



CALL  
FOR  
PAPERS

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.

## CIGRE SESSION

Paris / France

August

26-31, 2018

47



RECEIPT OF SYNOPSES  
AT CENTRAL OFFICE:  
30<sup>TH</sup> JUNE 2017 \*

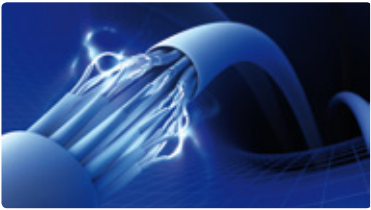


NOTIFICATION  
OF ACCEPTANCE:  
12<sup>TH</sup> OCTOBER 2017



RECEIPT OF FULL PAPERS  
AT CENTRAL OFFICE:  
15<sup>TH</sup> FEBRUARY 2018

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

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- > **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.**  
See full information page 4.

INTERNATIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS  
Conseil International des Grands Réseaux Électriques



## SC A1 - ROTATING ELECTRICAL MACHINES

### PS1 / GENERATION MIX OF THE FUTURE

- > Design improvements and technological developments required for machines to withstand cycled operation due to fluctuating feed-in of renewable energy and variable load demand.
- > Impact and effect of increasing renewable power mix on existing legacy generators, generator auxiliaries and motors.
- > Evolution and trends in designs of machines for renewable generation.

### PS2 / ASSET MANAGEMENT OF ELECTRICAL MACHINES

- > Experience with refurbishment, replacement, power up-rating and efficiency improvement of aged generators.
- > Novel techniques to overcome known operational and design problems.
- > Optimised condition monitoring, diagnosis, prognosis and maintenance practices to improve reliability and extend operational life at conventional plant and in new volatile grid conditions.

### PS3 / DEVELOPMENTS OF ROTATING ELECTRICAL MACHINES AND OPERATIONAL EXPERIENCE

- > Latest design, specification, materials, manufacture, maintenance and performance and efficiency improvements in generators and motors.
- > Operational experience: failures, root cause analysis, recovery options, cost and time reduction initiatives.

## SC A2 - TRANSFORMERS

### PS1 / THERMAL CHARACTERISTICS OF POWER TRANSFORMERS

- > Determination of winding hot-spot temperature rise by modelling and direct measurements.
- > Determination of temperature rise for core, tank, and other parts by modelling and direct measurements.
- > Effect of overload requirements on design and component selection.

### PS2 / ADVANCES IN DIAGNOSTICS AND MODELLING

- > High frequency modelling for power transformers and shunt reactors, including comparison with measurements.
- > Interpretation and modelling of winding frequency response results.
- > Experience with different methods of measuring partial discharge, at the factory and at site.

### PS3 / SITE COMMISSIONING TESTS

- > Required site commissioning tests for transformers and reactors.
- > Additional site commissioning tests for transformers and reactors, depending on circumstances.
- > Trial operation of transformers and reactors, including requirements for additional monitoring.

## SC A3 - HIGH VOLTAGE EQUIPMENT

### PS1 / REQUIREMENTS FOR AC AND DC TRANSMISSION & DISTRIBUTION EQUIPMENT

- > Requirements for DC equipment for multi-terminal HVDC grids.
- > Mitigation measures to facilitate higher reliability.
- > Developments in testing and verifications for AC and DC equipment.

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

- > Diagnostics and prognostics of equipment.
- > Influence of environmental and operating conditions on lifetime.
- > Experience and countermeasures for overstresses and overloads.

### PS3 / NOVEL DEVELOPMENTS OF TRANSMISSION & DISTRIBUTION EQUIPMENT

- > New switching devices and emerging equipment.
- > Switching with SF6 alternatives, equipment with new materials.
- > Incorporation of intelligence into AC and DC equipment. ■

## SC B1 - INSULATED CABLES

### PS1 / RECENT EXPERIENCES WITH UNDERGROUND AND SUBMARINE AC AND DC CABLE SYSTEMS

- > Design, manufacturing, installation techniques and operation.
- > Advances in testing and relevant experience.
- > Safety, health, environmental and quality considerations.
- > Lessons learnt from permitting, consent and implementation.

### PS2 / BEST USE OF EXISTING UNDERGROUND AND SUBMARINE AC AND DC CABLE SYSTEMS

- > Condition assessment and diagnostic testing of T&D cable systems.
- > Innovative tools for monitoring cables and accessories.
- > Upgrading methodologies and related experiences, including AC to DC conversion.
- > Trends in maintenance strategies, asset management and remaining life methodologies.

### PS3 / AC AND DC UNDERGROUND AND SUBMARINE CABLE SYSTEMS IN THE NETWORK OF THE FUTURE

- > New functionalities expected from cable systems.
- > Innovative cables and systems.
- > Environmental challenges for future cable systems.
- > Higher voltage levels for AC and DC cables.

