Notes on AER Export Tariff Guidelines [1]

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Summary of recommendations

A. The guidelines need to be expressed recognizing both adverse and positive impacts.
B. Symmetry in rewards and penalties is necessary to avoid perception of gouging
C. The long run marginal cost needs a defined sample rate to reflect the loss of life of equipment
D. There is an opportunity to have customer investment which is positive to network operation and this is one mechanism which will facilitate it.

Specific Notes

QUOTE 1

On Page 7, Paragraph 2 .” **Under this approach, consumers would pay export charges only if their exports (either generally or at particular times of the day) would contribute to increased network costs”**

COMMENT 1

There is no requirement that the charge is directly related to the increased network costs or limited to the times of network congestion.

QUOTE 2

Page 9, the last dot point: **creating more equitable, cost-reflective tariff options that reward customers for exporting when there is higher demand for electricity**

COMMENT 2

In order to have a more visibly equitable approach, the two-way tariff should a dynamic tariff, as described in [2].

The basic failure of the words used in the guidelines is to treat all DER in terms of its negative impact on the grid. Batteries Demand Management and PV all have potential for both positive and negative impacts and a transparent engagement process will provide variable rewards based on the desirability. The approach that says that there can be increased costs and we will charge you for these, fails to provide the visibility of an appropriate value for exports or diminished imports. A market mechanism for PV would be easily extended to address the impacts of PV on networks. If you need to charge at peak times there will be a higher cost than if charging at times of low network usage or at times that PV gives a reverse flow.

Overall the process appears to only talk about the penalty on customers for adversely affecting grid.

QUOTE 3

Each tariff must be based on the long run marginal cost (costs of providing additional capacity) of providing the service to which the tariff relates. • The revenue expected to be recovered from each tariff must reflect the Distribution Network Service Provider's (distributor's) total efficient costs of serving the retail customers that are assigned to that tariff. • A Distribution Network Service Provider must consider the impact on retail customers of changes in tariffs from the previous regulatory year. • The structure of each tariff must be reasonably capable of: being understood by retail customers that are, or may be assigned, to that tariff (including in relation to how decisions about usage of services or controls may affect the amounts paid by those customers); or being directly or indirectly incorporated by retailers or Market Small Generation Aggregators in contract terms offered to those customers

COMMENT 3

The comments to the framework are provided as below.

a. Long run marginal cost (LRMC)

Utilities are responsible for the quality of supply at the network side, then the LRMC needs to be clarify that which costs are included in the calculation as there is a very tight relationship between the costs associated with energy delivery or increasing DER in the network. Also, the reference network and hosting capacity should be determined for this calculation as the LRMC would be different at different level of hosting capacity. Without these references, the value of LRMC is whatever that can be decided.

b. Customer Investment beneficial for both sides

When there is an incentive for customer investments, we have seen a substantial investment in PV. Batteries can also be a positive for the individual as well as network. The study on a small network showed that optimization of customer and utility cost/investment together results in a lower cost overall to meet network constraints [2]. As shown in Fig. 1, the optimised investment decision is beneficial for both utilities and customers, in which case#1 is the reference and case#4 is the optimised one.

Results of Investment Decisions.

Case #	1	2	3	4	5	6	7
Total PV (kW)	952	1029	3108	3108	826	1099	1113
Total battery (kWh)	0	70	434	434	266	35	0
New line sections	2	1	0	0	1	1	1

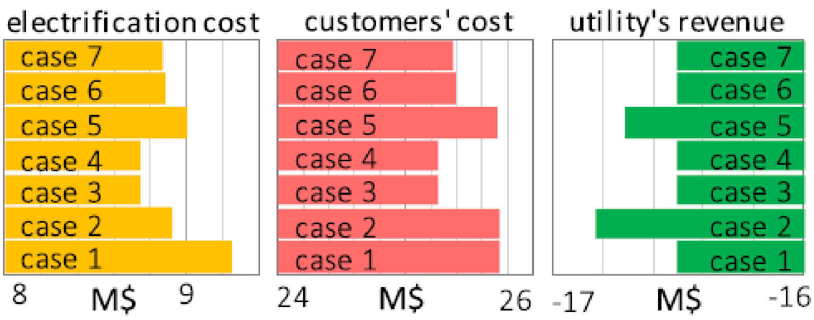

Fig.1. investment cost summary showing beneficial for both customers and utility.

c. Reliability

The value of energy delivery by network is declining by the time when the penetration of DER increase. Utilities should always think about how to increase the value to their customers otherwise they will leave behind considering the fast-growing business in providing DER directly to customers.

