

1.0 Promotional Description & Key Activities (for conference brochure)

<b>Study Committee No.</b>	C6
<b>Study Committee Title</b>	Distribution Systems & Dispersed Generation
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**Purpose:** *(please provide two or three sentences that describe the functionality of the Study Committee)*

The scope of the study committee includes (1) assessing the technical impacts and requirements of distributed and non-dispatched renewable energy generation (DG) on network planning and operation of T&D systems; (2) determining solutions likely to be adopted in the short, medium and long term and (3) Rural electrification, demand side management, and energy storage.

**Key Activities:** *(any visual / picture related to an activity would be appreciated)*

- Title of Activity #1: *(please provide two or three sentences describing the activity and the results achieved this year)*  
TF C6.04.02 *Computational Tools & Techniques for DG Analysis*, Convener: K Strunz (Germ.) created 2003, disbanded 2010, Can. Members (A. Gole, U. Annakage - U of M.; C. Abbey - NRCan; R. Iravani - U of T, G. Joos - McGill, J. Mahseredjian - Montreal Polytechnique, F. Mosallat, D. Muthumuni, Man. HVdc Research Centre)  
The TF has developed North American and European HV, MV, and LV benchmark transmission network models for DG analysis. A technical brochure has been prepared and approved by the SC. A web page to contain the benchmark data is being created. The final version is in the queue and will be published as a Cigre TB in 2011.
- Title of Activity #2: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.05 *Technical & Economic Impact of DG on Trans. & Distr. Systems*, Convener: G. Strbac (U.K.), created 2003, disband 2010, Can. Member (T. Molinski - Man. Hydro)  
The topics include (1) techniques for assessing the ability of various forms of DG to displace central generation plant; (2) cost of maintaining sufficient plant capacity in systems with large penetration of DG; (3) impact of DG on the need for reserve and frequency regulation services; (4) cost of balancing the system including the economic assessment of storage; (4) steady state and stability of transmission networks with large scale penetration of DG; and (5) impact of DG on transmission infrastructure cost  
The work is supposed to be near completion but the convener appears very busy elsewhere and has not reported on progress for another year. The Chair of SC6 may give it one more year otherwise he will recommend that the group be disbanded in 2011.
- Title of Activity #3: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.08 *Integration of Large Share of Fluctuating Generation*, Convener: H. Weber (Germany), created 2004, disband 2009, Can. Member (D. Jacobson - Man. Hydro)  
The topics include (1) Impact and utilization of Wind Power on Frequency Control and Reserve Requirements (primary/secondary/tertiary frequency control, reserve requirements and auto disconnects/reconnects after excursions); (2) Impact and Requirements on the Network (congestion, Volt-Var control, stability issues); and (3) a survey was prepared on regulatory issues and the results are summarized in the document.  
The working group document was submitted for review and approved by the Study Committee in 2010. The final version is in the queue and will be published as a Cigre TB in March 2011.
- Title of Activity #4: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.09 *Demand Side Integration*, Convener: A. Baitch (Au), created 2004, disband 2010, Can. Member (H. Iosfin - BC Hydro, Ben LaPianta-Toronto Hydro, Lloyd Kuczek-Man. Hydro)

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Topics include (1) Drivers associated with DR; (2) role of DGs in DR; (3) role of ICT in DR and (4) role of price signals. The WG document has submitted their technical brochure for review in July 2010. Some additional work (ensuring terminology is consistent with other groups) was completed. After revisions are made, it is expected that a Cigre TB will be published in 2011.

- Title of Activity #5: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.10 *Technical & Commercial Standardization of DER/micro-grid components*, Convener: J.M. Oyarzabal (U.K.), created 2006, disbanded 2009, Can. Member (none)  
Topics include (1) guidelines for easy installation including standardization of network interface and communications protocols.  
A WG document focused on interfacing/communication issues, which is linked to EU Framework program More-Microgrids project has been circulated for comment. Technical Brochure 423 was published in 2010.
- Title of Activity #6: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.11 *Development and operation of Active Distribution Networks*, Convener: C. D'adamo (It), created 2006, disband 2011, Can. Member (C. Abbey - NRCAN, K. Cheng - Man. Hydro)  
Topics include (1) Assessment of network and generator requirements for DG integration (e.g., islanded operation criteria, black-start capability, ancillary services); (2) Regulations and curtailments; (3) technical barriers; (4) economic cost/benefit analysis methods; and (4) regulatory requirements and DER controls.  
A questionnaire was submitted in Jan. 2007 and the results have been analysed and a Cigre Elektra article was published in October 2009 "Active Distribution Networks: General features, present status of implementation and operational practices". A draft TB was prepared and sent for review in August 2010. There was some debate whether the document should be a study committee report or a Technical Brochure. Some elements of the document fit well as a strategy for future work. The chair will look to collaborate with the C6.09 publication.
- Title of Activity #7: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.14/C3.05 *Environmental Impact of Dispersed Generation*, Convener: T. Smolka (Ge), created 2006, disband 2011?, Can. Member (none)  
The aim of the WG is to define procedures and methods to evaluate the environmental impact of DG including (1) definitions/technologies; (2) collection and analysis of case studies; (3) benchmarking of standards and experiences; and (4) criteria for standard methodologies.  
It appears so far the group has very weak participation and may be forced to disband. No update was provided in 2009 or 2010.
- Title of Activity #8: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.15 *Energy Storage Technologies*, Convener: Z. Styczynski (Ge.), created 2007, disband 2011, Can. Member (R. Iravani - U of T, R. Seethapathy- Hydro One)  
The objective of this WG is to evaluate different storage technologies and their commercial background, with special reference to support the integration in power systems of high penetration of DGs.  
The first results of the WG were presented at the Cigre Symposium in Calgary in 2009. A TB was prepared and circulated for review in August 2010 with comments due by the end of September 2010. *There were concerns from some SC members that the report might be taking the position that Cigre would be recommending storage for high penetration of renewables. This may be controversial.*
- Title of Activity #9: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.16 *Technologies for Rural Electrification*, Convener: T. Gaunt (S. Africa), created 2009, disband 2012, Can. Member (R. Seethapathy- Hydro One, H. Iosfin-BCTC, N. Hawley - BC Hydro, R. Lings-Kinectrics)  
The WG will be (1) describing the most prevalent technology solutions used in rural electrification; (2) categorizing the approaches especially in terms of grounding and protection; (3) assessing the advantages and disadvantages of the various approaches; and (4) identifying implications for DG interconnection and active networks.  
The WG had their first meeting in Calgary in July 2009. The work is on track and is expected to be complete on time in 2012.
- Title of Activity #10: *(please provide two or three sentences describing the activity and the results achieved this year)*  
JWG C6.18/C1/C2 *Coping with Limits for Very High Penetrations of Renewable Energy*, Convener: Frank Groome (Ireland), created 2008, disband 2011, Can. Member (D. Jacobson - Man. Hydro).