## SC B2 - OVERHEAD LINES

### PS1 / OVERHEAD LINES AND INFORMATION TECHNOLOGY

- > Recent developments in geographic information systems for line routing, environment mapping, data collection and analysis.
- > Transmission lines as a communication network: monitoring and operation, Internet of things, fiber optics and antennas.
- > Dynamic line rating and forecasting.

### PS2 / EXPERIENCES LEADING TO IMPROVEMENTS OF OHL

- > Failures: excessive climatic conditions, line and hardware defects, component ageing.
- > Reliability: condition assessment and monitoring, residual life criterion, life extension methods.
- > Availability: corridor encroachments; maintenance access limitations; solutions for inspection, repair and construction.

### JPS B2 & C3 / TECHNICAL AND ENVIRONMENTAL ASPECTS OF OHL

- > Advantages and challenges of reducing environmental impacts.
- > Public acceptance (including psychological elements).
- > Innovative design.
- > Multi-material structures.
- > Compact lines.
- > Mitigation and design for external impacts.

## SC B3 - SUBSTATIONS

### PS1 / ADVANCES IN SUBSTATION TECHNOLOGY AND DESIGN

- > GIS and GIL developments including HVDC.
- > Adapting substations to meet emerging power system requirements and optimised availability including modular, fast deployment substations and live working.
- > Changing roles and opportunities for substations including challenges for medium voltage and integration of storage systems.

### PS2 / EVOLUTION IN SUBSTATION MANAGEMENT

- > Advanced technologies for substation management, new information technologies, robotics and the application of 3D techniques.
- > Risk quantification and optimised asset decision-making, substation economics, maintenance management and life cycle management.
- > Substation asset performance, residual life, health and condition metrics.
- > Operations and maintenance of offshore substations.

## PS3 / HEALTH, SAFETY, ENVIRONMENTAL AND QUALITY ASSURANCE CONSIDERATIONS IN SUBSTATIONS

- > Customer and stakeholder interaction to reduce substation impact including aesthetics, noise and fire management.
- > Design for safety, eco-design / recycling and product development
- > Physical and cyber-security considerations for substations.
- > Managing the implementation of health, safety and environmental requirements for substations, including training.

## SC B4 - HVDC AND POWER ELECTRONICS

### PS1 / HVDC SYSTEMS AND THEIR APPLICATIONS

- > Planning and implementation of new HVDC projects including, need, justification, design, integration of wind generation, environmental and economic assessment.
- > Application of new technologies in HVDC, HVDC grids / multi-terminal HVDC.
- > Refurbishment and upgrade of existing HVDC systems.
- > Service and operating experience of converter stations including off shore platforms.

### PS2 / MVDC / LVDC AND POWER ELECTRONICS FOR DISTRIBUTION SYSTEMS

- > Medium voltage DC technology deployed in distribution systems.
- > PE technologies applied in distribution projects including the economics and reliability.
- > New concepts and designs.
- > Power electronics interfacing generation and storage to the network.

### PS3 / FACTS

- > Planning and implementation of new projects including, need, justification, FACTS devices for renewables, environmental and economic assessment.
- > Application of new technologies in FACTS and other PE equipment.
- > Refurbishment and upgrade of existing FACTS and other PE systems.
- > Service and operating experience.

## SC B5 - PROTECTION AND AUTOMATION

### PS1 / PROTECTION UNDER SYSTEM EMERGENCY CONDITIONS

- > Emergency loading, load shedding and islanding practices and experiences.
- > System oscillation detection and out of step / pole slipping techniques.
- > Thermal protection.

### PS2 / USER EXPERIENCE AND CURRENT PRACTICE WITH IEC61850 PROCESS BUS

- > Interoperability between merging units, stand alone and associated to NCIT, and Protection functions.
- > Experience from FAT, SAT, commissioning and maintenance of process bus based equipment and functions.
- > Use of process bus for metering and monitoring of HV equipment. ■

## SC C1 - SYSTEM DEVELOPMENT AND ECONOMICS

### PS1 / EXPANDING ROLE OF SOCIAL FACTORS AND TRANSPARENCY IN TRANSMISSION INVESTMENT DECISION APPROACHES

- > New elements in multi criteria evaluation.
- > New stakeholders in the decision making process.
- > Management of the scope of highly uncertain investments.

### PS2 / IMPACT OF CHANGING EXTERNAL FACTORS ON ASSET MANAGEMENT

- > Political, economic, regulation, weather, cyber and physical security factors.
- > Within-company strategy on grid modernization, e.g. monitoring, Big Data, asset analytics, security.
- > Asset usage and longevity effects from highly variable / non-schedulable generation.

