CALL FOR PAPERS

# CIGRÉ SESSION 46

From **21** till **26** August **2016**




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.

## DEADLINES

| > Receipt of synopses at Central Office: | > Notification of acceptance: | > Receipt of full Papers at Central Office: |
|---|---|---|
| 30th June 2015 * | 12th October 2015 | 15th February 2016 |

* Please contact your National Committee to know by which date they need to receive your synopsis for a prior screening.

**International Council on Large Electric Systems**

***Conseil International des Grands Réseaux Électriques***

http://www.cigre.org

## SC A1 - ROTATING ELECTRICAL MACHINES

**PS1 / DEVELOPMENTS OF ROTATING MACHINES AND EXPERIENCE IN SERVICE**

- Design, manufacture, maintenance and performance improvements in generators and excitation systems and in starting methods of pump storage units.
- Influence of customer specifications and grid operator requirements on generator design and performance.
- New developments for improving the performance, design, cost and flexibility of operation of large generators.
- Efficiency, operation, control and design of motors for power stations and dispersed generation.

**PS2 / ASSET MANAGEMENT OF ROTATING MACHINES**

- Refurbishment, replacement, power up-rating and efficiency improvement of aged generators and associated project cost benefit analysis.
- State of the Art equipment and experience with Robotic inspections.
- Improvements in monitoring, diagnosis and prognosis systems.

**PS3 / ROTATING MACHINES FOR RENEWABLE AND DISPERSED GENERATION**

- Design, manufacture, generator costs, efficiency, monitoring and diagnosis.
- Effects of faults and system disturbances on design and control strategies.
- Evolution and trends in machines for renewable generation.

## SC A2 - TRANSFORMERS

**PS1 / ADVANCES IN TRANSFORMER DIAGNOSTIC AND MONITORING**

- Innovative practices for data interpretation and condition assessment: prognosis, case studies and success stories.
- Diagnostics, monitoring, maintenance and operation information for strategic management of a transformer fleet.
- Specification, integration, and management of monitoring systems to ensure effective utilization of data.

**PS2 / EHV / UHV AND EHVDC / UHVDC TRANSFORMERS AND THEIR COMPONENTS**

- Specification, design, material, manufacturing and testing requirements and facilities.
- Transportation constraints, installation, commissioning, reliability, operation and maintenance.
- Shunt reactors.

**PS3 / TRANSFORMER WINDINGS**

- Design, manufacturing processes, application and performance of different winding types and material, experience with new insulation materials.
- Experience and evaluation of winding mechanical (short-circuit and load noise), thermal, dielectric and efficiency performance.
- Effects of ageing and maintenance practices on winding performance.

## SC A3 - HIGH VOLTAGE EQUIPMENT

**PS1 / HIGH VOLTAGE EQUIPMENT FOR EMERGING POWER SYSTEM CONDITIONS**

- Requirements for AC equipment, e.g. disconnecting switch, earthing switch, instrumental transformer.
- Requirements for DC equipment, e.g. DC circuit breaker, disconnecting switch, earthing switch, surge arrester / varistor.
- Developments in testing and verification.

**PS2 / LIFETIME MANAGEMENT OF TRANSMISSION & DISTRIBUTION EQUIPMENT**

- Impact of maintenance, monitoring, diagnostics.
- Influence of environmental and operating conditions.
- Optimized maintenance practices.
- Mitigation methods for overstresses and overloads.

**PS3 / APPLICATION OF INFORMATION TECHNOLOGY TOOLS FOR DEVELOPMENT & MANAGEMENT OF HIGH VOLTAGE EQUIPMENT**

- Advanced simulations and design tools.
- Integration of intelligence into high voltage equipment.
- Translating data into useful information and actions.

## SC B1 - INSULATED CABLES

**PS1 / FEEDBACK FROM NEWLY INSTALLED OR UPGRADED CABLE SYSTEMS**

- Design, installation, operation and techniques to improve safety from induced voltages and currents.
- Advances in testing and relevant experience.
- Lessons learnt from permitting, consent and implementation of mitigation measures.

