

Essential Consumer Protection for IEEE 1547-Related Active and Reactive Power Functionality

Interstate Renewable Energy Council
March 20, 2018

The Interstate Renewable Energy Council, Inc. (IREC) believes that deploying voltage and frequency-based active and reactive power functions will allow higher levels of penetration for DER, and thus should be widely deployed as soon as practicable as standard interconnection practice. However, due to the locational nature of voltage-based functions in particular, DER production losses can unequally and potentially significantly affect different customers. Voltage headroom is necessary to allow for backwards power flow which may occur from exporting DER, but customers do not have equal access to this headroom as it is affected by the electrical location on a circuit. Utility operating practices, as well as other DER operations, in addition to feeder design, can affect voltage at a particular customer's location. NREL research¹ has shown that at higher penetration levels, most customers may see little impact from functions like volt-var and volt-watt combined, however it is possible that a few customers can see quite high impact (5-15% annual energy loss). An energy loss this dramatic has the real potential to make a DER system uneconomic for customers and thus raises very real consumer protection questions. This is particularly true because it is not possible for a customer to know in advance whether their system will be impacted or to what degree. Thus, protections are necessary to ensure that when such functions are utilized, and unduly affected customer has an avenue to pursue correction.

There are technical challenges associated with alerting customers that power reduction has occurred or with estimating energy losses. Manufacturers have begun to identify the need for such information so the market may be at the beginning of a transformation in that regard. However, at a minimum, the working group should agree on procedures for customer reporting when losses are believed to have occurred. Additionally, reporting from the utilities to the PUC (such as an annual report) on such issues would allow the PUC to determine the extent/frequency to which issues do arise and track changes in instances over time. The following is a list of topics for the working group to discuss and address in order to ensure a minimally adequate method of protecting customers from significant unexpected system curtailment as a result of implementation of this important but problematic functionality:

- i. Establishment of a reporting mechanism for customers
- ii. Methods and techniques for estimation of loss
- iii. Corrective measures: Utility study, settings adjustment and monetary reimbursement
- iv. Reporting to the PUC (e.g. annually)

The goal of this conversation should be to enable use of the functionality without impacting individual customers in a manner that could impair the economic value of their investment and result in significant backlash toward the utilities and the Commission.

¹ J. Giraldez et al., "Simulation of Hawaiian Electric Companies Feeder Operations with Advanced Inverters and Analysis of Annual Photovoltaic Energy Curtailment," Technical Report NREL/TP-5D00-68681, September 2017