### PS 3 / COORDINATED PLANNING BETWEEN GRID OPERATORS ACROSS ALL VOLTAGE LEVELS

- > Methodologies for planning multiple interconnected transmission grids and for transmission-distribution interaction.
- > How cost sharing and / or company organization and strategy can improve or impact coordinated planning principles.
- > The evolution of planning methods to account for smart grids, distributed generation, demand response.

### SC C2 - SYSTEM OPERATION AND CONTROL

#### PS 1 / ENSURING OPERATING RELIABILITY

- > New concepts of system observability, controllability and flexibility.
- > New solutions for provision of ancillary services: frequency and voltage control.
- > Wide area control.
- > System restoration.

#### PS 2 / BIG DATA AND THEIR USE FOR SYSTEM OPERATIONS

- > Transformation of data into information for system operators.
- > Data exchange platforms with other entities: e.g. DSO, DG, among others.
- > Monitoring, visualization, awareness systems, decision support tools.
- > Forecasts.

### SC C3 - SYSTEM ENVIRONMENTAL PERFORMANCE

#### PS 1 / EFFECTIVENESS OF ENVIRONMENTAL PREVENTION, MITIGATION AND COMPENSATION MEASURES

- > Methodologies and procedures for evaluation.
- > Results (does it work)?
- > Experiences when the results are not in compliance with the expectations.

#### PS 2 / MITIGATION OF THE VISUAL IMPACTS OF ELECTRICAL ASSETS TO INCREASE PUBLIC ACCEPTANCE

- > Mitigating measures, for example:
  - Design, materials and camouflaging techniques.
  - Location, landscaping design and vegetation.
  - Design to hide the assets or show them off?
- > Communication methods for showing the visual impacts to stakeholders.
- > Do regulations and policies (including financial limits from regulators) promote or hinder visual impact?

### JPB 2 & C3 / TECHNICAL AND ENVIRONMENTAL ASPECTS OF OHL (See B2) .

### SC C4 - SYSTEM TECHNICAL PERFORMANCE

#### PS 1 / SYSTEM TECHNICAL PERFORMANCE ISSUES FOCUSING ON THE EFFECTS OF HIGH LEVEL INTEGRATION OF POWER ELECTRONICS BASED TECHNOLOGIES

- > Power system stability control with particular emphasis on frequency and voltage control systems of converter based energy sources including their modelling and performance and challenges on series compensation and impact of microgrids.
- > Analysis, measurement, benchmarking and standardisation of power quality.
- > EMC aspects of future power networks including ELF exposures.

#### PS 2 / DEVELOPMENTS AND ADVANCES IN MODELLING AND EVALUATION OF LIGHTNING PERFORMANCE AND INSULATION COORDINATION INCLUDING:

- > Estimation of lightning performance of transmission lines including detection, evaluation of shielding analysis methods and effectiveness of line surge arresters.
- > Lightning protection of renewable and nuclear power plants including seasonal variations and risk management.
- > Evaluation of surges and overvoltages on OHL / cable systems, impact of harmonic resonances on temporary overvoltages.

### PS 3 / COMPUTATIONAL ADVANCES IN TOOLS, MODELS, METHODOLOGY AND ANALYSIS OF POWER SYSTEM TECHNICAL PERFORMANCE RELATED ISSUES:

- > Frequency dependent modelling techniques for high frequency electrical transients and power quality assessments.
- > Developments in lightning surge studies with particular emphasis on FDTD method and advances in grounding electrode modelling.
- > Hybrid and real time simulation of system dynamic behaviour.

### SC C5 - ELECTRICITY MARKETS AND REGULATION

#### PS 1 / THE NEED TO CHANGE BUSINESS AND REGULATORY MODELS DRIVEN BY INCREASE IN DISTRIBUTED RESOURCES, STORAGE AND DEMAND RESPONSE

- > Evolution of regulatory models given reduction in revenue and negative load growth.
- > Evolution of regulatory models to accommodate distributed and / or renewable resources in a challenging economic situation.
- > Optimal evolution of markets at all levels.

#### PS 2 / IMPACT OF CLIMATE POLICY ON ELECTRICITY MARKETS

- > Methods to adapt electricity markets given the trend to zero marginal cost resources and feasibility of such evolution.
- > Market response to public policy driven intervention and methods by which markets can be utilized to implement public policy.
- > Market design or regulatory changes that can be considered to make markets more resilient to such intervention.

#### PS 3 / LOCALIZED MARKETS OR MICROGRIDS INTERACTING WITH WHOLESALE MARKETS

- > Methods to leverage markets for localized resources to provide system services.
- > Market signals and schemes that can be utilized to harmonize and coordinate resources across transmission / distribution interface.
- > Market design changes that can be considered at wholesale and retail level to manage localized resource interactions.

