





Proposed changes to the treatment of reactive power in the EDCM

Domestic customers  No impact	Non half hourly business customers  No impact	Half hourly CDCM business customers  No impact	Site-specific EDCM customers  Unfair detriment to some customers
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1. This alert is about a proposal of the electricity industry to change the treatment of reactive power flows in the calculation of distribution network charges for customers subject to site-specific EDCM tariffs from 1 April 2016. An industry consultation runs until Tuesday 14 October 2014.

Who is affected?

2. Distribution Network Operators (DNOs) are distinct from suppliers. DNOs run networks and charge suppliers for their use; suppliers recover the costs from users.
3. This change only affects customers who receive high-voltage electricity either directly from a primary substation (where electricity is transformed from a voltage greater than 22,000 Volts to the supply voltage) or at a supply voltage of more than 22,000 Volts. For these customers, suppliers normally treat the charges levied on them by DNOs as “pass-through” items, i.e. they recharge the customer at cost.
4. The proposed change has a material impact on two types of customers:
 - (a) Customers that have on-site generation and are classified as generation-dominated by the DNO. These customers will usually pay less as a result of the change.
 - (b) Customers that have had a poor power factor during the super-red time period (which typically covers every evenings in the winter). These customers will pay higher capacity charges as a result of the change.
5. I have put together a database of tariff impact using information from DNOs, DCUSA working groups and Market Domain Data. This is available from dcmf.co.uk/alerts.

Is this a sensible change?

6. No. The deficiencies of the proposal include:
 - (a) It would make customers pay for reactive power flows, which, because of diversity, do not generally use any capacity on the DNO’s network.
 - (b) It would charge customers in 2016/2017 for reactive power flows in 2014/2015, even if they install reactive power correction equipment before 1 April 2016.

- (c) It would increase the undue advantages that the EDCM already gives to generation-dominated sites.
 - (d) It would charge more for each kVArh to a customer with a low level of active power consumption than to a customer with a high level of active power consumption, without any cost justification.
- 7. The worked examples appendix at the end of this alert demonstrates these defects.
 - 8. There is no countervailing benefit to be set against the defects outlined above. In particular, the proposal does not even reduce the discrepancy between EDCM and CDCM, as it does not introduce in the EDCM any charge for excess reactive power flows that would be comparable to the CDCM reactive power charge.
 - 9. In my view, what has been proposed would not be an improvement to the charging methodology in any way. This is a bad proposal through and through.

Why is the electricity industry making this proposal now?

- 10. Ofgem asked DNOs to consider this change when it approved the EDCM charging methodology in 2012. The delay in taking it forward is par for the course in the context of the industry governance system for charging methodologies.
- 11. I have no reason to believe that the working group developing this proposal was deliberately seeking to achieve the adverse effects outlined above. Instead, what has probably happened is that the group has put no effort in testing whether their proposal made sense. Cock-up explains the facts and there is no ground to suspect conspiracy.

How to make your voice heard

- 12. The proposed change is under DCUSA, a governance regime overseen by Ofgem. This change will only be implemented if Ofgem approves it.
- 13. The working group that has been working on this change is consulting on its proposals. The stated closing date for responses is Tuesday 14 October 2014. These consultations usually receive very few responses from customers, and any response therefore has a chance to carry some weight.

For more information about this alert



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- 14. There is nothing confidential in this alert. Feel free to pass it on to others who might be interested or to include it with any consultation response you make. Supplementary material, any further updates on this topic, or alerts on other areas of interest to electricity customers can be found at **<http://dcmf.co.uk/alerts>**.

