Target and Competition Topics of the National Academy of Sciences of Ukraine**	**3**	**0**	**0**	**0**	**13 664,00**	**0,00**	**13,64**
2.1.	Topics carried out within the framework of the competition in the direction of "Support for priority research and scientific and technical developments for the state" of the budget program 6541230	1				7 700,00		7,69
2.2.	Topics that were carried out within the framework of the competition in the direction of "Defence and Security" under the program 6541230	1				2 640,00		2,64
2.4.	Grants of the National Academy of Sciences of Ukraine to research laboratories/groups of young scientists:	1				700,00		0,70
2.5.	Acquisition of the latest and modernisation of existing scientific equipment					2 624,00		2,62
3	**Departmental topics**	**27**	**0**	**0**	**0**	**70 866,02**	**0,00**	**70,76**
3.1.	Topics of fundamental research 6541030	22				60 933,79		60,85
3.2.	Topics of applied research 6541030	5				9 932,23		9,92
4	**Search topics**							
5	**Contractual topics**	**0**	**11**	**0**	**9**	**0,00**	**9 528,90**	**9,52**
5.1.	Topics financed under agreements and contracts with domestic and foreign customers (applied research)		11		9		1 808,54	1,81
5.3.	Topics implemented at the expense of grants from international and foreign organisations						7 720,36	7,71
	Overall	**30**	**15**	**0**	**11**	**84 530,02**	**15 614,36**	**100,00**

Financing of the Institute (in thousand UAH)

Theme Type / Years	2023	2024	2025
General Fund of the State Budget TOTAL	**61901**	**79311**	**85189**
Program-target and competition topics of the NAS of Ukraine	6700	10781	13664
Departmental topics	55201 (82,18%)	68529 (69,07%)	70865 (67,64%)
Special Fund of the State Budget TOTAL	**5272**	**19918**	**19580**
INCL . contractual topics (incl. NRFS)	3021	6785	8301
incl. property lease	2231	2466	3559
incl. international Grant agreements	20	10667	7720
Total funding	**67173**	**99229**	**104769**

Capital expenditure on equipment to improve the energy efficiency of buildings and introduce green energy technologies

- In 2025, there will be no capital expenditure on equipment to improve the energy efficiency of buildings.
- In 2025, there will be no capital expenditure on equipment for the implementation of green energy technologies.

Staff

Indicators / year	2023	2024	2025
General. Number of employees (without part-time employees)	297	295	288
Number of sciences. employees (without part-time employees)	165	165	152
Number of academicians of the National Academy of Sciences of Ukraine	4	5	4
Number of Corresponding Members of the National Academy of Sciences of Ukraine	5	4	5
Number of Doctor of Technical Sciences	41	41	44
A number of Ph.D., Doctor of Philosophy.	78	82	80
Number of Doctor of Technical Sciences, under the age of 40 years.	1	-	1
Number of Ph.D., Doctor of Philosophy, under the age of 35.	15	15	13
Average age of sciences. employees	60,2	61,3	60,9
Average age of Doctor of Technical Sciences	67,7	68,4	70,2
Average age Ph.D., Doctor of Philosophy.	55,9	55,5	56,5

Average salary of the Institute's employees

Indicator/years	2023	2024	2025
Average salary Employees	**14 506**	**18 808**	**21 840**
Average salary of scientific Employees	**15 902**	**20 643**	**24 486**

Training of scientific personnel

Indicator/years	2023	2024	2025
Quantity doctoral students	4	4	5
Quantity Postgraduate students	12	14	14
Number of defended doctoral theses dissertations	-	-	1
Number of defended PhD dissertations (including doctors philosophy)	6	2	2

Publication activities

Type of publications	2023	2024	2025
Articles in scientific periodicals indexed by leading scientometric databases (Web of Science, Scopus)	64	76	**72**
Articles in domestic scientific publications included in the List scientific professional publications of Ukraine	54	40	**66**
Monographs	4	6	**5**
Chapters in monographs	8	4	**5**
Scientific and educational literature (textbooks, manuals)	6	2	**14**
Abstracts of international conferences,	**45**	**39**	**65**

Inventive activity

	2023	2024	2025
Applications submitted in total (inventions + utility models)	9(3+6)	9(4+5)	12(7+5)
Decisions on Issuance of patents of Ukraine (inventions + utility models)	6(3+3)	13(9+4)	6(0+6)
Received inventions + utility models	5(2+3)	12(8+4)	7(1+6)
Obtained copyright certificates for computer programs (CP) and databases (DB)	0	4	2

Hirsch index information

NHR Ukrainian National H-index Ranking 2025

Member of the ranking

Institute of Electrodynamics of the National Academy of Sciences of Ukraine
Інститут електродинаміки НАН України

Criterion	National H-index	Scopus	Web of Science	Google Scholar
H-index	23	28	16	50
Position	138	68	71	86

Date issued: 13/02/2026
Organization Page: https://ua.h-index.com/institute-of-electrodynamics-of-the-national-academy-of-sciences-of-ukraine

The number of scientists of the institute who, according to Google Scholar, have the Hirsch index:

