Within the framework of these **preferential subjects**, CIGRE encourages the submission of papers representing all aspects of the electric power system, including, but not limited to: Generation, Transmission, Distribution, Storage and End Use.

**There is no individual presentation** of Papers during Group Discussion Meetings. **Special Reports** give the essence of Papers with questions for the audience. **Authors** will have the opportunity to present their Paper during Poster Sessions. **If your Paper is accepted**, then you must attend both meetings.
The 2022 Paris Session will follow two other Sessions of special nature: the 2020 e-Session and the 2021 CIGRE Centennial Celebration Session. In addition, the 2022 Session started a new procedure of Session papers selection, in order to achieve a full excellence in the papers, carefully reviewed in full according to most comprehensive procedures.

The 4.0 Industry thinking, the impressive development of digitalization, the proliferation of Active Distribution Networks combined with the dramatic need for increasing the utilization of favorable renewable energy sources towards reaching a carbon-free society, all these factors represent a major change on mindset regarding scopes of new Working Groups, Symposia, Workshops and, certainly, in the selection of Preferential Subjects for our Biennial Sessions.

The new paradigms derived from the above mentioned facts bring up an effect of vanishing of frontiers, which turns out to be a big challenge for us as an international organization based on volunteer work, to address timely and exciting subjects for discussion and publications, with an optimal and suitable allocation of contributions at each Study Committee.

Every challenge, at the end, would mean an opportunity for our growth. This is a main target of all 16 Study Committees that compose the Technical Council of CIGRE.

The Preferential Subjects here selected are in line with thoughts, concerns, vision of the future, new trends, as well as the establishment of CIGRE as an outstanding platform for power system expertise. On behalf of CIGRE Officers, Study Committees Chairs, allied with our main governing bodies [Administrative Council and Steering Committee], I therefore urge authors to examine the proposed Preferential Subjects for each Group Discussion Meeting and look forward to receiving a large number of high quality, interesting and thought provoking papers for our 2022 Session.

Marcio Szechman - Technical Council Chair
> Expectations and benefits from digital substation and IEC 61850 principles and applications to energize and transform the grid.

**C1 - POWER SYSTEM DEVELOPMENT & ECONOMICS**

**PS 1 / SYSTEM TRANSITION RESILIENCE & ASSET MANAGEMENT RESPONSE**
> Resilience metrics and measures to safeguard stakeholder value through grid-forming, power electronics control, smart load shedding, fast restoration.
> Response to unexpected emerging system and business risks during the energy transition.
> New standards [equipment design and system planning for resilient and life-cycle sustainable systems] required.

**PS 2 / ENERGY SYSTEM INTEGRATION AND TACKLING THE COMPLEXITY OF MULTI-FACETED NETWORK PROJECTS**
> Energy sector integration, hydrogen & power-to-gas, deep electrification: technical and economic aspects.
> Multi-purpose, multi-terminal, multi-actor, multi-jurisdiction grid projects: how to tackle transitioning complexity.
> Including in the planning process the flexibility options from non-network-assets and non-electric solutions [storage, virtual power plants, DR, energy communities, behind-the-meter resources].

**PS 3 / PLANNING UNDER UNCERTAINTY AND WITH CHANGING EXTERNAL CONSTRAINTS**
> Modelling the impact of environmental, technical advancements, greater stakeholder involvement, generation fleet shift, new type of contingencies, use of data-driven network methods for long-term load forecasting, including impact of COVID pandemic on load profiles, planning scenarios, investments patterns and assets’ maintenance schemes.
> Decision-making under pervasive energy policies: optimising economic vs environmental benefits for consumers and matching centralized energy targets with private driven investments.
> Leveraging the evolving system services, market products and load profiles to optimize investment and timing, avoiding stranded assets [also from fossil plants dismissal].

**C2 - POWER SYSTEM OPERATION & CONTROL**

**PS 1 / SYSTEM CONTROL ROOM PREPAREDNESS: TODAY AND IN THE FUTURE**
> Operator training, situational awareness and decision supporting tools.
> Effective and efficient use of synchro-phasor data in power systems operation.
> Advanced and intelligent methods applied to power systems operation.

