Conference Program Book Conference Program Conference Book Program

2023 23rd International Scientific Conference on Electric Power Engineering (EPE)

Book





Welcome...

to the 2023 23rd International Scientific Conference on Electric Power Engineering (EPE). On behalf of the organizing committee who has been working for over a half year to put this meeting together, we cordially welcome all participants. The EPE conferences are organized in turns by three technical universities. This year, it is a cooperation of Brno University of Technology and Czech Technical University in Prague.

Our goal in planning this meeting has been to provide an intellectually stimulating atmosphere for the exchange of scientific ideas concerning research, development and service in electrical power engineering area in a relaxing environment. We hope that you will have the opportunity to take advantage of the conference venue. Please don't hesitate to contact one of us if any questions arise.

Thanks for coming and enjoy your time in Brno!



May 24 – 26, 2023, Brno, Czech Republic

The Conference Program

Wednesday 24 th	^h of May, 2023			
9:00 - 16:00	Participants Registration			
10:30 - 11:15	Room 4+5 - Conference Opening Ceremony			
11:15 - 12:00	Room 4+5 – Keynote Presentation			
12:20 - 13:30	Lunch – Restaurant			
14:00 - 15:30	Parallel Sessions 1			
	Room 5 - Session A1 Power System Operation	Room 2+3 - Session B1 EMC and PQ, Measurement and Instrumentation	Room 1 - Session C1 Machines and Converters	
15:30 - 16:00	Coffee Break - Foyer			
16:00 - 17:30		Parallel Sessions 2		
	Room 5 - Session A2 Power System Transition	Room 2+3 - Session B2 E-mobility	Room 1 - Session C2 Materials and Apparatus	
19:30 - 24:00	19:30 - 24:00 Welcome party – Room 1-5			
		Notes to presentat	ions	
Presentation types	and times	·····		
K Keynote presentation 40 minutes for presentation + 5 minutes for discussion				
Invited prese	entation 2	5 minutes for presentation + 5 minutes for	or discussion	
L Standard pre	L Standard presentation 15 minutes for presentation + 5 minutes for discussion			
We kindly ask presen	ting authors to be present in the room a	t least 10 minutes before the session start	ts. Please introduce yourself to the chair	man and deliver your presentation

(USB drive is expected).

Thursday 25 th of May, 2023				
8:00 - 11:00	Participants Registration			
8:30 - 10:00		Parallel Ses	ssions 3	
	Room 5 - Session A3 Power System Components Co-simulation and Testing	Room 2+3 - Session B3 Instrumentation, Measurement and Monitoring	Room 1 - Session C3 Diagnostics and Apparatus I	
10:00 - 10:30		Coffee Brea	k - Foyer	
10:30 - 12:00		Parallel Ses	ssions 4	
	Room 5 - Session A4 Innovative Technologies for the Energy Sector	Room 2+3 - Session B4 Smart Grids Operation	Room 1 - Session C4 Nuclear Physics and Engineering I	
12:00 - 13:30		Lunch – Restaurant		
14:00 - 15:30		Parallel Sessions 5		
	Room 5 - Session A5 Faults and Protection I	Room 2+3 - Session B5 Integration of Distributed Generation I		
15:30 - 16:00		Coffee Break - Foyer		
16:00 - 17:30		Parallel Sessions 6		
	Room 5 - Session A6 Faults and Protection II	Room 2+3 - Session B6 Integration of Distributed Generation II		
18:30	Departure from the Maximus Resort**** to the VIDA! SCIENCE CENTER by Buses			Buses
19:00 - 24:00	The Conference Banquet – VIDA! SCIENCE CENTER			
Notes to presentations Presentation types and times				

Presentation types and times

K Keynote presentation	40 minutes for presentation + 5 minutes for discussion
Invited presentation	25 minutes for presentation + 5 minutes for discussion
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We kindly ask presenting authors to be present in the room at least 10 minutes before the session starts. Please introduce yourself to the chairman and deliver your presentation (USB drive is expected).