Indicator H-index	2023	2024	2025
≥ 20	4	6	6
≥ 10	17	17	18
≥ 5	61	62	61

Attraction of grant funds

Grant Program	Project name	Did she receive Funding application	Deadline	Total amount of funding. thousand UAH
Competition of joint Ukrainian-Slovak research projects 2025	"Scientific and methodological foundations of P2P trade in local markets electricity during Smart monitoring"	Did not receive	2026-2027	
Innovate Ukraine Round 2: Supporting Ukraine's Energy Recovery	MatZero x Mettle2 (MZxM2): Innovative heating solution combined with swappable sodium ion battery solution Application number: 10164257	Did not receive	2025-2027	
Міністерство освіти і науки України, Ministry of Education and Science of Ukraine	Smart Grid model for operational management of distribution networks based on artificial intelligence methods	Funded by	2024-2025	398
Funded by UK International Development, UK Foreign, Commonwealth & Development Office (FCDO) and implemented by the Innovate UK	OMM-Ukraine: Optimised Microgrid Management in Ukraine	Funded by	2024-2026	2528,76
Funded by UK International Development, UK Foreign, Commonwealth & Development Office (FCDO) and implemented by the Innovate UK	Grant for project METTLE "Mobile energy storage unit with swappable second-life battery"	Funded by	2024-2026	3008,32
Program-Target and Competition Topics of the National Academy of Sciences of Ukraine	"Cyber Protection"	Did not receive	2025-2026	
Program-Target and Competition Topics of the National Academy of Sciences of Ukraine	IER-2025/2	Funded by	2025-2026	5220
NRFU Competition "Advanced Science"	"Development of the theory of energy processes in power supply systems with renewable sources and energy storage installations of various types to increase the efficiency of their operation in market conditions of Ukraine"	Did not receive	2025-2026	
NRFU Competition "Science for Strengthening Defense Capability and National Security of Ukraine"	Electromechanical systems of increased energy efficiency for aircraft	Funded by	2025-2026	2900
NRFU Competition "Science for Strengthening Defense Capability and National Security of Ukraine"	Magnetohydrodynamic unit for the production of lead shot for anti-drone cartridges	Funded by	2025-2026	3600
NRFU Competition "Science for Strengthening Ukraine's Defense Capability"	Electromechanical systems for increased energy efficiency for energy, technology and transport	Funded by	2024-2025	1368
NRFU Competition "Science for Strengthening Ukraine's Defense Capability"	A device for effective protection of cyber infrastructure from cyber intelligence and cyber actions of the enemy	Funded by	2024-2025	2611

4. Scientific results obtained
General Number of topics performed in the reporting year

State topics

No.	Title of the Scientific Research Project	Supervisor	Deadline	Source of funding
1	Magnetohydrodynamic plant for the production of lead shot for anti-drone ammunition.	Zharkin A.F., Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Director	01.08.2025 30.11.2026	NRFU
2	Electromechanical systems for increased energy efficiency for aircraft devices.	Grebenikov V.V., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2025 31.12.2026	NRFU
3	Electromechanical systems for increased energy efficiency for aircraft devices.	Yurchenko O.M. Doctor of Technical Sciences, Professor, Head Department	01.09.2024 31.12.2025	NRFU
4	Electromechanical systems of increased energy efficiency for the power industry, technologies and transport.	Mazurenko L.I. Doctor of Technical Sciences, Professor, Head Department	01.09.2024 31.12.2025	NRFU

Program-Target and Competition Topics of the National Academy of Sciences of Ukraine

No.	Title of the Scientific Research Project	Supervisor	Deadline	Source of funding
1	IER-2025/2 - section 1 (code: IER-2025/2)	Kyrylenko O.V. Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Advisor to the Directorate	10.01.2025 31.12.2026	NASU
2	Developing a digital twin of a microgrid to optimise and manage decentralised networks (code: Double)	Shymaniuk P.V., Doctor of Philosophy. , Researcher	01.07.2025 31.12.2026	NASU
3	Ensuring the effective functioning and development of distributed energy in Ukraine using microgrid technologies (code: Mode-3)	Shcherba A.A. Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Professor, Head of the Department Zharkin A.F. Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Professor, Director	01.01.2025 31.12.2026	NASU
4	High-Efficiency Electromagnetic System for Recycling Waste and Aluminum Scrap for Production of Secondary Aluminum Alloys (code: EMSAL)	Shcherba M.A. Doctor of Technical Sciences, Professor, Senior Researcher	03.03.2025 31.12.2026	NASU

Departmental topics (part 1)

No.	Title of the Scientific Research Project	Supervisor	Deadline	Funding source
1	Scientific and Technical Principles of Restoration and Controllability of the Electric Power System of Ukraine in the Post-War Period with Synchronous Work with Continental European Energy Association (ENTSO-E) (code: PHOENIX)	Blinov I.V., Doctor of Technical Sciences, Professor, Deputy Director of Research	01.01.2023 31.12.2027	NASU
2	Creation of information and measuring tools for monitoring the condition of the stator winding rods in the grooves of the core and the influence of quality parameters of electricity for vibration of shafts of powerful electric machines (code: ROD)	Zaitsev E.O., Doctor of Technical Sciences, Senior Researcher, Head Department	01.01.2025 31.12.2027	NASU
3	Models and Means of Improving the Reliability of Distribution Grids in the Context of Growth of Renewable Energy Generation (code: Monitor 5)	Kyrylenko O.V. Academician of the National Academy of Sciences of Ukraine, Doctor of Sciences, Prof.,	01.01.2025 31.12.2027	NASU
4	Development of electromechanical equipment of increased energy efficiency and reliability, diagnostic systems for electric power facilities (code: Agregat-4)	Mazurenko L.I., Doctor of Technical Sciences, Professor, Head of Department	01.01.2025 31.12.2027	NASU
5	Development of the theory and modeling of non-stationary electrophysical processes in electrically conductive and dielectric media of pulsed electromagnetic systems (code: Barrier-3)	Kondratenko I.P., Corresponding Member of the NAS of Ukraine, Doctor of Sciences, Prof., Head of Department	01.01.2023 31.12.2027	NASU
6	Development of theoretical foundations for the creation and development of means for improving energy efficiency and reliability of combined systems power supply with different types of generators when operating in autonomous mode and on the grid (code: ENERGOSYST-3)	Mazurenko L.I., Doctor of Technical Sciences, Professor, Head of Department	01.01.2021 31.12.2025	NASU
7	Scientific Foundations and Means of Complex Design Synthesis of Integrated Asynchronous Machines of Systems of Generation, Accumulation, and Energy Use of Renewable Sources of Increased Efficiency (code: Aselma-V)	Popovych O.M., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2023 31.12.2027	NASU
8	Development of the foundations of the theory and methods for studying the influence of non-sinusoidal voltages and currents and emerging electrothermodynamic processes on reliability and resource of modern cable power lines and energy efficiency of electrical installations of resonant type (code: Elres)	Shcherba A.A. Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Professor, Head Department	01.01.2023 31.12.2027	NASU
9	Expansion of functionality and improvement of metrological characteristics of measuring instruments in monitoring and diagnostics in the electric power industry (code: PARAMETER-D)	Melnyk V.G., Doctor of Technical Sciences, Senior Researcher, Head of Department	01.01.2022 31.12.2026	NASU
10	Development of new methods and automation of the process of reproducing power quality parameters and media parameters (code: TAURUS)	Tesyk Y.F., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2025 31.12.2029	NASU
11	Development of digitalization of power systems and development of means of adaptation of emergency automatic control of electrical modes in transition to synchronous operation of the IPS of Ukraine with the ENTSO-E power system of continental Europe (code: ARPACKER)	Pavlovsky V.V., Doctor of Technical Sciences, Senior Researcher, Head of Department	01.01.2023 31.12.2027	NASU
12	Development of theory, development of mathematical models and complex study of processes of electromechanical systems based on high-speed electric machines with permanent magnets and two-stage and one-stage magnetic gearboxes (code: MAGRED-2)	Mazurenko L.I., Doctor of Technical Sciences, Professor, Head of Department	01.01.2025 31.12.2029	NASU
13	Development of the theory and development of measures and technical means to ensure the quality of power supply and electromagnetic compatibility of consumers' distribution systems in the conditions of emergencies in the IPS of Ukraine. (code: Emission-4)	Zharkin A.F., Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Director	01.01.2025 31.12.2029	NASU
14	Development of the theory of electrotechnological processes and development of efficient electric melting and electric charging systems with controlled electromagnetic influence. (code: Eltech)	Zharkin A.F., Academician of the National Academy of Sciences of Ukraine, Doctor of Sciences, Prof., Director	01.01.2022 31.12.2026	NASU
15	Development of new mathematical models and methods for studying electrophysical processes and fields in electrical equipment to ensure reliable operation and diagnosis. (code: Kompleks-5)	Shydlovska N.A. Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Professor, Chief Researcher Employee	01.01.2021 31.12.2025	NASU