Appendix — Illustrative worked example

15. An illustrative worked example is available to download from dcmf.co.uk/alerts.
16. The DNO-wide data used in the example were inspired by a DNO operating in the South of Wales in 2013/2014. That DNO has not verified or approved this example.
17. That DNO has also refused to disclose DNO-wide data for 2014/2015. I do not know what has changed, but in this case I am inclined to interpret non-disclosure as a sign that there might be features of the charges calculated by the EDCM which the DNO is not completely confident of being able to defend if challenged.
18. The customer data in the worked example are completely hypothetical and designed to highlight some features of the DCP 183 proposal. There are three customers, each with 5,000kVA of import capacity:
 - (a) Mr Full On consumes 4,500kW and 1,000kVAr flat (power factor 0.976).
 - (b) Mr Load Manager switches off its energy consumption at peak times. Its average consumption in the super-red time band is 50kW and 1,000kVAr.
 - (c) Mr Generator is classified as “generation dominated” by the DNO. His generator suffered an outage for part of the most recent winter for which data were available at the time of setting charges and he consumed an average of 500kW and 1,000kVAr during the super-red period.
19. These three customers are metered at 11,000 Volts at a primary substation with an average amount of notional assets and zero LRIC charges.
20. The worked example assumes that DCP 183 has no net effect on DNO-wide aggregates. (In practice the effect in at least some DNO areas seems to be a slight reduction in charging rates.)
21. Table 1 shows the results in terms of annual distribution charge for import with and without DCP 183.

Table 1 Annual demand charges (£/year) in the worked example

	Base case	With DCP 183	Impact	Impact (%)
Mr Full On	224,416	221,496	-2,920	-1.3%
Mr Load Manager	43,011	75,496	+32,485	+75.5%
Mr Generator	41,669	41,486	-183	-0.4%

22. Mr Generator pays less than Mr Load Manager despite consuming more in the super-red period. This is primarily because of the blanket application of the collar values for network use factors on site classified as generation dominated.
23. Mr Full On and Mr Generator benefit from DCP 183 because in the application of the notional assets for 33kV circuits and 132kV, power factors of 0.976 and 1 respectively have been used instead of the 0.95 notional value used in the base case.

24. Mr Load Manager loses out significantly from DCP 183, mainly because the notional assets for 33kV circuits and 132kV on which it gets charged for direct costs, network rates and the asset scaler are multiplied by a factor of 19, from 50kW in the base case to 1,001kVA converted to a notional 951kW under DCP 183.
25. In the worked example, the annual charge on notional assets is 6.9 per cent. Table 2 summarises the notional assets involved: the major part of the £32,485 increase for Mr Load Manager is the application of the 6.9 per cent rate to the 19-fold increase in 33kV circuits and 132kV notional assets by £386,000.

Table 2 Notional asset values in the worked example (£)

	33kV/11kV assets		33kV circuits and 132kV assets	
	Base case	With DCP 183	Base case	With DCP 183
Mr Full On	375,617	375,617	1,929,119	1,877,369
Mr Load Manager	375,617	375,617	21,435	407,767
Mr Generator	237,014	237,014	69,300	65,835

26. The CDCM model suggests that, at peak times, the reactive power flow is 0.275kVAr for each kVA (CDCM table 1092). Table 3 illustrates with a small increment (increment 1), a larger increment (increment 2), and an increment that matches Mr Load Manager's demand (increment 3).

Table 3 Illustration of capacity used by reactive power on shared network assets

	kW	kVAr	kVA	Phase angle	Power factor
Base flow	96,147	27,490	100,000	15.96°	0.961
Incremented flow 1	96,147	27,690	100,055	16.07°	0.961
Increment 1	0	200	55	+0.11°	
Incremented flow 2	96,147	28,490	100,279	16.51°	0.959
Increment 2	0	1,000	279	+0.55°	
Incremented flow 3	96,197	28,490	100,327	16.50°	0.959
Increment 3	50	1,000	327	+0.54°	

27. This parameter 0.275 underpins the calculation of CDCM excess reactive power charges. A similar concept should have been used to charge for consumption of reactive power by EDCM customers. This would have meant that Mr Load Manager would have been charged for about 327kVA of network capacity (50 kW plus about 275kVA on account of the 1,000kVA of reactive power), which is about one third of the 1,001kVA that DCP 183 uses to calculate charges.