

Network Capability Incentive Parameter Action Plan (2014-2019)

Project Number	24
Project Priority	3
Transmission Circuit / Injection Point	All non-Network Control System Protection Scheme (NCSPS) circuits
Project	Fifteen Minutes Transient Rating for Transmission Lines
Scope of works	<p>Transend computes the continuous rating of the EHV transmission lines using the real time measurement of ambient conditions such as ambient temperature and wind velocity. This rating is used by AEMO and Transend to limit the line loadings and the post continuous flows below the continuous rating.</p> <p>Additional transmission line capacity can be realised by using real time transient ratings (fifteen minute dynamic rating) and using the transient rating to dispatch the generators. Fifteen minute rating gives the maximum current that can be permitted in the conductor for duration of up to fifteen minutes without violating the maximum conductor temperature. Under most conditions, dynamic short time ratings are above the continuous line rating. During contingency events the line will be permitted to carry a firm rating current corresponding to the fifteen minute rating. During the period following the contingency, AEMO's generation dispatch mechanism can be used to regulate the current in the overloaded line below the continuous rating.</p> <p>The additional line capacity that can be achieved by using the short time line rating varies between 5 to 20 % depending upon the conductor properties, transmission line construction (stringing) and the ambient conditions. Additional short time capacity is available during low wind conditions.</p> <p>The scheme can be implemented for non-NCSPS protected lines that are currently monitored by AEMO using thermal limit equations. If required the scheme can also be extended to NCSPS lines during periods when the NCSPS is not in operation.</p>
Reasons to undertake the project	Thermal limit of all non- NCSPS circuits. In order to release additional capacity while ensuring appropriate ground clearances are maintained
Current value of the limit	The continuous dynamic thermal rating
Target limit	Availability of 15-min rating of transmission lines dynamically for real-time operation.
Priority project improvement target	<p>Based on the initial analysis carried out, following benefits can be achieved:</p> <ul style="list-style-type: none"> a) An additional line capacity of 5 to 20 % can be achieved depending upon the conductor properties, transmission line construction (stringing) and the ambient conditions. b) The scheme is found to provide an additional capacity of 10 to 20 % levels during low wind conditions. This will provide boost to transmission capacity during adverse high temperature and low wind conditions. c) The scheme requires no additional control mechanisms to regulate the line flow and can use AEMO's existing generation dispatch engine to reduce the overload. d) The same computation methodology can be extended to provide two minute dynamic ratings that are required for future NCSPS schemes.
Completion date	June 2015
Capital cost	\$40k
Operating cost	\$0
Market Benefit	<p>The introduction of a 15 minute transient line rating will increase line ratings between 5 and 20 per cent depending on the wind speed, type of conductor and the pre-contingency current.</p> <p>Taking into consideration these variables, it is estimated that this project will result in a market benefit of between \$6,000 and \$84,000 per year, per transmission line.</p>