**PS2 / BEST USE OF EXISTING CABLE SYSTEMS**

- Condition assessment, diagnostic testing and monitoring of cable systems and accessories.
- Upgrading methodologies and related experience.
- Trends in maintenance strategies, remaining life assessment and asset management.

**PS3 / INSULATED CABLES IN THE POWER SYSTEM OF THE FUTURE**

- New functionalities, innovative cable designs, accessories and systems.
- Advances in modelling.
- Environmental challenges for future cable systems.
- Longer lengths and higher voltage levels for AC and DC Cables.

## SC B2 - OVERHEAD LINES

**PS1 / OVERHEAD LINES FOR HIGH POWER TRANSFER CAPACITY**

- Design for AC and DC Lines including dedicated metallic return.
- Climatic and environmental considerations.
- Influence of operational aspects on reliability and line security.

**PS2 / PROJECT MANAGEMENT, CONSTRUCTION AND MAINTENANCE**

- New methods including replacement and refurbishment.
- Experience with contracting and financing models.
- Reliability evaluation of installed components and their change with time.

**PS3 / APPLICATION OF NEW MATERIALS AND TECHNOLOGIES**

- Conductors, insulators, fittings and structures.
- Experience and trends.
- Specification and test requirements for line components.

## SC B3 - SUBSTATIONS

**PS1 / ADVANCES IN SUBSTATION TECHNOLOGY**

- GIS and GIL developments including DC technologies.
- Integrating Non-Conventional instrument transformers.
- Integrating new materials and new technologies into substations.

**PS2 / DEVELOPMENTS AND NEW THINKING IN SUBSTATION DESIGN**

- Integrating IEC 61850 into existing substations.
- Maximising substation availability.
- Modular, pre-fabricated, fast deployment and off-shore substation solutions.
- Adaption of substations to meet emerging power system requirements.

**PS3 / EVOLUTION IN SUBSTATION MANAGEMENT**

- Risk quantification and optimised asset decision making, substation economics, maintenance management.
- Customer and stakeholder interaction with design and life cycle management.
- Substation asset performance, residual life, health and condition metrics.
- Substation auxiliary and ancillary systems.
- Knowledge management, design methodologies and training.

## SC B4 - HVDC AND POWER ELECTRONIC SYSTEMS

**PS1 / HVDC SYSTEMS AND THEIR APPLICATIONS**

- Planning and implementation of HVDC projects inc luding, need, justification, design, integration of wind generation, environmental and economic assessment.
- Application of new technologies in HVDC, HVDC Grids / Multi-Terminal HVDC.
- Refurbishment and upgrading.
- Service and operating experience.

**PS2 / FACTS AND OTHER POWER ELECTRONIC (PE) SYSTEMS FOR TRANSMISSION**

- Planning and implementation including, need, justification, FACTS devices for renewables, environmental and economic assessment.
- Application of new technologies.
- Refurbishment and upgrading.
- Service and operating experience.

**PS3 / DC AND OTHER POWER ELECTRONIC (PE) SYSTEMS FOR DISTRIBUTION**

- Applications for harvesting and integration of renewables, power quality improvements and increasing asset utilisation.
- Service and operating experience.
- Planning and implementation including need justification, environmental and economic assessment.
- New concepts, designs and control algorithms.

## SC B5 - PROTECTION AND AUTOMATION

**PS1 / PROTECTION AUTOMATION AND CONTROL SYSTEM (PACS) OPTIMIZATION AND LIFE TIME ASSET MANAGEMENT**

- Lifecycle management of existing PACS including maintenance and design.
- Optimization and improvement in lifecycle management of PACS by design modifications.
- Optimization techniques including functional integration, use of process bus and interfacing and m onitoring of HV equipment and infrastructure.

