

Future Power Systems 21 - The Smart Customer - Salient Points

- 1) The change from fixed preset single or two rate daily tariff to ToU has a major impact. Try going in stages via more preset rates (time of day, day of week, season etc).
- 2) Put up a safety net at each progression with the old and next tariff in parallel. Allow the customer to pay the cheaper at each billing point but try and help them see where behavioural change would make the new tariff more advantageous.
- 3) Predictive ToU, being sequences of firm then non-firm prices updated at regular intervals, would seem to be more effective in getting useful Customer reaction. This however has a big impact on Meter design and upstream processing. Make the meter (Customer Interface) unit flexible as regards data content.
- 4) Get the data together for customer reaction vs price (Site Import/export change) from the interface; quite a complex function which varies depending on preceding profiles of price level and activity. Use the Smart interface to get intelligence on appliance action.
- 5) Don't try using raw marginal prices (10x at peak etc) as a tariff signal to a large part of the customer demand base or you will throw the load curve all over the place. That will result in inefficient operation of generation.
Set the price to get the customer reaction to remove just the high price generation.
(P.S I have experience in the area of marginal price signals in getting the big Iterative Generation-Fuel models to converge).
- 6) What we are aiming to do is to 'flatten the fossils'; i.e. reduce running periods for this plant but also make sure that the remaining fossil plant runs up and down at max rate and is then loaded flat out when on the bars (FPS20). That requirement shape will not necessarily follow the demand curve, especially where large amounts of variable output renewables (e.g. Big Wind) are installed.
- 7) All the Customer controls need to be automatic; we need good HAN, BMIS and Industrial Control mechanisms with suitable AI to help the customer set up the strategy logic.
- 8) There is also of course the concept of supplier or operator trading kW 'blocks' across time with the customer, where the resultant customer action can be proved and therefore charged/credited.
- 9) The intelligent Customer-Utility Interface (CUI - 'meter' is too restrictive a term), needs to be a flexible unit within a flexible Standards 'framework' for data content. This will ensure that new data structures can be incorporated as we develop the methodologies for customer participation. I believe this is the message coming out of the consultation by the GB Regulator (OFGEM). This approach also of course allows 'interoperability' in that the same meter can be used by different suppliers

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with different tariff and customer trading structures. Thus, if the customer changes supplier the 'interface unit' (meter++) does not need to be changed.

10) One size will most definitely not fit all. Different solutions will be appropriate on different Power systems and for different customer groups.

11) Don't try making too many changes at once. If, for instance, you increase the electricity price (rate) basis while installing smart meters, the customer will target the new meter as the reason for any bill increases whereas it is in fact the underlying price (rate) increase which is responsible.

12) There is only so much demand you can 'shift' on a particular day. On a GB Winter Weekday the trough can be 65% of the peak demand (due to off peak electrical heating in some areas). There could be more potential gains from weekday to weekend and cross seasonal movements but the latter especially require large amounts of storage. Longer period 'shifts' are even more important when there are large penetrations of variable output renewables (Big Wind Again) which exhibit multi-day patterns.

13) The installation of Smart metering across the retail sector, coupled with the changes to Supplier back office systems should allow Transmission, Distribution and Balancing Services Use of System charges to be correctly apportioned as an annual levy based on customer Peak power demand and not as an Energy type charge. This would encourage customers to limit simultaneous use of heavy appliances (e.g. dryer + Electric Vehicle charging) and thus stabilise system loadings which in turn avoids major reinforcement and keeps the Use of System charge levels down.