Departmental Topics (Part 2)

16	Research and development of specialised magnetic-semiconductor pulse devices of power electronics and means of their power supply from renewable energy sources of comparable power, and with smart control. (code: Domain-2)	Mykhalskyi V.M., Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Head of Department	01.01.2021 31.12.2025	NASU
17	To develop the scientific foundations and principles of the construction of magnetoelectric mechatronic modules for specialised systems of automatic control (code: Mechatron)	Akinin K.P., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2024 31.12.2028	NASU
18	Development of scientific foundations for the restoration and modernisation of turbine generators in power plants in Ukraine in the post-war period, and the development of methods and means to increase reliability and extend the service life of equipment. (code: "Restoration")	Kensytskyi O.G., Doctor of Technical Sciences, Leading Researcher	01.01.2024 31.12.2028	NASU
19	Development of scientific foundations and development of methods and systems for diagnosing the condition of equipment during the restoration and modernisation of energy equipment of power plants of Ukraine using resistance methods in the post-war period (code: Diagnostics EM-4)	Zvarych V.M., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2025 31.12.2029	NASU
20	Study of methods for improving the efficiency of power supply systems with distributed generation sources, taking into account new methods of construction and control of semiconductor compensators for disturbances and inactive power components (code: Adapter-2)	Mykhalskyi V.M., Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Head of Department	01.01.2025 31.12.2029	NASU
21	Development of models and methods for the analysis of abnormal modes of electrical networks under conditions of partial damage to electrical equipment for restoration of their safe functioning and modernisation (code: Safety-5)	Tugay Y.I., Doctor of Technical Sciences, Head of the Department	01.01.2024 31.12.2028	NASU
22	To develop the principles of construction of specialised control systems for semiconductor and electromechanical converters to increase the energy efficiency of electrotechnological installations (code: Baza-P10)	Mykhalskyi V.M., Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Head of Department	01.01.2025 31.12.2027	NASU
23	Analysis, synthesis and development of the principles of construction of high-frequency transistor converters for power supply systems of technological and power equipment (code: Frequency-4)	Yurchenko O.M., Doctor of Technical Sciences, Prof., Head of Department	01.01.2025 31.12.2029	NASU
24	Analysis, synthesis and development of the principles of construction of hybrid filters of current harmonics as a universal means of improving the electromagnetic compatibility of converter equipment devices with the power supply network (code: HYBRID)	Mykhalskyi V.M., Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Prof., Head of Department	01.01.2022 31.12.2026	NASU
25	Development of hybrid power supply systems combining batteries and supercapacitors to improve the energy efficiency of autonomous electric vehicles, and of technological systems for electrothermal treatment of parts made of refractory alloys. (shelfmark: "Elind-P2")	Shydlovskyi A.K. Academician of the National Academy of Sciences of Ukraine, Doctor of Technical Sciences, Professor, Chief Researcher	01.01.2025 31.12.2027	NASU
26	Development of the theory and principles of the construction of energy-efficient high-frequency semiconductor converters of modular structure for powerful power supply systems for electrotechnological equipment with non-stationary load (code: Source 4)	Martinov V.V., Doctor of Technical Sciences, Senior Researcher, Leading Researcher	01.01.2024 31.12.2028	NASU
27	Short-term price forecasting on the wholesale electricity market for the management of energy resources of the microgrid (code: microbalance)	Miroshnyk V.O., Ph.D., Senior Researcher	01.03.2025 31.12.2025	NASU

In 2025, 11 economic contracts were executed for a total of 2216.678 thousand UAH. UAH (11 customers from Ukraine, including 8 - Kyiv)

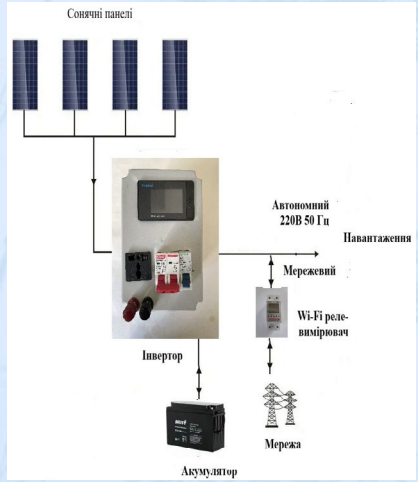
The most significant scientific results of 2025

"MOBILE ENERGY STORAGE UNIT WITH SWAPPABLE SECOND-LIFE BATTERY (METTLE)"

(I.A. Shapoval, V.V. Chopyk, V.O. Voitech)

InnovateUkraine's "Innovative Ukraine – Support to Ukraine's Energy Recovery" program, funded by the British Innovation Agency.