Friday 26 th of May, 2023			
8:00 - 11:00	Participants Registration		
8:30 - 10:00	Parallel Sessions 7		
	Room 2+3 - Session B7 Nuclear Physics and Engineering II	Room 1 - Session C7 Diagnostics and Apparatus II	
10:00 - 10:30	Coffee Break - Foyer		
10:30 - 12:00	Parallel Sessions 8		
	Room 2+3 - Session B8 Nuclear Physics and Engineering III	Room 1 - Session C8 Lighting and illumination systems	

12:15 - 12:30	Hall 4+5 Plenary Session – Conference Closing Ceremony
12:30 - 13:30	Lunch – Restaurant

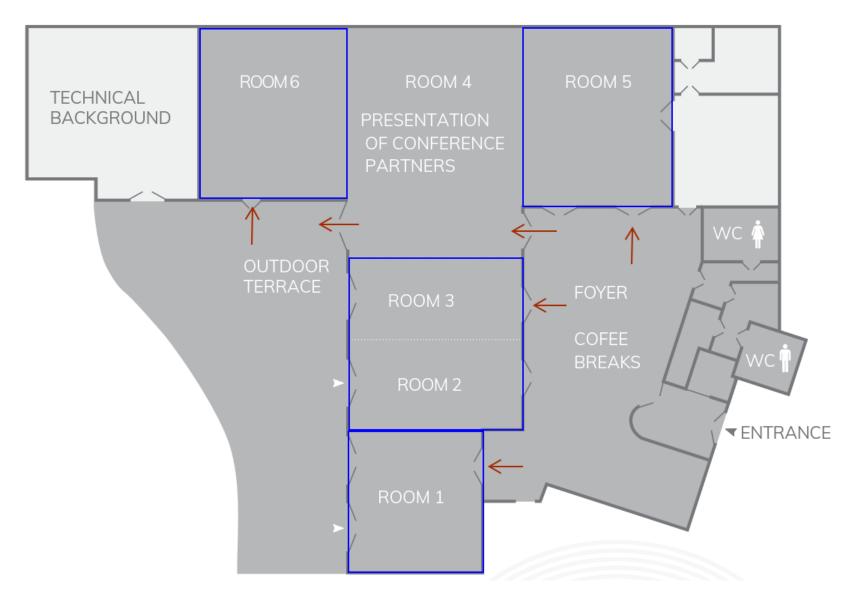
Notes to presentations

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k	Keynote presentation	40 minutes for presentation + 5 minutes for discussion
	Invited presentation	25 minutes for presentation + 5 minutes for discussion
L	Standard presentation	15 minutes for presentation + 5 minutes for discussion

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Conference plan – 1st floor



The Conference Program in Detail

Wednesday, May 24, 2023

9:00 – 16:00 Participants Registration

10:30 – 11:15 Room 4+5 – Conference Opening Ceremony

11:15 – 12:00 Room 4+5 – Keynote Presentation

Energy Efficiency versus Power Quality: Challenges Related to Modern Power Electronics in Low Voltage Networks

Jan Meyer, Technische Universität Dresden, Germany

12:20 – 13:30 Lunch

14:00 - 15:30 Parallel Sessions 1

Room 5 – Session A1 Power System Operation

Chairman: Petr Toman, Brno University of Technology, Czech Republic

- 1093 Extreme Weather Effects on Transmission Grids and the Potential of the Utilization of Real Time Monitoring for Smart Grids Applications Mohamed F. Abdel-Fattah, Grétar Ass Sigurðsson
- L070 Ground Current Analysis during Steady State and Transients in Power System Zaneta Eleschova, Boris Cintula, Anton Belan, Matej Cenky, Jozef Bendik, Peter Janiga
- L037 Assessment of the Impact of 25kV, 50Hz Electric Traction on Cabling Around the Railway Jiri Ciganek, Vaclav Kolar, Roman Hrbac, Lukas Demel

L004 Multi Area Dynamic Model for Continental Europe Synchronous Area Splitting Jan Koudelka, Branislav Batora, Petr Toman, Stanislav Macejko, Tomas Haba, Karel Maslo

Room 2+3 – Session B1

EMC and PQ, Measurement and Instrumentation

Chairman: Jan Meyer, Technische Universität Dresden, Germany

1018 Disturbance Mitigation in Ship Power System with DC Distribution System

Zhivko Grozdev, Nikolay Djagarov, Dimitar Tsvetanov, Gabriel Predoi, Petr Toman, Jiri Drapela

L010 The Effect Electric Traction Vehicles Consumption on Energy Meter Accuracy with Consideration of Harmonic Distortion

