

DER Impacts and Equity Considerations for Transmission Assets in a Multi Area Network

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Due to the rising trend in Distributed Energy Resource (DER) integration it is important to understand the impacts of DER in a multi area network. Transmission line utilization can be altered due to the DER penetration in adjacent areas. The nearby areas which don't have DERs also can be impacted by adjacent DER penetration. These impacts are not considered in traditional transmission planning studies. This paper investigates adjacent area DER impacts on transmission lines from a transmission owner perspective. In order to quantify the transmission line impacts a metric named Performance Index (PI) is developed. Due to the adjacent area DER penetration; over-utilization, under-utilization and no change in utilization of transmission lines were captured using this metric along with their probability of occurrences. The results showed that there can be significant impact on transmission lines in a non-DER area due to the adjacent area DERs. Economic analysis is carried out to capture the loss or benefit in line revenues due to the change in line utilization. The economical analysis is carried out based on the annual transmission revenue requirements for a transmission owner. The results from the economic analysis also showed that there can be significant impacts in line revenue recovery due to the adjacent area DERs. If these adjacent area DER impacts are not considered, the loss or benefits incurred by the utility will be solely attributable to the respective utility, thus eventually increasing the burden on customers.