- ✓ A specialised energy converter for renewable energy sources of limited power has been developed using modern methods of smart control and optimal control.
- ✓ New control tools for hybrid converters have been developed in systems with modular renewable energy sources with a capacity of up to 5 kW, which makes it possible to significantly simplify the control scheme, reduce the cost of the system and increase the energy efficiency of such converters.
- ✓ An experimental rooftop solar power plant with a capacity of 50 kW was put into operation. Basic operational data is collected to analyse the effectiveness of the system. It is planned to connect it to a METTLE charging station with replaceable rechargeable batteries.



Prototype of a hybrid inverter

Prototypes of the charger
METTLE stations

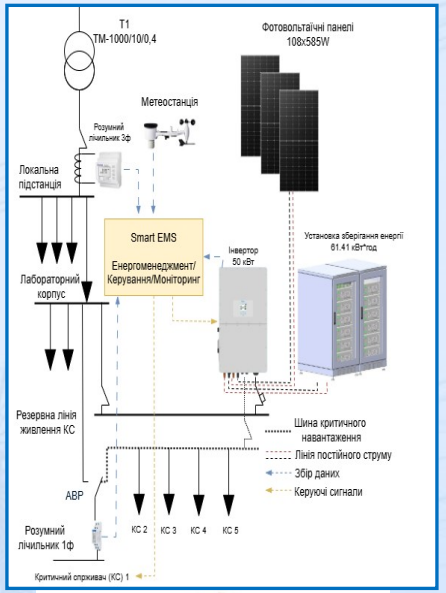
The most significant scientific results of 2025

"OMM-UKRAINE: OPTIMIZED MICROGRID MANAGEMENT IN UKRAINE"

(Corresponding Member of the National Academy of Sciences of Ukraine I.V. Blinov, V.O. Miroshnyk, P.V. Shymaniuk)

The InnovateUkraine program "Innovative Ukraine – Support to Ukraine's Energy Recovery" is funded by the British Innovation Agency.

- ✓ The structure and functions of energy management systems, as well as the tasks of microgrid management, are defined. A system for monitoring microgrid parameters has been developed as part of a pilot project to implement a microgrid with solar power plants and electricity storage.
- ✓ A model for optimising the use of available energy resources of the microgrid as part of a solar power plant and an energy storage unit has been developed, which allows minimising the cost of purchasing electricity by the owner of the microgrid in the retail market under the conditions of providing a power reserve for a critical load. An author's certificate for a computer program was obtained.
- ✓ A program for testing the functions of the energy management system (EMS) of the microgrid has been developed. It is planned to conduct tests together with DTEK Grids LLC in 2026.



The most significant scientific results of 2025

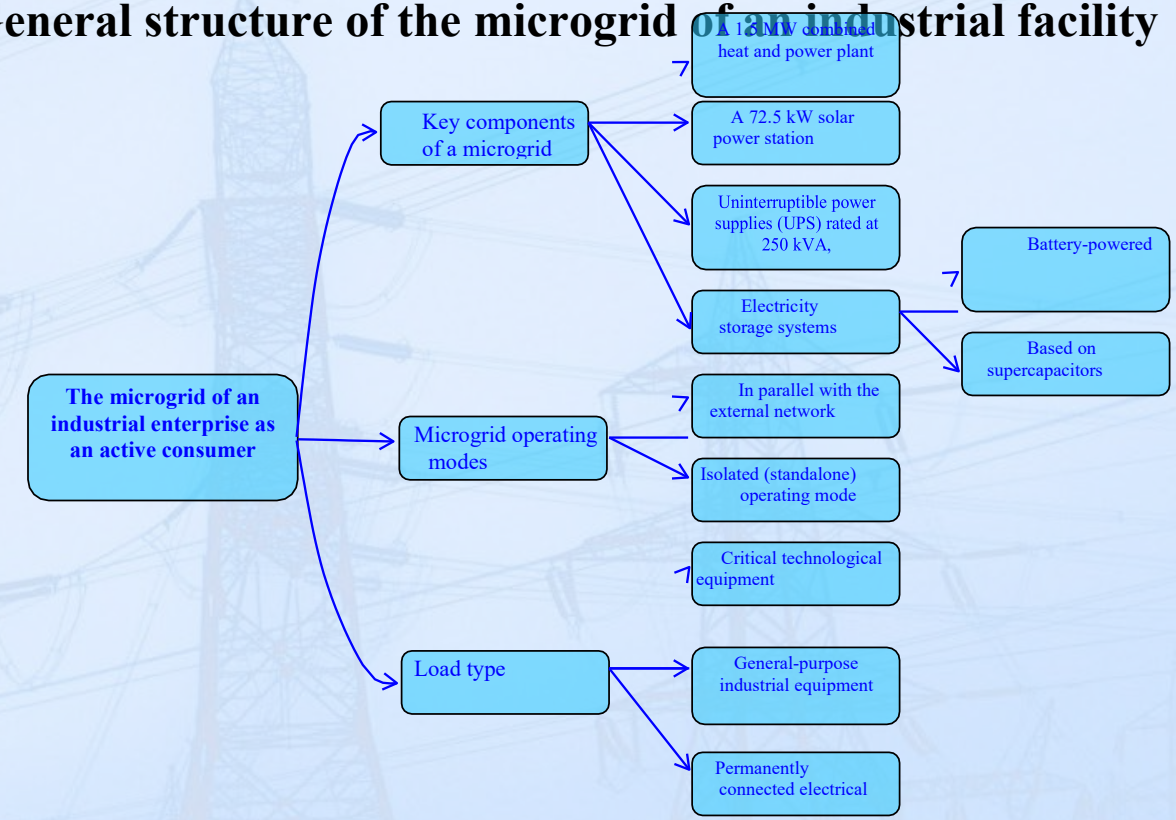
"DEVELOPMENT OF MATHEMATICAL MODELS AND PHYSICAL IMPLEMENTATION OF A POWERFUL MICROGRID OF AN INDUSTRIAL ENTERPRISE FOR THE PRODUCTION OF CRITICAL PRODUCTS FOR THE ELECTRIC POWER INDUSTRY OF UKRAINE"