Pavel Stanko, Michal Regula, Alena Otcenasova

L060 Accuracy Testing of PQ Analyzers Using the OMICRON CMC 356 Lukas Hlavaty, Petr Bilik

L075 Power Quality Parameters Forecasting Based on SOM Maps with KNN Algorithm and Decision Tree Ibrahim Jahan, Faisal Mohamed, Vojtech Blazek, Lukas Prokop, Stanislav Misak, Vaclav Snasel

Room 1 – Session C1 Machines and Converters

Chairman: Anton Rassölkin, Tallinn University of Technology, Estonia

1013 Concepts of Additively Manufactured Electrical Machines and Components

Toomas Vaimann, Hans Tiismus, Ants Kallaste

L051 Specialised Frequency Converter For Induction Devices Michal Knedlik, David Rot

L101 Improvement Studies of High Power Density Motor for Aviation and Marine Application Tomasz Wolnik, Tomasz Jarek, Łukasz Cyganik

L001 Single Phasing Simulation of Asynchronous Motor

Stanislav Kocman, Lukas Demel, Petr Orsag, Roman Hrbac

15:30 – 16:00 Coffee Break

16:00 – 17:30 Parallel Sessions 2

Room 5 – Session A2

Power System Transition

Chairman: Petr Mastny, Brno University of Technology, Czech Republic

L063 Europe to North America Super-Grid Utilizing Iceland and Greenland Renewable Energy Potential Part I: Simplified Load Profiles

Kevin Wang, Raoul Voisin, Mohamed F. Abdel-Fattah

L065 Europe to North America Super-Grid Utilizing Iceland and Greenland Renewable Energy Potential Part II: Power Management Scenarios

Kevin Wang, Raoul Voisin, Mohamed F. Abdel-Fattah

L058 Determination of Critical Parameters and Interdependencies of Infrastructure Elements in Smart Grids

Matej Vrtal, Radek Fujdiak, Jan Benedikt, David Topolanek, Michal Ptacek, Petr Toman, Jiri Misurec, Michal Beloch, Pavel Praks

L057 The use of hyperspectral sensors in aerial inspections of overhead transmission lines Lubos Skurcak, Jan Gbelec, Roman Sitko, Simon Salon, Radoslav Forgac, Milos Ockay

Room 2+3 – Session B2 E-Mobility

Chairman: Nikolay Djagarov, Nikola Vaptsarov Naval Academy, Bulgaria

- L006 Grid Frequency Support from Electric Vehicle Charging Stations Jan Koudelka, Branislav Batora, Petr Toman, Stanislav Macejko, Tomas Haba, Karel Maslo
- L034 An Intelligent Load Optimisation for Self-Powered Robotic Parking House in Inhabited Areas Zdenek Slanina, Vojtech Blazek, Jan Fulnecek, Tomas Vantuch
- **L074** Effect of Ambient Temperature on EV Charging Curves After Seven Years of EV Operation Vojtech Blazek, Ivo Pergl, Pavel Kedron, Marian Piecha, Mohit Bajaj
- L095 Simulation of EV operation in "Vehicle 2 grid" charging mode Jozef Kiraly, Dusan Medved, Michal Kolcun, Marek Pavlik

Room 1 – Session C2 Materials and Apparatus

Chairman: Toomas Vaimann, Tallinn University of Technology, Estonia

- L008 Effect of Zinc Oxide Blend on Dielectric Responses of Family Cold Curing Polyurethanes Stefan Hardon, Jozef Kudelcik, Alena Kozakova, Tomas Derer
- L024 Analysis of Polarization and Depolarization Currents of Samples of NOMEX®910 Cellulose–Aramid Insulation Impregnated with Nytro® BIO 300X Adam Krotowski, Stefan Wolny
- L035 Analysis of selected dielectric parameters of insulating liquids Aleksandra Płuzek, Łukasz Nagi, Michał Kozioł, Małgorzata Zygarlicka
- L023 Software for Computer-aided Design in Flocking Jaroslav Dzmura, Jaroslav Petras, Milan Bernat

L048 Insulation for rotating machines type II under different electrical stress conditions Ousama Zidane, Rainer Haller, Pavel Trnka, Hans Barnklau

19:00 – 24:00 Welcome party – Restaurant

Thursday, May 25, 2023

8:30 -10:00 Parallel Sessions 3

Room 5 – Session A3

Power System Components Co-simulation and Testing

Chairman: Robert Schürhuber, Institute of Electrical Power Systems, Austria

1009 An EV-Traction Inverter Data-Driven Modelling for Digital Twin Development

Mahmoud Ibrahim, Hadi Ashraf Raja, Anton Rassolkin, Toomas Vaimann, Ants Kallaste

L028 Upgrade of the conventional generation plant models within a grid simulator

Thomas Meißner, Dirk Lehmann, Alexander von Auw, Harald Schwarz, Klaus Pfeiffer, Marcel Kotte, Nico Brose

L042 Compliance testing concept of grid-connected inverter-based resources using simulated input

Jiri Dvoracek, Jiri Drapela, Jan Moravek, Martin Vojtek, Petr Toman, Anton Rassolkin, Toomas Vaimann

L069 Testing of the digital arc suppression coil controller using real-time simulator

Viktor Jurak, Jaroslava Orsagova, David Topolanek

Room 2+3 – Session B3
Instrumentation, Measurement and Monitoring
airman: Waldemar Rebizant, Wroclaw University of Science and Technology, Poland
Design and Verification of a Phasor Measurement Unit Model Using Matlab
Obed Muhayimana, Petr Toman, Vaclav Vycital, Viktor Jurak
62 Capacitor coupled voltage transformer inaccuracy effect on circuit breaker operation
Sajjad Asefi, Guido Andreesen, Jako Kilter, Mart Landsberg
005 Influence of Phasor Measurement Unit Accuracy on State Estimation in Power System
Ali Aljazaeri, Petr Toman
Proposal for Simplifying Smart Metering Data Access for Authorised Energy Service Providers and Other Third-Parties Upon End-Consumer Request and Consent
Valeria Maksimovich, Michal Vrana, Martin Vojtek, Michal Ptacek, Alina Demchenko, Gleb Nesterenko
Room 1 – Session C3

Diagnostics and Apparatus I

Chairman: Marek Höger, University of Zilina, Slovakia

L014 Validation of partial discharge calibrators for small charge rates

Radek Prochazka, Jan Hlavacek

Cł

L015 Towards Fault Diagnosis of Covered Conductors through Partial Discharge Classification using Antenna-based Frequency Domain Analysis

Lukas Klein, Michal Kunicki, Ondrej Kabot

L022 Partial Discharges in Electronic Parts in Low Air Pressure Environment

Ondrej Kabot, Lukas Klein, Michal Kunicki, Michal Koziol

L025 Analysis of Radio Frequency and Ultraviolet Signals Emitted by Surface Partial Discharges

Michał Kozioł, Michał Kunicki, Ireneusz Urbaniec, Łukasz Nagi, Ondrej Kabot, Lukas Klein

10:00 - 10:30 Coffee Break

10:30 - 12:00 Parallel sessions 4

Room 5 - Session A4

Innovative Technologies for the Energy Sector

Chairman: Zdenek Müller, Czech Technical University in Prague, Czech Republic

- L092 Industrial Research and Development of Innovative Technologies for the Energy Sector Marek Pipa, Attila Kment, Frantisek Janicek, Jozsef Konczer, Jozef Konczer sr., Tomas Potasch, Ignac Havran, Botond Santa , Lajos Csonka
- L108 Potential of quantum technologies in the energy sector Marian Mester
- L038 Wireless Power Transfer System Design for Industrial Mobile Robots Initial Study Przemyslaw Krupiarz, Jaroslaw Zygarlicki
- L107 Providing intelligent maintenance through an autonomous robot Marian Mester, Vladimir Kristof, Marek Hvizdos

Room 2+3 - Session B4 Smart Grids Operation

Chairman: Mohamed Abdel-Fattah, Reykjavik University, Iceland

L067 Analysis of Dynamic Events in the Network During the Operation of a SOFC Hydrogen Fuel Cell Dusan Medved, David Martinko, Michal Kolcun, Jozef Kiraly, Olexandr Shavolkin, Iryna Shvedchykova

- L054 Mitigation of Overvoltages in Low Voltage Network by Distributed Battery Energy Storage System Jozef Bendik, Matej Cenky, Zaneta Eleschova, Anton Belan, Boris Cintula, Peter Janiga.
- L072 On controllers for energy diverters designed with respect to revenue meter metrics Jan Klusacek, Jiri Drapela, Roberto Langella
- L041 Real-Time Estimation in Cyber Attack Detection and Mitigation Framework for DC Microgrids Amir Basati, Najmeh Bazmohammadi, Josep M. Guerrero, Juan C. Vasquez