One critical aspect which would be utilities' competitive advantage is the **reliability** of supply. The reliability provided by network is much higher that the reliability by the PV and battery system installed at the customers' premises, therefore, the costing of any new tariff must be based on the added value to the customers not the penalties to the customers.

d. Complexity

Passing the cost through multiple retailers complicates matters when multiple retailers service the one distribution feeder.

e. Symmetrical charge for overload

To ensure that good behaviour is seen to be rewarded and bad behaviour penalized, a symmetrical tariff is strongly recommended. If one customer causes a voltage rise and is charged, then the customer who absorbs energy at that time should have a matching reward.

f. Duration of impact

There is little comment on the impact of duration of feeder overloads. There are two reasons for impact of PV on network investment. One is that reverse powerflow can increase overloads on lines and transformers. Computation of the impact of customers on overloads is based on the thermal time constant which is of the order of tens of minutes. The other issue is overvoltage from reverse flow on lines. The reason for limiting overvoltage is based on damage to customer equipment. The overvoltage vs duration function is summarized in Fig 2. It is not reasonable to use markets or penalties to limit the fast transients and this moves into a regulation of permitted load types. A sample rate of tens of minutes would be an appropriate and feasible figure. Long run marginal cost has an implies sample rate that needs to be refined.

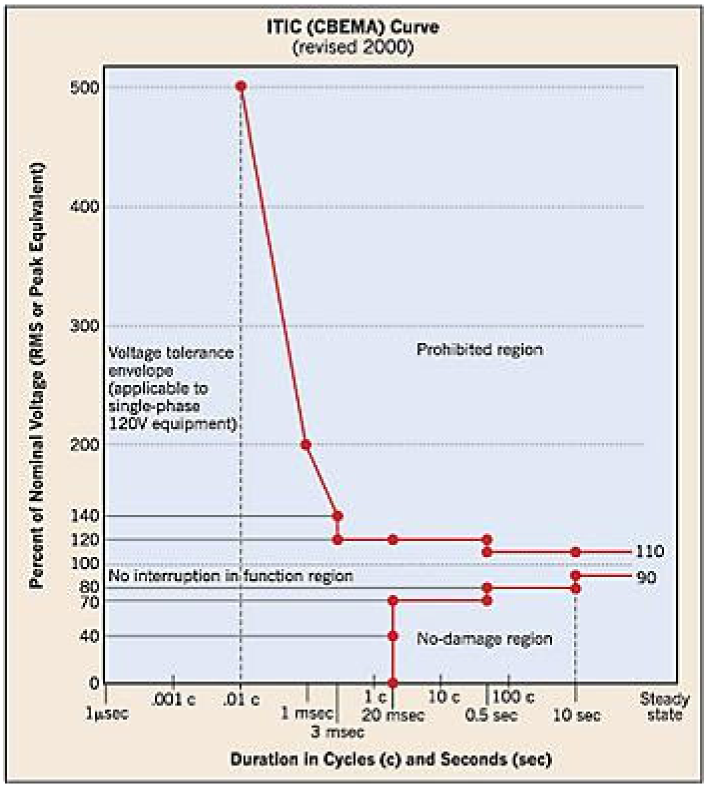

Fig. 2. ITIC Curve

g. Benefit Factors from distributed batteries

As discussed, utilities need to provide value to customers instead of focusing on penalising them. For example, the advantage of distributed batteries is to support supply quality in distribution network as well as frequency/emergency support for large system. Also, the issues associated with batteries to be resolved, are to have a fast communication system and to ensure that the density and location does not give severe export limits.

h. Neighbourhood energy trading

There can be a clear advantage for neighbourhood energy trading in reducing the total costs of electrification and economy of scale but if we want customers to invest, there needs a clearer reward mechanism for grid support and guaranteed access to battery energy for subscribers for limited local support (mimic benefit of owning my own battery).

References

1. www.aer.gov.au/system/files/AER%20-%20Export%20tariff%20guidelines%20consultation%20paper%20-%20September%202021_0.pdf
2. Javid Maleki Delarestaghi[a,*], Ali Arefi[a], Gerard Ledwich[b], Alberto Borghetti[c] "A distribution network planning model considering neighborhood energy trading" Electric Power Systems research 191 2021