**PS 2 / OPERATIONAL PLANNING STRATEGIES, METHODOLOGIES AND SUPPORTING TOOLS**
> High share of grid-connected and distributed power electronic interfaced resources including hybrid AC-DC systems,
> Advanced and intelligent methods applied to power systems operational planning and day-ahead procedures,
> Impact of low demand and other predictable extreme operating conditions.

**C3 - POWER SYSTEM ENVIRONMENTAL PERFORMANCE**

**PS 1 / SETTING AMBITIOUS CLIMATE STRATEGIES IN THE ENERGY SECTOR**
> Standards and methods used to define goals and impacts reduction pathways.
> Reasons for setting ambitious climate strategies and benefits resulting from them.
> Company internal and external challenges to commit to an ambitious climate strategy and power system targets.

**PS 2 / BIODIVERSITY AND THE SUPPLY OF ELECTRICITY, RENEWABLES-BASED OR NOT: RISKS, CHALLENGES, SOLUTIONS AND OPPORTUNITIES**
> Showcases how biodiversity has been enhanced in a generation, transmission or distribution project.
> Showcases how biodiversity has been accommodated in a generation, transmission or distribution project.
> Highlight special measures or actions taken to protect biodiversity impacted by a generation, transmission or distribution project.

**PS 3 / ENVIRONMENTAL AND SAFETY ASPECTS FROM OHL [JOINT PS WITH B2]**
> Safety of workers in construction and maintenance of lines [equipment, methods].
> Reducing environmental impacts from new and existing OHL.
> Innovative engineering solutions/design to deal with environmental challenges.

**C4 - POWER SYSTEM TECHNICAL PERFORMANCE**

**PS 1 / CHALLENGES AND ADVANCES IN POWER QUALITY [PO] AND ELECTROMAGNETIC COMPATIBILITY [EMC]**
> Modelling, measurement and assessment of PO phenomena including emerging areas such as super-harmonics, harmonic instability, geo-magnetically induced currents and other similar phenomena,
> Integration and application of advanced signal processing, artificial intelligence techniques and big data analytics for event diagnostics and system planning purposes such as hosting capacity or emission limit calculation,
> Impacts on equipment compatibility and immunity, and extreme events and emerging mitigation approaches.

**PS 2 / CHALLENGES AND ADVANCES IN INSULATION CoORDINATION AND LIGHTNING RESEARCH**
> Insulation coordination practices for end-to-end power networks, including the effects of long lines, long cables and frequency dependent models,
> Development of insulation coordination in AC systems interfaced with power electronics based systems and the need for standardisation,
> Lightning evaluation of transmission and distribution systems covering new asset designs and extreme meteorological events.

**PS 3 / CHALLENGES AND ADVANCES IN POWER SYSTEM DYNAMICS**
> Modelling, analysis and validation of individual components and wide-area system interactions including system level protection schemes considering changing system dynamics,
> Impact of emerging technologies such as hydrogen and other storage devices, grid forming inverters and demand side management.
> Analysis of security and resilience of power systems having high share of grid-connected or distributed technologies and resources including feasibility of providing system support such as black start, islanding, system strength and inertia.

**C5 - ELECTRICITY MARKETS & REGULATION**

**PS 1 / THE EVOLUTION OF MARKET DESIGN AND REGULATION TO INTEGRATE DISTRIBUTED ENERGY RESOURCES**
> Market development designs to facilitate the integration of new participants and renewable resources.
> The role of retail electricity markets in the transition of generation [with emerging technologies]
> Innovative contracts/services between market participants and with customers/distributed energy resource owners.

**PS 2 / CHANGES TO MARKETS AND REGULATION TO ENHANCE RELIABILITY AND RESILIENCE**
> The lessons for markets and regulation from major system disturbances and social disruptions.
> Market designs for reliability and resilience in systems with high penetration of asynchronous and low inertia renewables.
> Markets to coordinate resources that are not responsive to demand or price.

**PS 3 / WORKING WITH INNOVATION AND DISRUPTION – PREPARING FOR THE FUTURE**
> Innovative approaches to markets and regulation to achieve energy policy targets and to include edge-of-grid activities,
> The design and structure of retail and wholesale electricity markets to support capital-intensive investments.
> Sector regulation and tariff design in the face of technological disruption, e.g. vehicle to grid, hydrogen and new forms of storage.

**C6 - ACTIVE DISTRIBUTION SYSTEMS AND DISTRIBUTED ENERGY RESOURCES (DER) SOLUtIONS AND EXPERIENCES FOR ENERGY TRANSFORMATION AND AGGREGATION**
> Electric mobility charging systems configuration and operation,
> Demand response and intelligent load configuration for customer empowerment,
> Electrification of transportation, heat systems and industrial processes.

**PS 4 / DISTRIBUtED ENERGY RESOURCES (DER) PLANNING AND OPERAtION OF ACTIvE DISTRIBUTION SYSTEMS**
> Aggregation and management platforms for active distribution systems with DER, strategies and tools for DER integration, hosting capacity, congestion management, and system service provision by DER,
> Greening rural and green-field electrification, off-grid distribution and zero emission industrial systems.

**PS 5 / AGGREGATED DER FOR ENHANCED RESILIENCE, RELIABILITY AND ENERGY SECURITY OF DISTRIBUTION SYSTEMS**
> Configuration of local energy storage systems for managing uncertainties,
> Coordination of multi-energy systems supported by state-of-the-art technologies including intelligent inverter controls,
> Individual AC and DC micro-grids, multiple micro-grids, virtual power plant and local energy communities’ control and network integration.

**D1 - MATERIALS AND EMERGING TEST TECHNIQUES**

**PS 1 / TESTING, MONITORING AND DIAGNOSTICS**
> Testing and experience with non-standardized, composite and combined voltages,
> PD measurement under DC, rectifier and impulse stress,
> Requirements of systems for testing, monitoring and diagnostics.

**PS 2 / MATERIALS FOR ELECTRO TECHNICAL PURPOSES**
> Ageing under electrical, mechanical & thermal stress [e.g. power electronics and semiconductors, load cycling, higher temperatures, compact applications, corrosion and radiation age (ing), etc.],
> Functional properties of insulation materials & testing for validation,
> Materials for battery and charging devices.

**PS 3 / SIMULATION TOOLS PARTNERED WITH MEASUREMENT CAPABILITY [EMC]**
> Application and development of new multi-physics simulation methods,
> Digital twin for insulation components and insulation systems,
> Physical models and sensors.

**D2 - INFORMATION SYSTEMS & TELECOMMUNICATIONS**

**PS 1 / THE OPPORTUNITIES AND CHALLENGES BROUGHT BY EMERGING INFORMATION AND COMMUNICATION TECHNOLOGIES TO ELECTRIC POWER UTILITIES IN THEIR PATH TO DIGITALIZATION**
> IoT technologies and architectures in physical asset management,
> Artificial intelligence, big data and analytics tools to improve asset management in electric power utilities,
> Augmented and virtual reality technologies in electric power utilities and power plants.

**D3 - CHALLENGES, SOLUTIONS, TECHNOLOGIES AND APPLICATIONS FOR SECURING CRITICAL UTILITY ASSETS**
> Cybersecurity directives, supporting standards and certification schemes – experiences from electric power utilities worldwide,
> Cyber incident management and experiences in the implementation of security operation centers for electric power utilities,
> Impact assessment and mitigation strategies for cyber-attacks to power system operations. Studies and experiences in the implementation of information and communication technology (ICT) network and cybersecurity simulators with existing power system analysis tools.

**PS 3 / MEETING THE DEMANDS OF THE MODERN UTILITY AND DER WITH AN AGILE AND RESILIENT TELECOMMUNICATION NETWORK**
> Supporting operation technology (OT) services and applications using current and next generation cellular (4G/5G) and IoT-based wireless technologies,
> Increasing efficiency and cyber security with the use of cloud-based techniques and intelligent networks including modern network management systems, network automation and service orchestration, network function virtualization (NFV) and software-defined wide area network (SD-WAN),
> Improving and maintaining reliability and resiliency of critical services including protection services using modern telecommunication techniques and technologies.

**ACRONYMS**

- AC: Alternating current
- DC: Direct current
- DER: Distributed energy resources
- DR: Demand response
- EMC: Electromagnetic compatibility
- GIS: Gas insulated substation
- HVDC: High voltage direct current
- ICT: Information and communication technology
- IoT: Internet of things
- MV: Medium voltage
- NFV: Network function virtualization
- OHL: Overhead line
- OT: Operation technology
- PD: Partial discharge
- PQ: Power quality
- PV: Photovoltaic
- SD-WAN: Software-defined wide area network
- SF6: Sulphur hexafluoride
At CIGRE Sessions Authors do not present their papers during Discussion Group Meetings. They have this opportunity during specific meetings – The Poster Sessions – for which full detailed information is made available after the selection process. The delegates read the papers in advance and they discuss them around a set of questions given in a Special Report which incorporates the gist of the papers. To discuss the papers in depth, Session papers must therefore address a strictly limited list of topics, referred to as “Preferential Subjects” and selected by each Study Committee of CIGRE. The Preferential Subjects are the main part of this Call for Papers.

**SESSION PAPERS FULL PROCESS**

**SYNOPSIS SELECTION**

As a first step, the papers are selected on the basis of synopses. Synopses are collected, checked and reviewed by National Committees. A second review and final selection decision is made by Study Committee Chairpersons, who are in charge of the running of the discussions. Authors are notified of the synopses selection results and invited to forward their full Paper to National Committees in case of acceptance.

**PEER REVIEW OF FULL PAPERS BY EXPERTS**

Full Papers are collected by National Committees. Study Committees manage the process of final Papers review with a Peer Review Panel composed by experts. Authors may be asked to make changes or adjustments to their papers. Final acceptance or non-acceptance is duly notified to authors.

**WHO CAN PROPOSE A PAPER?**

The main author (assuming there is more than one) must be an individual member or must be collective member staff. Co-authors are not required to be CIGRE members. Co-authors may be from different countries.

A paper must focus on one preferential subject and only one. One single synopsis must be drawn up for each paper proposal.

The synopsis – 500 words minimum – must closely reflect the various points to be developed in the paper.

When sending the synopsis, the name and address of the main author – and more importantly the email address that will be used for notification of the selection results – the Study Committee reference and Preferential Subject addressed must be clearly specified. Template: Authors will make use of the sample pages for layout of synopses; these are available on the CIGRE website, 2022 Session page.

WHERE ARE SYNOPTES TO BE DIRECTED?

If the main author is from a country with a CIGRE NC: The synopsis must be sent by the main author to the involved CIGRE National Committee. See the contact details on the CIGRE website. Any synopsis sent directly to the Central Office will be returned to the sender. For Papers with authors from different countries, the proposal must be sent to the National Committee of the main Author only. If the main author is from a country where there is no National Committee: the synopsis must be sent in PDF format to the CIGRE Central Office to sessionpapers@cigre.org. If the proposed paper is written on behalf of a Study Committee: the synopsis should sent directly to the Study Committee Chair, who will transfer it to the Central Office.

**FULL PAPERS PEER REVIEW**

Authors who received the notification of acceptance for the synopsis should then draw up the corresponding full Paper and forward it to the National Committee involved. Final acceptance of full Papers will be notified to authors after a peer review from a panel of experts.

**MAIN DEADLINES**

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<th>Submission Deadline</th>
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<tr>
<td>SYNOPSES</td>
<td>28th June 2021</td>
<td>24th Sept. 2021</td>
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<tr>
<td>FULL PAPERS</td>
<td>24th January 2022</td>
<td>25th April 2022</td>
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Deadlines for synopses and Full Papers submission are firm dates and will not be extended. National Committees are required to observe the deadlines which implies that National Committees will have received synopses/full papers earlier. HENCE AUTHORS must contact their National Committee who will let them know by which date they need to receive the synopses/full Papers [allowing time for screening and meeting the Central Office deadlines]. AUTHORS FROM COUNTRIES where there is no National Committee will be sending their synopsis/full Papers directly to the Central Office strictly observing the deadlines.

**ACKNOWLEDGEMENT OF RECEPTION**

Authors with no National Committee who send their synopsis/full Paper directly to Cigre Central Office will receive an acknowledgement.

See our 2022 Session page on Cigre.org

Contact at sessionpapers@cigre.org