(Academician of the National Academy of Sciences of Ukraine A.A. Shcherba, N.I. Suprunovska, O.D. Podoltsev)

Contract with PJSC "PLANT PIVDENKABEL"

A computer model has been constructed and the results of numerical calculations of long-term (during the day) electromagnetic processes and active and reactive power flows of the microgrid of a powerful industrial facility have been obtained for various scenarios of connection of existing power sources. The use of the developed model and the obtained calculated data allow, using information on the purchase of gas and hourly prices for the purchase or sale of electricity in the day-ahead segment, to determine for each day a planned economically justified scenario for connecting various power sources to ensure both uninterrupted and reliable power supply of critical loads and minimal electricity costs for the enterprise.

General structure of the microgrid of an industrial facility



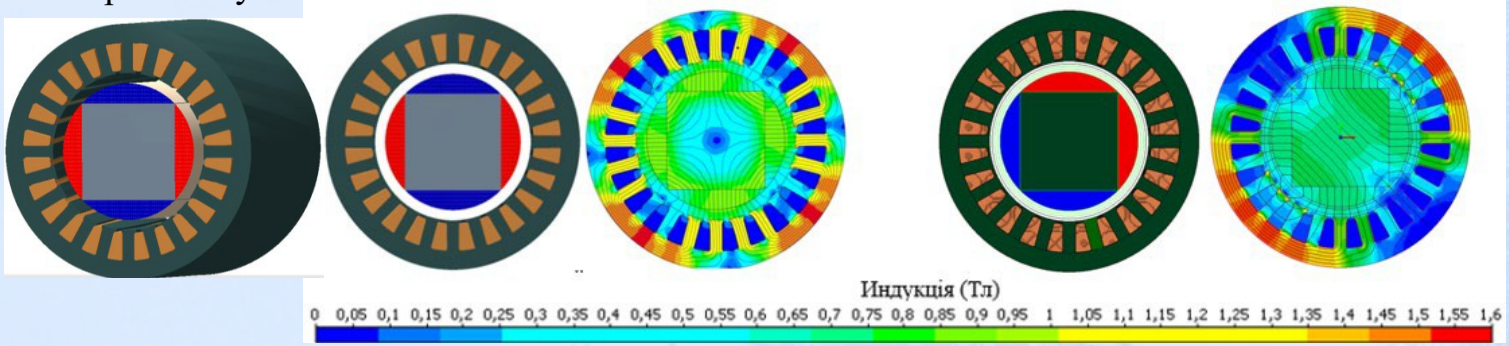
The most significant scientific results of 2025

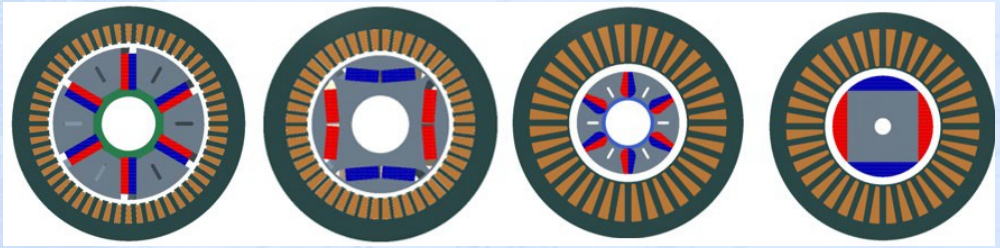
"RESEARCH AND DEVELOPMENT WORK (R&D) ON THE PRELIMINARY DESIGN OF AN ELECTRIC MOTOR FOR A HYBRID TURBOELECTRIC POWER PLANT"

(L.I. Mazurenko, V.V. Grebenikov)

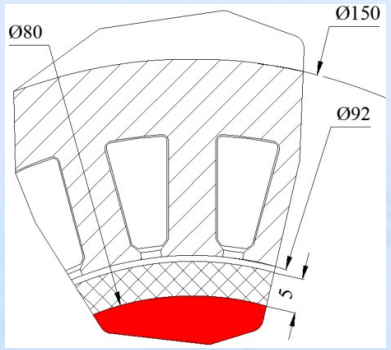
Agreement with SE "Ivchenko-Progress. Project "Environmentally Friendly Aviation for All Aircraft Classes (EFACA)" of the European Framework Program "Horizon Europe"

For the first time, parametric computer models of a high-speed electric starter-generator of cylindrical type with a rotational speed were created rotor over 58,000 rpm, designed for special-purpose vehicles. Comprehensive studies of the influence of the rotor magnetic system configuration and the number of poles on the level of losses in steel elements and the thermal state of the active components of an electric machine have been conducted. The results obtained enabled the determination of rational design parameters that reduce electromagnetic and thermal loads during high-speed operation. The results of the study were implemented in the production and design practice of the State Enterprise "Zaporizhzhya Machine-Building Design Bureau "Progress" named after Academician O. G. Ivchenko" (SE "Ivchenko-Progress").





