

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP¹

WG N° A1.65	Name of Convenor: Louis Jestin (FRANCE) E-mail address: louis.jestin@uct.ac.za	
Strategic Directions #²: 1		Technical Issues #³: 5
The WG applies to distribution networks⁴: No		
Potential Benefit of WG work #⁶: 2,5		
Title of the Group: Guide to optimal management of coal generation in presence of significant inverter based resources		
Scope, deliverables and proposed time schedule of the Group: Background: <p>The addition of inverter based resources into the generation mix internationally over the past two decades has led to the need for additional services to be provided from conventional generation, the majority of which is coal based. The coal based generators were not designed for high ramp rates, quick response and provision of other ancillary services such as frequency and voltage support. There is also a requirement for minimum generation levels to be maintained for a period of time.</p> <p>It is therefore clear that flexible and minimum load operation must be achieved to effectively implement inverter based resource generation, and this poses the following primary challenges among others:</p> <ul style="list-style-type: none"> • To maintain stable combustion with coal under variable load conditions, • To maintain grid stability, • To minimise material creep and fatigue and to accommodate thermal expansion due to significant temperature and pressure ramps during load changes, and • To adapt emissions abatement units to cope with variable flue gas compositions and flow rates to avoid emission excursion. <p>Besides these challenges, a host of secondary influences will result in increased operating and maintenance cost for the fleet.</p> Scope: <ol style="list-style-type: none"> 1. To determine the current status and operating conditions of coal fired generation in networks with significant penetration of inverter based resources. 2. To determine the issues experienced with coal fired generators with regard to provision of ancillary services, ramping, minimum load generation, rate of change of frequency, excitation limits, frequency limits, mode changes and voltage-frequency requirements. 3. To provide guidance on the best practices to manage the coal fleet in the event of significant penetration of inverter based resources. This can include boiler modifications, operational strategies, turbine and electrical rotating machine strategies. <p>Whilst focussing primarily upon coal-fired generation the WG will consider the relevance & applicability of their finding to other large thermal power plant technologies.</p> Deliverables: <input checked="" type="checkbox"/> Technical Brochure and Executive summary in Electra		

Electra report

Tutorial⁵

Time Schedule: start: December 2018

Final Report: December 2022

Approval by Technical Council Chairman:

Date: 24/07/2018

A handwritten signature in black ink, appearing to read "M. Wald", is written over the signature line.

Notes: ¹ or Joint Working Group (JWG), ² See attached Table 2, ³ See attached Table 1,
⁴ Delete as appropriate, ⁵ Presentation of the work done by the WG, ⁶ See attached table 3

Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (ref. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit