



CIGRE Study Committee C4

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° C4.34	Name of Convenor : U.D. Annakkage (Canada) E-mail address: udaya.annakkage@ad.umanitoba.ca
Technical Issues # (2): 2, and 8	Strategic Directions # (3): 1
The WG applies to distribution networks (4): Applies to both transmission and distribution networks	
Title of the Group: Application of Phasor Measurement Units for monitoring power system dynamic performance	
<p>Scope, deliverables and proposed time schedule of the Group :</p> <p>Background :</p> <p>The state of the art in the application of Phasor Measurement Units (PMUs) for the monitoring power system dynamics and the preliminary investigations into applying wide-area control and protection of power systems was reported in 2007 in a Technical Brochure on Wide Area Monitoring and Control For Transmission Capability Enhancement. This work was the result of one of the tasks of CIGRE WG C4.601 on Power System Security Assessment.</p> <p>The Technical Brochure concluded that the expectations for Wide Area Monitoring and Control Systems are high and a growing community of researchers and utility experts are working on practical applications and installations of this technology around the globe. It also stated that the technology is promising, but it was still a long way away from seeing applications. It was also reported that an increasing number of transmission system operators are running application studies to evaluate the benefits of this technology or even execute implementation projects at the time of writing the Technical Brochure.</p> <p>The purpose of this proposed Working Group is to survey and report the recent developments in this fast advancing technology. The past two to three years saw a large number of Phasor Measurement Units installed on North American, European and other power systems across the world. Preliminary deployment of PMUs are also appearing in distribution networks with large penetration of distributed generation as PMUs are expected to enable both real-time observability and control of these networks. Major relay manufacturers are facilitating the measurements from PMUs to be received and utilized within their devices. The development of common communication protocols has also advanced in the recent years. There is a major move towards adopting the IEC 61850 as the common protocol. In addition, parallel developments have also been taking place on new tools to utilize the data obtained from PMUs to monitor power systems. Such applications will enhance the security of the power system. At research and development level, efforts of closing the loop by using the PMU measurements as input signals to controllers and protective relays have also been reported recently. Another branch of research being reported is to use the PMU measurements as supplemental signals to State Estimation in Energy Management Systems.</p> <p>Scope:</p> <p>The main scope of this WG will be the assessment of the maturity of technology of</p>	

synchrophasor measurements and its applications for enhancing the power system technical performance.

The main activities will include:

1. Overview of the synchrophasor technology including its capability and robustness against latency and missing data.
2. Overview of the common communication protocol and data security.
3. Differentiation of PMU accuracy requirements for transmission and distribution networks applications.
4. Collection and description of applications relevant to system technical performance enhancement for both transmission and distribution networks.
5. Identify and describe the need for new applications and analysis tools based on existing knowledge.
6. Recommend areas for further research and development to gain new knowledge and to identify new and valuable applications of PMU data.

In the course of this work, consideration will be given to and a review made of related recent publications such as the IEEE Standard C37.118.1-2011 "IEEE Standard for Synchrophasor Measurements for Power Systems".

Deliverables: Report to be published in Electra or technical brochure with summary in Electra

Time Schedule: start: July 2013

Final report : 2016

Comments from Chairmen of SCs concerned:

Approval by Technical Committee Chairman:



Date: 10/05/2013

- (1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

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 within distribution level and to the upstream network.
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 (cf. 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