**PS2 / COORDINATION OF GENERATOR AND POWER SYSTEM PROTECTION**

- Requirements for power plant protection to cater for developing stress points.
- Generator protection security for recoverable grid events.
- Power plant protection schemes and backup setting criteria to enhance grid stability.

## SC C1 - SYSTEM DEVELOPMENT AND ECONOMICS

**PS1 / STATE OF THE ART APPROACHES AND STANDARDIZATION IN ASSET MANAGEMENT DECISION MAKING**

- Life-cycle cost-based techniques.
- Using enhanced asset data and information.
- Investment requirements for better integration of transmission and distribution.

**PS2 / INTERFACE AND ALLOCATION ISSUES IN PLANNING T&D NETWORKS WITH MULTI-PARTY PROJECTS**

- Business models for sharing of costs, benefits and risks between parties; approvals from different authorities.
- Centralisation or decentralisation of system design decisions.
- Examples: interconnectors; distribution-transmission interface; system services from external systems, e.g. distribution, neighbouri ng transmission.

**PS3 / NEW SYSTEM SOLUTIONS AND PLANNING TECHNIQUES FOR FLEXIBLE AND ROBUST SYSTEM PLANS**
- Taking into account environmental and social impact using scenario based techniques.
- Achieving optimal solutions for the entire power system with all stakeholders.
- The particular cases of embedded HVDC, offshore grids and the technological fit of system services from renewable energy sources.

## SC C2 - SYSTEM OPERATION AND CONTROL

**PS1 / GRID OPERATION SOLUTIONS TO CHANGES IN GENERATION MIX INCLUDING DISTRIBUTED AND RENEWABLE GENERATING RESOURCES**
- Monitoring, operation and control of frequency and voltage.
- Control of stability including excitation system, power stabilizers, governors and converters (due to decreased system inertia).
- Managing integration of HVDC into the interconnected power grid.

**PS2 / MANAGING SYSTEM DISTURBANCES AND SYSTEM RESTORATION**
- Essential load and critical generator consideration.
- Disturbance management and restoration strategies, including cross border approach.
- TSOs/DSOs/Grid User Cooperation requirements.

## SC C3 - SYSTEM ENVIRONMENTAL PERFORMANCE

**PS1 / ENVIRONMENTAL LIABILITIES OF TRANSMISSION AND DISTRIBUTION ASSETS**
- Best practices regarding prevention, investigation and remediation of environmental damage.
- Operational and financial impact on property transfer and grid projects (substations, cables & lines), and of incidents on existing assets.
- Methodologies and techniques for environmental due diligence audits.

**PS2 / OVERHEAD LINES AND UNDERGROUND CABLES: ACCEPTABILITY ISSUES**
- Specific impact assessments (e.g. EMF, visual impact, biodiversity, noise, soil heating, land use, grid losses) during life-cycle of the assets.
- Mitigation and compensation policies and measures.
- Strategies, methodologies and techniques for stakeholder engagement.

**PS3 / CLIMATE CHANGE: IMPLICATIONS FOR ELECTRIC POWER SYSTEMS**
- Methodologies and techniques to improve grid energy efficiency.
- Greenhouse gas (GHG) emissions accounting and reduction measures for T&D companies.
- Risk assessment, resilience and adaptation measures.

## SC C4 - SYSTEM TECHNICAL PERFORMANCE

**PS1 / IMPACT OF INVERTER BASED GENERATION AND ENERGY STORAGE**
- Potential improvement of power system dynamic performance from new functionalities.
- Challenges for system dynamic performance caused by high penetration levels (especially in island systems).
- Modeling, measurement and assessment of PQ and EMC related issues.

**PS2 / CHALLENGES WITH MODELING AND EVALUATION OF LIGHTNING PERFORMANCE AND INSULATION COORDINATION IN THE POWER SYSTEM OF THE FUTURE**
- Transient analysis and modeling for HVDC and large renewable power plants.
- Analysis of, and operational experience with, lightning performance in high-voltage networks, including detection systems and lightning attraction models.
- Methods for the analysis of transient and temporary over-voltages and their impact on high voltage equipment including suitability of standard wave forms.