## 2010 CIGRÉ Canada Conference on Power Systems Power System Solutions for a Cleaner, Greener World

The purpose of the WG is to investigate issues with very high penetration of renewables on both island and continental systems. A survey was prepared to gather perspectives from various experts and Network Operators. This survey has been analyzed and a draft Elektra article has been prepared with publication expected in 2011. The group has established a liason with EIA Annex 25, who have a similar scope. Further work beyond the survey is under discussion but it is likely the group will disband in 2011.

- Title of Activity #11: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.19 *Planning and Optimization Methods for Active Distribution Systems* Convener: Fabrizio Pilo (Italy), created 2010, disband 2012, Can. Member (Tarek El-Fouly-Canmet, Chad Abbey-IREQ, Ravi Seethapathy-Hydro One, Andrew Klimek-Areva).  
The working group will determine (via a survey) what the state of the art is in terms of planning active distribution networks. Short, medium and long term models will be identified considering technical, economic, market and reliability. Methods and tools to assist with design, DG sizing and siting will be determined.  
A TB is planned for 2012.
- Title of Activity #12: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.20 *Integration of Electric Vehicles in Electric Power Systems* Convener: Joao A. Pecas Lopes (Portugal), created 2009, disband 2012, Can. Member (Ravi Seethapathy-Hydro One, Chad Abbey-IREQ, Claudio Canizares-Waterloo, Reza Iravani-UofToronto, Tom Molinski-Man. Hydro).  
The working group will attempt to determine the impact of massive penetration of electric vehicles on the T&D grids and planning and operating methodology. Potential new smart control concepts will be developed. Information on EV charging standards will be collected. Information related to modeling will be collected. There are more than 45 members in this group.  
The kick-off meeting for this group was held in Paris in August 2010.
- Title of Activity #13: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.21 *Smart Metering-State of the art, regulation, standards and future requirements* Convener: Eduardo Navarro (Spain), created 2010, disband 2012, Can. Member (Hassan Farhangi-BCIT, Wayne Cross-BC Hydro).  
The working group plans on preparing a report to define regulatory approaches, state of the art in advanced metering and review communication standards. In addition testing procedures and functional specification will be documented. There are only 11 members.  
The kick-off meeting for this group was held in Paris in August 2010.
- Title of Activity #14: *(please provide two or three sentences describing the activity and the results achieved this year)*  
WG C6.22 *Microgrids Evolution Roadmap* Convener: Chris Marny (USA), created 2010, disband 2012, Can Member (Geza Joos-McGill, Hassan Farhangi-BCIT, Bob Singh-Hydro One, Jeff Blais-Man. Hydro, Farid Katiraei-Quanta)  
This working group will produce a comprehensive document to define the concept of a microgrid including market and regulatory aspects, control issues, business case development. A roadmap will be developed to help utilities adapt their existing infrastructure. There are approximately 20 members on this group (6 from Canada).  
The kick-off meeting for this group was held in Paris in August 2010.

### 2.0 Two points about your personal CIGRE involvement over the last year (for introductions at the banquet)

- Participated in SC WG C6.15, C6.16 in 2009 Cigre Canada Conference
- Did not participate in 2010 Cigre Conference in Paris FR

### 3.0 SC Presentation Guidelines

- Once during the two day conference, you will be asked to provide a 10 minute presentation (preferably PowerPoint) to one of the technical program sessions. These presentations will be in a 15 minute time slot just ahead of each technical session. The alignment of the SC presentations with the technical sessions will be done in September when the technical program is finalized.