



AUSTRALIA-CHINA WORKSHOP:
MEASUREMENT CHALLENGES FOR
ELECTRICAL ENERGY SECURITY
5-8 SEPTEMBER 2017

**FIRST ANNOUNCEMENT AND CALL
FOR EXPRESSIONS OF INTEREST**

The electrical energy industries in Australia and China rely on measurement science and technology to solve current and emerging challenges. These needs are only expected to increase in the future.

The workshop will explore these challenges, showcase present scientific achievements, and formulate a roadmap of future requirements for measurement research in electrical energy security. It is anticipated that the roadmap will inform future research project opportunities to address industry needs.

The workshop is co-organised by the National Measurement Institute, Australia (NMIA), the National Institute of Metrology (NIM), China and the Australian Academy of Science (AAS) and supported by the Australia-China Science and Research Fund (ACSRF).

⚡ MAIN OBJECTIVES OF THE WORKSHOP:

- Share measurement strategies on electrical energy security;
- Lay the foundation for a roadmap of measurement capabilities that will enable the security of electricity supply for the 21st century;
- Facilitate cross-sector discussions between senior leaders in universities, research institutions, government research agencies and electricity supply utilities and manufacturers;
- Allow representatives from Australia and China to share experiences and insights;
- Initiate new and strengthen existing collaborations;
- Develop a foundation for future collaboration, including opportunities for funding.

⚡ TECHNICAL SCOPE

It is envisaged that the workshop will explore the role that measurement plays in achieving the technical objectives that are essential to ensuring energy security in both Australia and China, such as:

- Preventing loss of high-voltage (HV) transmission elements;
- Developing whole-of-grid, real time monitoring technologies for better power system management;
- Maintaining constant power system frequency within specified tolerances;
- Maintaining power system voltages close to nominal;
- Maintaining power quality as more inverter-based equipment rapidly connects to the grid;
- Addressing metrology needs for battery storage;
- Ensuring viability of HV Direct Current transmission for connecting emerging high-capacity renewable energy sources.

⚡ PRELIMINARY TECHNICAL TOPICS:

Technical Issue	Measurement Challenges
Improvement in the ability of HV equipment to withstand HV disturbances	Measurement of fast transients from switched gas-insulated substations with up to 100 ns/MV rise time. Switchgear testing at voltages up to 1 MV.
Enablement of the uptake of HV DC transmission	On-site DC voltage measurement with improved accuracy. Measurement of quality of DC high voltage (ripple, voltage variation and superimposed AC components). HV DC polarity reversal testing particularly with rapid reversal of voltage polarity.
Integration of renewable sources of energy and modern power electronics systems	On-site measurements of frequency, rate of change of frequency. Calibration and use of phasor measurement units. Measurement of HV harmonics, particularly emissions within 2-9 kHz. Measurement and characterisation of power quality issues of future grids with respect to high penetration of modern power electronics systems (2-150 kHz). Real-Time Stability Monitoring. Measurement of harmonic phases.
Maintenance and support of transmission and distribution networks	On-site high voltage testing for impulse and ac withstand and Partial Discharge (PD). Condition monitoring - PD, cable temperature, moisture and gas levels in transformers. Grid impedance detection. Measurements for lifetime and reliability analysis of future grids (cables, transformers, etc). Network impedance and system resonances in transmission and distribution networks.
Storage of electrical energy	Measurement support for medium and large capacity storage systems. Optimal placement of storage technologies in the network and real-time market dispatch.
Ultra-high voltage transmission	Measurement of ultra-high voltage, fast transients, HV harmonics. Network impedance and system resonances.
Data security	Ensuring security of measurement data in Smart Grids.
Digital Transformers	Metrological support for digital transformers as a new technology for energy measurement.



PRELIMINARY PROGRAM:

5 Sept	Shine Dome, Canberra
AM	Plenary presentations
PM	Focussed breakout discussions
6 Sept	Lindfield, NSW
AM	Bus to Sydney
PM	Tour of NMIA energy facilities
7 Sept	Lindfield, NSW
	Focussed breakout discussions
8 Sept	Lindfield, NSW
	Reports from breakout discussion groups and formulation of energy measurement roadmap

EXPRESSIONS OF INTEREST

The workshop is fully funded by the governments of Australia and China and there will be no registration fee. Furthermore, travel support will be offered to key participants.

To qualify for participating in this event, please complete the [expression of interest form](#) by 30 June 2017.

Participants will be notified by 20 July 2017 if their application has been accepted.

CONTACT

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