**PS3 / BRIDGING THE GAP BETWEEN EMT, FEM AND POSITIVE SEQUENCE GRID SIMULATION**
- Limitations of positive sequence modeling methods and techniques.
- Hybrid EMT-positive sequence modeling methods, especially for HVDC and inverter based generation.
- Advanced numerical techniques in modeling and simulation, such as highfrequency transformer modeling, finite element methods and finite difference time domain methods.

## SC C5 - ELECTRICITY MARKETS AND REGULATION

**PS1 / INTERACTIONS BETWEEN WHOLESALE AND RETAIL MARKETS; THE FUTURE OF REGULATION**
- Policy drivers, jurisdictional aspects and incentive mechanisms to foster the alignment between wholesale and retail markets..
- Market design aspects of wholesale compared to retail markets; the role of resource aggregation and the changing nature of retail market.
- Interaction between networks and markets in the future.

**PS2 / MARKET MODELS AND REGU LATORY STRUCTURES IN AN EVOLVING INDUSTRY SITUATION**
- Experiences with market mechanisms to maintain security of s upply and economic efficiency through the industry transition.
- Impact of political and environmental investment drivers on market design.
- Lessons learned for supporting infrastructure investments with multiple regulatory jurisdictions in regional market structures.

**PS3 / DISTRIBUTED RESOURCE AND DEMAND RESPONSE INTEGRATION FROM THE PERSPECTIVE OF ELECTRICITY MARKET STRUCTURES**
- Experiences and Lessons learned.
- Designing a market model to accommodate distributed and alternative resource management.
- Business aggregation and market information flows for distributed and alternative resources.

## SC C6 - DISTRIBUTION SYSTEMS AND DISPERSED GENERATION

**PS1 / INTEGRATED PLANNING AND OPERATION FOR UPGRADING DISTRIBUTION NETWORKS**
- Novel methods for integrating planning and operation including asset management, control and protection.
- Enabling technologies for increasing penetration of renewables, including energy storage and demand side integration.
- Distribution systems perspective on interaction with TSO, aggregators, further market participants. Contribution of DER to system stability, interconnection, and communication requirements.

**PS2 / ENERGY INFRASTRUCTURE FOR URBAN NETWORKS**
- Smart Cities.
- Multi-energy systems including heat, cooling, gas, water, transport.
- Impact of developments in energy technology, IT, big data and further trends on the distribution system.

**PS3 / MICROGRIDS AND OFFGRID HYBRID SYSTEMS**
- Technological challenges.
- Real world installations.
- Business cases and road maps.

## SC D1 - MATERIALS AND EMERGING TEST TECHNIQUES

**PS1 / COMPACT INSULATION SYSTEMS (AC AND DC)**
- High field strength phenomena.
- Field grading.
- Ageing and long-term performance.

**PS2 / NEW MATERIALS**
- Nanocomposites.
- Eco-friendly materials.

**PS3 / NON-STANDARDISED STRESSES AND EMERGING TEST TECHNIQUES**
- Offshore and subsea application (high pressure, corrosion, etc.).
- Advanced diagnostic techniques.
- Impact of non-standardised stresses on materials.

## SC D2 - INFORMATION SYSTEMS AND TELECOMMUNICATION

**PS1 / NEW APPLICATIONS TO CONTROL POWER SYSTEMS**
- Smart Grid applications for DSO and TSO.
- Big data, applications and solutions.
- Convergence of SCADA, EMS, DMS and MMS applications.

**PS2 / EPU RESPONSE TO EVOLVING CYBER SECURITY LANDSCAPE**
- Protection of digital systems against current and upcoming threats.
- Impact of evolving cyber security regulations.
- Security architecture for power system information infrastructure.

**PS3 / MOBILE OPERATIONAL APPLICATIONS, SYSTEMS AND INFRASTRUCTURE**
- Wireless access to EPU field assets, operation and support platforms.
- Service continuity during disaster or blackout situations.
- Use of public versus private infrastructure.

## ACRONYMS

| | |
|---|---|
| **AC** | Alternating Current |
| **DC** | Direct Current |
| **DER** | Distributed Energy Resources |
| **DSO** | Distribution System Operator |
| **EHV** | Extra High Voltage |
| **EHVDC** | Extra High Voltage Direct Current |
| **EMC** | Electro-Magnetic Compatibility |
| **EMF** | Electro-Magnetic Field |
| **EMS** | Energy Management System |
| **EMT** | Electro-Magnetic Transient (studies) |
| **EPU** | Electric Power Utilities |
| **FACTS** | Flexible AC Transmission Systems |
| **FEM** | Finite Element Method |
| **GHG** | Green House Gas |
| **GIL** | Gas Insulated Line |
| **GIS** | Gas Insulated Substations |
| **HVDC** | High Voltage Direct Current |
| **IT** | Information Technology |
| **MMS** | Market Management System |
| **PACS** | Protection Automation and Control Systems |
| **PE** | Power Electronics |
| **PQ** | Power Quality |
| **RES** | Renewable Energy Source |
| **SCADA** | Supervisory Control And Data Acquisition |
| **T&D** | Transmission and Distribution |
| **TSO** | Transmission System Operator |
| **UHV** | Ultra High Voltage |
| **UHVAC** | Ultra High Voltage Alternating Current |
| **UHVDC** | Ultra High Voltage Direct Current |

Information and recommendations

## > Why Preferential Subjects?

At CIGRE Sessions Authors do not present their papers.

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 "Prefer ential Subjects" and selected by each Study Committee of CIGRE. The "Preferential Subjects" are the main part of this "Call for Papers".

## > How are papers selected?

The papers are selected on the basis of synopses.

- They are first screened by National Committees (where applicable), who are entitled to put forward a set number of Papers.
- Then the Study Committee Chairmen, who are in charge of the running of the discussions, will select the proposals received, under the coordination of the Technical Committee Chairman. Authors will be informed of the results.
- A Paper may still be turned down even once written out in full, if considered of insufficient quality.

## > 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; in this case the Paper is identified as an "International paper".
- A paper must focus on one preferential subject and only one.
- A separate 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 his email address which 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 lay-out of synopses; these are available on the CIGRE website, page "2016 Session".

## > Where are synopses 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 his CIGRE National Committee (Contact details are available on the CIGRE website; see "Links / National Committees" from the homepage).
  Any synopsis sent directly to the Central Office will be returned to the sender.
  For International Papers, 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 electronic format (WORD or PDF) to the CIGRE Central Office, to the following address: Sylvie.bourneuf@cigre.org
- **If the proposed paper is written on behalf of a Study Committee (SC Allotment):** the synopsis is sent directly to the Study Committee Chairman, who will transfer it to the Central Office.

## > Deadlines for reception of the synopses

- **Synopses must be received at the Central Office by 30th June 2015 at the latest. Past this date they will not be accepted. National Committees are required to send all paper synopses to the Central Office by 30th June 2015 at the latest, which implies that National Committees will have received these synopses earlier. Hence authors must contact their National Committee who will let them know by which date they need to receive the synopses (allowing time for screening and meeting the Central Office deadlines).**
- **Authors from countries where there is no National Committee will be sending their synopsis directly to the Central Office. The strict deadline is 30th June 2015.**
- **Main authors will be notified of the selection results by 12th October 2015.**
- **Deadline for receipt of the full Papers at the Central Office is 15th February 2016.**

## > Acknowledgement of reception

The Central Office will acknowledge receipt of the synopses within two weeks.

If no acknowledgement is received, the sender should forward the message once again, to make sure the proposal(s) will be duly considered in the selection process.

All information on the 2016 Session can be found on the CIGRE website:

http://www.cigre.org/events/session

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