

PROPOSAL FOR CREATION OF A NEW WORKING GROUP

WG C1.24	Name of Convenor: David Bones (Australia)
<p>Title of the Group: Tools for developing Optimum Network Development Plans</p>	
<p>Background:</p> <p>Transmission system planners are faced with the challenge of developing long-term transmission plans capable of delivering high reliability, low emission of carbon and open access. Increasingly transmission planners must also demonstrate that their plans represent an optimum development path.</p> <p>In many countries regulators require the transmission investments pass economic tests. These tests often require the transmission planner to demonstrate that the proposed augmentation or development represents the most economic option considering a range of potential futures. At the heart of the economic analysis is a traditional cost benefit analysis, with the costs reflecting the cost of the transmission development and the benefits including:</p> <ul style="list-style-type: none"> • increased reliability; • deferral of investments in both transmission and generation; • reduction in generator variable costs (including cost of emissions permits and fuel); • reduction of market power; and • satisfying planning standards set out in transmission licences or other legislative or regulatory instruments. <p>Determining these benefits is becoming increasingly complex as they require forecasting the manner in which transmission developments will interact with generation investments. In many countries generation investment decisions are decentralised, with investors deciding where, when and what type of technology to invest in by considering the potential profitability of various investment options. The profitability assessment considers capital costs, potential earning opportunities in the electricity market, fuel costs, carbon emissions intensity, carbon price, and incentives for zero-emissions and renewable generation. The future transmission capability may have a significant impact on the profitability of generation and therefore must be taken into account in the analysis.</p> <p>Many tools currently used for this analysis have been developed from generation planning tools and adequacy assessment tools used in vertically integrated power systems. These tools can model detailed network representations and generation characteristics, but generally are computationally intensive which limit the number of scenarios or alternative transmission options that can be efficiently assessed.</p> <p>Increasingly transmission planners are being asked to develop system-wide long-term¹ development plans. The overall plans are expected to be made up of augmentations consistent with those justified using the economic tests normally applied to single augmentation proposals. This requires demonstration that the network plan is an optimum combination of transmission and non-transmission developments. Often these plans are required to be updated relatively frequently². The added complexity required to:</p> <ul style="list-style-type: none"> • consider the sequences of augmentations that define a long-term; • consider the market impacts of transmission augmentations and appropriately time 	

¹ Often spanning 10 to 20 years.

² In Australia plans are revised annually with an updated plan published every year.

- and size the augmentations to maximise the market benefits they deliver;
- address the increased uncertainty in generation options and electricity demand driven by moving to a low carbon future, and
- the limited time available to develop and review these plans raises questions regarding the suitability of existing tools.

This working group will study the need for new tools and techniques to assist in the development and economic justification of long-term transmission plans. This will be achieved by:

- (1) reviewing previous CIGRE studies to identify and build on relevant material;
- (2) conducting a survey to establish international practice and identify the strengths and deficiencies of existing tools;
- (3) reviewing survey responses and available literature to identify the current state of the art in this area and recommend areas for future development.

The survey will review and report on the tools and also their application and context. That is, they will address the following questions:

- what combination of tools and techniques are used to formulate long-term transmission plans?
- how are the potential future generation expansions forecast and / or taken into account in the formulation of the transmission plan?
- what is the objective of the long-term transmission plan?
- how is it assessed and demonstrated that the plan is an optimum? In particular, how is the optimisation applied at the individual transmission development and at the overall plan levels? Is the optimisation applied to the transmission and generation developments together?

A report on the results of the survey, the strength and weakness of existing tools and recommendations regarding the current state of the art and the need for future development will be produced.

This working group would probably benefit from having input from SC C5 given that the tools need to be able to assess the transmission development from generation developments and hence may need to model electricity market behaviour.

Time Schedule: Start Sept 2009 Final Report due : August 2011

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : Klaus Fröhlich **Date :** 07/09/2009