### SC C6 - DISTRIBUTION SYSTEMS AND DISPERSED GENERATION

#### PS 1 / ACHIEVING FLEXIBILITY THROUGH STRATEGIC DISTRIBUTION PLANNING

- > Managing resilience and congestion using distributed energy resources.
- > Implementing demand response, customer empowerment and technologies for transactive markets.
- > Distributed resources asset management.

#### PS 2 / ENERGY STORAGE IN DISTRIBUTION SYSTEMS

- > Deploying and managing energy storage, including but not limited to electrical and thermal applications.
- > Advances in transportation electrification.
- > Multi-energy system and load interaction for energy efficiency.

#### PS 3 / INTELLIGENT ELECTRIFICATION FOR ALL

- > Electric energy systems for smart cities.
- > Grid-connected microgrids.
- > Off-grid electrical systems for remote and rural deployment. ■

### SC D1 - MATERIALS AND EMERGING TEST TECHNIQUES

#### PS 1 / HVDC INSULATION SYSTEMS

- > Measurement methods for validating electrical field simulations.
- > New diagnostics for maintenance.
- > Experience and requirements for new test procedures and standards.

#### PS 2 / MATERIALS AND AGEING

- > New stresses, e.g. from power electronics.
- > Higher stress operating environment, e.g. compact applications.
- > Materials with lower environmental footprint.

#### PS 3 / TESTING, MONITORING AND DIAGNOSTICS

- > Experience and added value from online monitoring systems.
- > Reliability of equipment and systems for testing, monitoring and diagnostics.
- > Advanced condition assessment.

### SC D2 - INFORMATION SYSTEMS AND TELECOMMUNICATION

#### PS 1 / OPPORTUNITIES AND CHALLENGES IN ICT APPLIED TO MICROGRID AND DER

- > Communication solutions to remotely monitor and operate off-grid premises.
- > Facilities for control, monitoring, physical security and safety.
- > Standards, interoperability and cyber security issues.

#### PS 2 / POTENTIAL APPLICATIONS AND IMPLEMENTATION OF NETWORK AND INFRASTRUCTURE VIRTUALIZATION

- > Opportunities and benefits using software defined networking and network function virtualization.
- > Issues identified in implementation and operation of virtualization architectures.
- > Strategies to operate a secure SDN / NFV deployment.

#### PS 3 / MAINTAINING RELIABLE AND SECURE OPERATION IN AN EVOLVING ENVIRONMENT

- > ICT to support asset management and maintenance.
- > Life cycle management and integration of legacy and new devices.
- > Situational awareness, risk management and cyber incident responses. ■

## ACRONYMS

3D	Three dimensions
AC	Alternating Current
DC	Direct Current
DER	Distributed Energy Resources
DG	Distributed generation
DSO	Distribution System Operator
ELF	Extra low frequency
EMC	Electro-Magnetic Compatibility
FACTS	Flexible AC transmission systems
FAT	Factory acceptance tests
FDTD	Finite difference time domain
GIL	Gas insulated line
GIS	Gas insulated substation
HV	High voltage
HVDC	High voltage direct current
ICT	Information and communication technologies
LVDC	Ow voltage direct current
MVDC	Medium voltage direct current
NCIT	Non-conventional instrument transformers
NFV	Network function virtualization
NFV	Network function virtualization
OHL	Overhead line
PE	Power electronics
SAT	Site acceptance tests
SDN	Software defined networking
SF6	Sulfur hexafluoride
T&D	Transmission and distribution

## Why Preferential Subjects?

**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”.

## 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.

Full papers are considered to be accepted so authors do not have to expect any additional notification of acceptance. However, a paper may still be turned down even once written out in full, if considered of insufficient quality. Study Committee Chairmen may also ask authors to make changes or adjustments to their papers. In both cases, authors will be duly informed.

## 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 “2018 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 (PDF preferably) to the CIGRE Central Office, to the following address: [Sylvie.bourneuf@cigre.org](mailto: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 30<sup>TH</sup> JUNE 2017 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 30<sup>TH</sup> JUNE 2017 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 30<sup>TH</sup> JUNE 2017.**

**MAIN AUTHORS WILL BE NOTIFIED OF THE SELECTION RESULTS BY 12<sup>TH</sup> OCTOBER 2017.**

**DEADLINE FOR RECEIPT OF THE FULL PAPERS AT THE CENTRAL OFFICE IS 15<sup>TH</sup> FEBRUARY 2018.**

## Acknowledgement of reception

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

**If not received within 2 weeks,** they must then contact Cigre again to make sure their proposal is duly taken into consideration.

**INTERNATIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS**  
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