Room 1 - Session C4 Nuclear Physics and Engineering I

Chairman: Surjit Mukherjee, Brno University of Technology, Czech Republic

1044 Systematic study of the (n, p) reaction cross section on 112Cd isotope from reaction threshold to 20 MeV energies

N. L. Singh et.al.

- L110 Subcritical Reactor VR-2 and Its Control System Jan Rataj, Ondrej Huml, Filip Fejt, Jan Frybort
- **L050** Impact of External Injection from FLEX Equipment during LOCA in APR1400 Tomas Cerny, Peter Mician, Karel Katovsky, Michal Ptacek
- L082 Neutron irradiation effects in La₂Zr₂O₇ pyrochlore

N. L. Singh et.al.

12:00 – 13:30 Lunch

14:00 - 15:30 Parallel sessions 5

Room 5 - Session A5 Faults and Protection I

Chairman: Eugeniusz Rosolowski, Wroclaw University of Sciene and Technology, Poland

1096 Turn-to-Turn Faults in Phase-Shifting Transformers Waldemar Rebizant, Krzysztof Solak

L026 Operation of directional overcurrent protection in Microgrids Robert Stefko, Zsolt Conka, Marek Pavlik, Samuel Bucko, Dusan Medved, Michal Kolcun

L030 The experimental method for verifying the accuracy of estimating earth fault residual current in the compensated network

Karolina Cechova, Jiri Cernoch, Jaroslava Orsagova

L080 In-situ arc fault testing on MV substation

Dominik Czeschka, Katrin Friedl, Andreas Abart

Room 2+3 - Session B5 Integration of Distributed Generation I

Chairman: Matti Lehtonen, Aalto University, Finland

Grid Protection issues of Converter Dominated Generation Systems Robert Schürhuber

L002 Interactive Dynamic Characteristics of Angle Stability of Multi-Converters System Ziqian Zhang, Robert Schürhuber, Katrin Friedl

L029 Aspects of grid-connected converters and their inherent influence on the power grid Maximilian Heinz Brestan, Robert Schuerhuber

L068 Predicted Impact of Future Penetration Levels of Domestic PV and Battery Sizes on Low-voltage Grid Consumption Balances

David Martinko, Dusan Medved, Michal Kolcun

15:30 - 16:00 Coffee break

16:00 – 17:30 Parallel sessions 6

Room 5 - Session A6 Faults and Protection II

Chairman: Jaroslava Orsagova, Brno University of Technology, Czech Republic

1109 A New Method for Fast Removal of Decaying Offset in Relaying Input Current

Eugeniusz Rosolowski

L104 Simulation-Based Investigations of the Distance Relay Protection for Extended Double-Circuit Lines Mohamed F. Abdel-Fattah, Gretar Ass Sigurðsson

L106 Evaluation IEC 60850 Protocols based Protection Schemes of Digital Substation Mayada Daboul, Jaroslava Orsagova

L071 A Software Tool for Setting Upstream Active Power Protection in a Meshed Distribution Network Vit Krcal, David Topolanek, Viktor Jurak, Jaroslava Orsagova

Room 2+3 - Session B6 Integration of Distributed Generation II

Chairman: David Topolanek, Brno University of Technology, Czech Republic

1007 On PV Hosting Capacity of Distribution Networks

Matti Lehtonen, Verner Püvi, Samar Fatima, Mahdi Pourakbari-Kasmaei

L032 Random Network Topology Generator for Advanced Testing of Smart Grid Applications

Marek Höger, Michal Bahernik, Peter Bracinik, Klemen Dezelak

- L102 Modelling and Testing Transformer Differential Protection in Inverter-Based Generation Networks Krzysztof Solak, Waldemar Rebizant, Frank Mieske, Sebastian Schneider
- **L076** Prediction of degradation process of mono-Si photovoltaic panels in Ukrainian and Czech conditions Milan Belik, Jan Timr, Olena Rubanenko

18:30 19:00 – 24:00	Departure from the Maximus Resort**** to the VIDA! SCIENCE CENTER by Buses The Conference Banquet – VIDA! SCIENCE CENTER		
	18:10 – 18:20 18:30	Meeting in front of the hotel Departure from the Maximus Resort**** to the VIDA! SCIENCE CENTER by Buses	
	19:00 – 24:00	The Conference Banquet – VIDA! SCIENCE CENTER Casual dress code is expected.	
	23:00, 24:00	Bus departs from the VIDA! SCIENCE CENTER to the hotel Maximus. Eventually, you can also use a taxi servise.	