Configuration Options for the Magnetic System of the High-Speed Electric Machine with a Speed of 30000 RPM and a Power of 110 kW



Parameter	4-pole	2-pole
Stator axial length, mm	150	200
Mass of the rotor core, kg	3,68	4,91
Mass of the rotor magnets, kg	2,05	2,73
Mass of the active component, kg	17,67	23,99
Torque (N·m)	34,85	34,62
Power (kW)	111,3	110,1
Efficiency (%)	98,48	98,64
Current density (A/mm²)	11,7	8,8
Total losses (kW)	1,69	1,49
Specific power (kW/kg)	6,24	4,65

Parameter	АИР280S2	4-pole
Rotational speed, rpm	3000	30000
Power, kW	110	110
Weight, kg	592	34
Specific power, kW/kg	0,19	3,2
	16,8	

The most significant scientific results of 2025

"A DEVICE FOR EFFECTIVE PROTECTION OF CYBER INFRASTRUCTURE FROM CYBER INTELLIGENCE AND CYBER ACTIONS OF THE ENEMY "

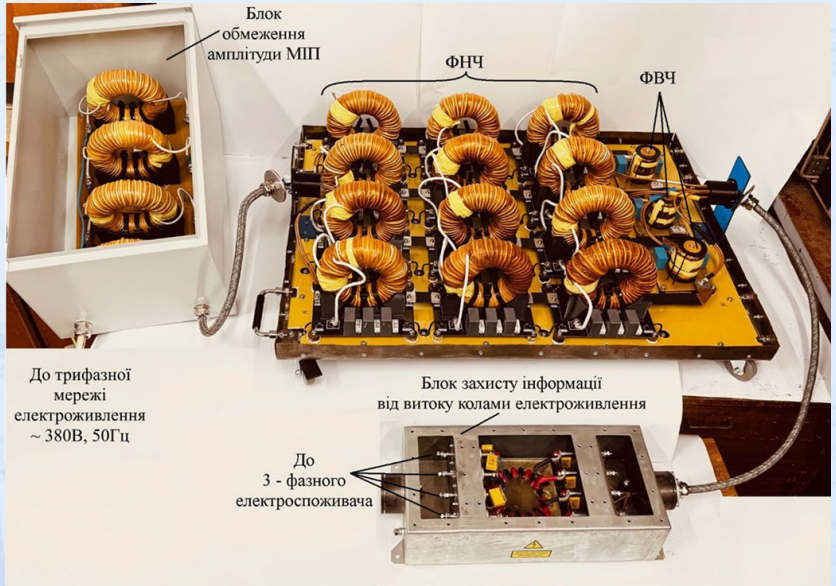
(O.M. Yurchenko, V.O. Pavlovsky, P.Y. Gerasymenko)

Competition of the National Research Foundation of Ukraine "Science for Strengthening Ukraine's Defense Capability"

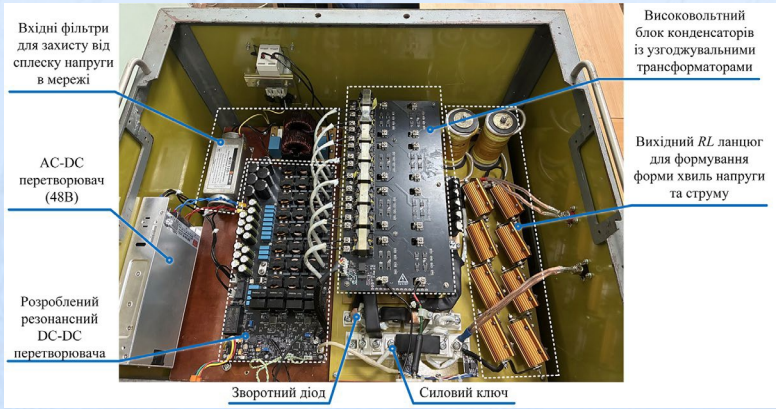
- A device for protecting information processing facilities with limited access from short-term high-voltage impulse interference with an amplitude of up to 4 kV and from information leakage by power supply circuits at frequencies above 1000 MHz **has been developed**.

- The leakage current in the "phase-case-ground" circuit has been significantly reduced, which increases the electrical safety of the proposed device.

- Designed and manufactured a microsecond impulse interference simulator in accordance with the requirements **of IEC 61000-4-5**



Standardized microsecond pulse interference simulator (CWG 1.2/50–8/20 μs)



Key technical specifications	
Rated power	13 kW
Nominal network	3-phase 0.4 kV, 50 Hz
Attenuation of the information signal	at least 60 dB
Residual level from a 4 kV pulse disturbance	not more than: 60 V
Protected operating frequency band	150 кГц – 3 ГГц
Operation mode	continuous

5. Other activities in 2025
International activities

Implementation of two innovative projects within the framework of the InnovateUkraine program, funded by the Foreign and Commonwealth Office (FCDO) of the United Kingdom:

- "Mobile Energy Storage Device with Replaceable Reusable Batteries" (Department No. 1);
- "Optimized Microgrid Management in the Power System of Ukraine" (Department №3).

The Institute's partners are AceOn LLC, the University of Liverpool, the Ukrainian Red Cross Society, Technoservisprivod LLC, Innvotek LLC, the University of Hertfordshire, DTEK Grids LLC, Sicame Ukraine LLC.

Cooperation agreement with the International Energy Cluster (Lithuania), memorandum and joint research project with the Lithuanian Energy Institute.

The Institute coordinates the work of the Permanent Council for Planning, Strategic Development and Innovation of the National Technical Committee of Ukraine of the International Electrotechnical Commission (IEC), the Institute's specialists are international experts of IEC and CIGRE.

Cooperation of the Institution with higher education institutions

The Institute actively cooperates with higher education institutions in terms of:

- development of new disciplines and their teaching;
- participation of the Institute's specialists in the management of diploma works;
- organising work placements for students at higher education institutions under existing cooperation agreements;
- development of educational and scientific-educational programs;
- preparation of textbooks and textbooks for students of higher education institutions;
- implementation of joint research, in particular, a joint scientific project within the framework of the competition of the National Research Foundation of Ukraine "Science for Strengthening the Defence Capability and National Security of Ukraine"
- conducting open lectures for students of higher education institutions;
- advanced training for teachers of higher education institutions;
- preparation of advanced training courses for higher education institutions;
- preparation of joint publications.

