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Study Committee B4  
PS2: HVDC and FACTS – Operating Experience and New Projects

## Aysén-SIC HVDC Transmission System: Planning Studies

**G. Olguin, J.C. Araneda**      **R. La Fuente**  
**Transec**                              **Hidroaysén**  
**Chile**  
[golguin@transec.cl](mailto:golguin@transec.cl)

This paper describes the planning studies that have been undertaken in order to select the most economic solution for a 2.000 km HVDC link in Chile. The link will enable the transmission of renewable energy from five hydro power plants to be built at the very south of Chile to Santiago in the centre of the country.

Chile is a long and narrow country located along a coastal strip in South America, just between the Andes Mountains and the Pacific Ocean. Chile's electrical development had traditionally been based on hydro power plants located along various river basins in the central-southern area of the country. Chile's capital and main load centre, Santiago, is supplied from southern and northern power plants. Northern power plants are mainly thermal, southern plants are mainly hydro.

Chile's centrally located cheap primary energy resources have already been exploited and therefore far located primary energy resources are now on focus. In particular, the Aysén region which comprises the land territory located between latitude 44° and 49° South has a high hydro potential, estimated in about 10 GW. Technology to exploit such resources is available at a cost that makes the generation-transmission project economically competitive against coal fired power plants.

HVDC transmission has become a mature and well accepted technology suitable to transmitting bulk power over extremely long distances. The Aysén-SIC project consists of a 2000 km HVDC transmission line and two converter stations that will enable the power transmission from Aysén to Santiago. HVDC technology has been chosen as the most economic solution.

The final transmission solution will have to be supported on several technical and economic studies. Network planning studies have been undertaken to determine the most relevant HVDC parameters. Power system stability studies have been performed to guarantee that the receiving power system is prepared to withstand a single contingency, in particular a monopolar outage. Reliability studies have been conducted to assess the most likely performance of the link. Economic studies were developed to determine the minimum cost solution. Such a solution must fulfil environmental, economics and technical constrains. As a minimum cost solution, the final design of the transmission link will minimise the total cost of transmission, i.e. the present value of investment, transmission losses and expected energy not supplied due to monopolar outages.

The paper will describe the studies and illustrate the methodology used to determine the minimum cost solution that facilitates the project to be undertaken by private companies.