Friday, May 26, 2023

8:30 – 10:00 Parallel Sessions 7

Room 2+3 - Session B7

Nuclear Physics and Engineering I

Chairman: Karel Katovsky, Brno University of Technology, Czech Republic

L043 Measurements of neutron capture cross sections on 109Ag at 0.53, 1.05, 1.66 MeV S. Mukherjee et.al.

- **L073** Simplified modeling of natural circulation during Station Blackout with MELCOR Peter Mician, Tomas Cerny, Karel Katovsky
- L097 Analysis of neutronic properties of spallation target materials Ondrej Stastny, Dusan Kral, Kamil Stevanka, Karel Katovsky
- L098 Lessons from the US approach to licensing of Small Modular Reactors Kamil Stevanka, Ondrej Chvala
- L081 Transmutation of 239Pu irradiated by 660 MeV protons Karel Katovsky et.al.

Room 1 - Session C7 Diagnostics and Apparatus II

Chairman: Jaroslav Petras, Technical university of Košice, Slovakia

L039 Investigation of thermal stress impact to the dielectric properties of the oil-paper insulation system

Jan Zbojovsky, Marek Pavlik, Iraida Kolcunova

L040 AC breakdown voltage thermal dependence in magnetic fluids Milos Sarpataky, Michal Rajnak, Jan Zbojovsky, Juraj Kurimsky

- L056 A numerical model for DC partial discharges in internal voids Kristian Hudec, Radek Procházka
- L078 Electrical Type Testing of Low and Medium Voltage Cables Attila Kment, Marek Pipa

L103 Grid Connection Studies for PV Power Plant in Medium Voltage Distribution Network

Godfrey Gladson Moshi, Erick Vincent Mgaya, Sithole Edwin Mwakatage

10:00 – 10:30 Coffee Break

10:30 - 12:00 Parallel Sessions 8

Room 2+3 - Session B8
Nuclear Physics and Engineering II
Chairman: Karel Katovsky, Brno University of Technology, Czech Republic
L045 Measurement of 85Rb(n,2n)84mRb reaction cross- section at different energies
N. L. Singh et.al.
L099 High Energy Gamma Radiation Induced by Fast Neutrons from Californium Source in Nal(TI) Detector in Close Geometry Measurements
Dusan Kral, Ondrej Stastny, Karel Katovsky, Craig M. Marianno
L077 Experimental Investigation of Critical Heat Flux
Taron Petrosyan, Kamil Stevanka, Dan Vlcek, Lukas Nesvadba, Karel Katovsky
L059 Assessment of radiological doses from the uranium retention in the various human organs and tissues
Pargin Bangotra et.al.

Room 1 - Session C8 Lighting and illumination systems		
Chairman: Jiri Drapela, Brno university of Technology, Czech Republic		
L047 Testing of Airport Runway Lighting Cables Attila Kment, Marek Pipa, Rastislav Valach		
L011 Example of Grow Box Lighting System Designing		
Lukas Vavra, Tomas Novak, Pavel Valicek, Simon Vanek, Radomir Gono		
L033 Decentralization of the Lights Control by a DALI Bus with a Connection Node		
Jan Choutka, Zdenek Slanina, Ivo Pergl, Vojtech Blazek		
L105 Survey on LED lamps for residential applications: characterization of performance		
Tomas Hudac, Jiri Drapela, Leos Kukacka, Jan Meyer, Robert Stiegler		

12:15 – 12:30 Room 4+5 Plenary Session – Conference Closing Ceremony

12:30 - 13:30 Lunch

Notes to presentations

Presentation types and times

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Notes:

We would like to invite you to the next conference

2024 24th International Scientific Conference on Electric Power Engineering (EPE),

which will be organized by VŠB-TU Ostrava, Czech Republic

on May 15 – 17, 2024

We are looking forward to seeing you next year.





ELECTRIC POWER ENGINEERING