NTUU "KPI. Igor Sikorsky"

NTU "Dnipro Polytechnic"

Kharkiv National University of Urban Economy

Taras Shevchenko National University of Kyiv

National University of Food Technologies

National University of Life and Environmental Sciences of Ukraine

Cooperation of the Institute with domestic scientific institutions

- In collaboration with the Institute of Metal Physics of the National Academy of Sciences of Ukraine, a project under the National Academy of Sciences of Ukraine's defence research programme is being carried out.

- The G.E. Pukhov Institute of Energy Modelling Problems of the National Academy of Sciences of Ukraine is carrying out a project funded by the National Research Foundation of Ukraine, with the participation of a researcher from the Institute of Electrodynamics of the National Academy of Sciences of Ukraine.
- In collaboration with the G.E. Pukhov Institute for Energy Modelling Problems of the National Academy of Sciences of Ukraine, a youth grant was awarded to the research laboratories of young scientists at the National Academy of Sciences of Ukraine (2024–2025).
- In collaboration with the G.E. Pukhov Institute of Energy Modelling Problems of the National Academy of Sciences of Ukraine, a research project is being carried out entitled 'The Development of Distributed Energy in the Context of Ukraine's Electricity Market through the Use of Digitalisation Technologies and Systems. Section 1. Organisational and mathematical models of interaction between participants in the decentralised electricity market' (code 'Digitalisation', KPKVK 6541230)

Cooperation with state and local authorities

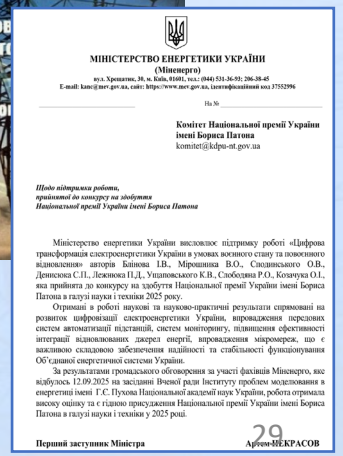
In 2025, in accordance with Order No. 244 of the Ministry of Energy of Ukraine dated 5 July 2024 on the implementation of modern European and international standards in the field of ‘smart grid’ development by 2035, a working group was established within the National Electrotechnical Committee of Ukraine (International Electrotechnical Commission, IEC) to develop a work programme for national standardisation in the field of ‘smart grids’. The working group has identified a list of standards, which has been submitted to the Ministry of Energy and circulated to interested parties (in particular, NPC ‘Ukrenergo’) for implementation. The working group’s work is scheduled to continue into 2026.

РЕКОМЕНДОВАНИЙ ПЕРЕЛІК МІЖНАРОДНИХ СТАНДАРТІВ

для реалізації плану заходів щодо впровадження сучасних європейських та міжнародних стандартів у сфері розвитку «розумних мереж» до 2035 року та заходів щодо реалізації Концепції впровадження “розумних мереж” в Україні до 2035 року

15.6	EN IEC 61851-23-2:2021; IEC 61851-23-2:2018 - Electric vehicle conductive charging system - Part 23-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems. (Провідна система зарядження електричних транспортних засобів. Частина 23-2: Вимоги до електричних транспортних засобів для провідного підключення до змінного/постійного струму — Вимоги з електромагнітної сумісності для зовнішніх систем зарядження електричних транспортних засобів)	ТК 22, ТК 155	—“—	—“—	п.25. Впровадження систем проведення моніторингу стану зарядних станцій електромобілів і здійснення контролю за ними, інтеграція цих систем із системами моніторингу роботи електромереж, впровадження систем контролю за зарядженням-розрядженням електромобіля.
16	**Створення підкомітетів з «розумних мереж» в дочірніх технічних комітетах стандартизації України для узгодження спільних планів робіт зі стандартизації. Забезпечення співпраці оператора системи передачі з технічними комітетами стандартизації України щодо узгодження спільних планів робіт та участі оператора системи передачі в технічних комітетах стандартизації України як колективного члена.**	**НЕК «Укренерго», Міненерго**	**Протягом 2025–2026 років**		
16.1	Створення нових підкомітетів ТК, що відповідатимуть ТК IEC 8B, TK IEC SyC в межах діючих ТК	ТК 162, ТК 306, ТК 13	Протягом 2025–2026 років		п.6. Запровадження проведення регулярних семінарів і конференцій з питань впровадження “розумних мереж”.

Голова робочої групи, заступник директора з наукової роботи Інституту електродинаміки НАН України — Ігор БЛІНОВ



МІНІСТЕРСТВО ЕНЕРГЕТИКИ УКРАЇНИ
(Міненерго)
вул. Хрещатик, 30, м. Київ, 01601, тел.: (044) 531-36-93; 206-38-45
E-mail: kanc@mev.gov.ua, сайт: https://www.mev.gov.ua, ідентифікаційний код 37552996

Комітет Національної премії України імені Бориса Патона
komitet@kdpn-nt.gov.ua

Щодо підтримки роботи, прийнятої до конкурсу на здобуття Національної премії України імені Бориса Патона

Міністерство енергетики України висловлює підтримку роботі «Цифрова трансформація електроенергетики України в умовах воєнного стану та повоєнного відновлення» авторів Блінова І.В., Мірошника В.О., Сподинського О.В., Денисюка С.П., Лежнюка П.Д., Ущаповського К.В., Слободяна Р.О., Козачука О.І., яка прийнята до конкурсу на здобуття Національної премії України імені Бориса Патона в галузі науки і техніки 2025 року.

Отримані в роботі наукові та науково-практичні результати спрямовані на розвиток цифровізації електроенергетики України, впровадження передових систем автоматизації підстанцій, систем моніторингу, підвищення ефективності інтеграції відновлюваних джерел енергії, впровадження мікромереж, що є важливою складовою забезпечення надійності та стабільності функціонування Об’єднаної енергетичної системи України.

За результатами громадського обговорення за участі фахівців Міненерго, яке відбулось 12.09.2025 на засіданні Вченої ради Інституту проблем моделювання в енергетиці імені Г.С. Пухова Національної академії наук України, робота отримала високу оцінку та є гідною присудження Національної премії України імені Бориса Патона в галузі науки і техніки у 2025 році.

Перший заступник Міністра — Артем НЕКРАСОВ

In collaboration with representatives of the NEURC, a monograph entitled ‘The Digital Transformation of Ukraine’s Electricity Sector: Implementation under Martial Law and Post-War Recovery’ has been prepared, outlining directions for the development of Ukraine’s electricity sector, including the roll-out of Smart Grid technologies over the coming years.

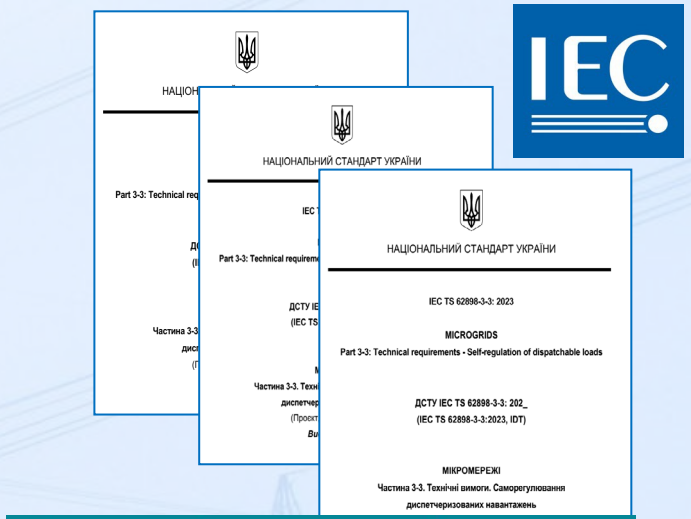
The findings were discussed at PJSC “Volynoblenergo”, JSC “Poltavaoblenergo” and JSC “Khmelnytskooblenergo”. A letter of support for the work was received from the Ministry of Energy of Ukraine.

Expert activity

•As part of Technical Committee 162 ‘Power System Operation and Related Information Exchange’, work has been carried out to support the adoption of the IEC TS 62898 ‘Microgrid’ series of standards as national regulatory documents, which were developed by the Institute.

• Experts from the Institute were members of a working group set up by the Ministry of Energy and the CIGRE National Committee on Large Power Systems to address the issue of ‘Implementing the smart grid concept by 2035’.

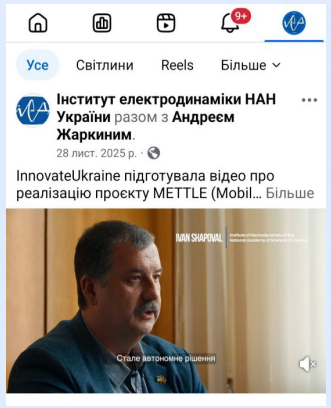
•Researchers from the Institute participated as experts in defining research priorities within the project ‘Ukraine’s Integration into the European Research Area – a joint funding and capacity-building platform to strengthen research and innovation cooperation (LUKE)”, part of the European Union’s Horizon Europe Framework Programme for Research and Innovation.

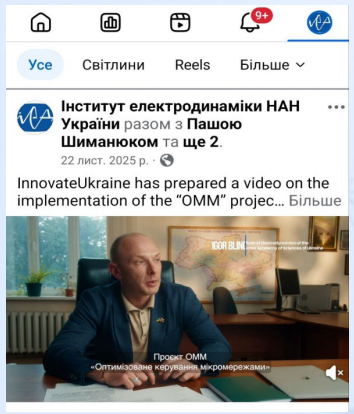


Specialists from the Institute participated as experts and members of committees in the Ministry of Education and Science’s accreditation process and the National Academy of Sciences of Ukraine’s evaluation process.

Promoting science

Posts on relevant social media platforms





Exhibition activities

Presentation of the results of the work to international partners

Public discussions on energy development within international organizations

cigre Ukraine

cen CENELEC

Participation in international conferences

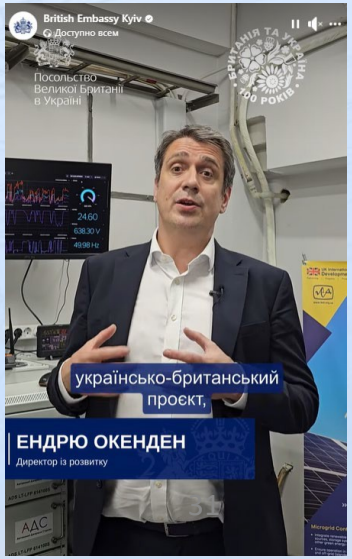
IOPscience

IEEE

Presentations on the YouTube channel of the National Academy of Sciences of Ukraine

Visit to the Institute by Stephen Doughty, the UK Minister of State for Europe.

Visit to the Institute by Andrew Ockenden, Director of Development at the UK Foreign and Commonwealth Office.



Awards received

- ✓Academician of the National Academy of Sciences of Ukraine Anatoliy Shcherba has been awarded the National Academy of Sciences of Ukraine Medal ‘For Professional Achievements’.
- ✓Ihor Kondratenko, Corresponding Member of the National Academy of Sciences of Ukraine, has been awarded the National Academy of Sciences of Ukraine Medal ‘For Professional Achievements’.
- ✓Oleksii Bondar, a research fellow in the Department of Electromagnetic Energy Parameter Stabilisation at the Institute of Electrodynamics of the National Academy of Sciences of Ukraine, was awarded a Certificate of Appreciation from the Mayor of Kyiv on the occasion of Science Day in Ukraine.
- ✓Ivan Zubkov, Ph.D., a junior research fellow in the Department of Transistor Converters at the Institute of Electrodynamics of the National Academy of Sciences of Ukraine, has been awarded the National Academy of Sciences of Ukraine’s ‘Talent, Inspiration, Work’ Award for Young Scientists.

Thank you for your attention!