



Customer-Led Network
Revolution

April 2010 Tariff Reform Analysis

Introduction of the Common Distribution Charging Methodology (CDCM)

DOCUMENT NUMBER

CLNR-L087

AUTHORS

Peter Davison, Durham University

ISSUE DATE

23/01/2015



Contents

1	Introduction	3
1.1	Purpose of the Study.....	3
2	Analysis and Results.....	4
3	Conclusions	11

1 Introduction

This report contains the results of an investigation into the impact of the Common Distribution Charging Methodology (CDCM) on 2054 Industrial and Commercial (I&C) customers across the Northern Powergrid DNO areas. This Distribution Use of System (DUoS) tariff implementation has been designed to unify the charging procedure for HV and LV customers. Ofgem’s 2008 document did not provide a specific request to implement such a scheme; therefore the move has been made as a voluntary consideration by the DNO groups.

The data made available for analysis covers the period (01/03/2009-20/04/2011) and therefore details energy consumption for one year prior to and post introduction of the tariff in April 2010.

Real power consumption data from the North East and Yorkshire areas has been examined, in order to determine if there has been a significant shift in demand in coordination with the new DUoS charges. The CDCM methodology details three ‘time bands’ which reflect periods of network loading. If the network has a high probability of peaking, customers are incentivised to reduce their demand by high DUoS charges and vice versa; these conditions relate to the ‘Red’ and ‘Green’ periods respectively.

	Mon-Fri	Sat/Sun
Rate 1: Red	16:00 – 19:30	
Rate 2: Amber	08:00 – 16:00 19:30 – 22:00	
Rate 3: Green	00:00 – 08:00 22:00 – 24:00	00:00 – 24:00

Table 1 – Northern Powergrid (Northeast and Yorkshire) CDCM DUoS Time Bands

1.1 Purpose of the study

The study aims to examine if the sharper price signals resulting from the introduction of the CDCM have had an identifiable impact on demand. This will inform the application of sharper tariffs to other groups and inform ancillary services contracts with individual I&C customers.

2 Analysis and Results

As a preliminary analysis, each customer’s raw power consumption was analysed for data clarity. Datasets with greater than two weeks of zero monitoring were discounted in order to preserve accuracy. The majority of datasets removed were those with an entire year’s data missing. A number of additional files were removed due to inherent errors in the measurements taken. The number of these files was small in comparison to those removed for non-recording.

Figure 1 shows a scatter plot of the percentage usage per time band at all sites, pre- and post-introduction of the CDCM.

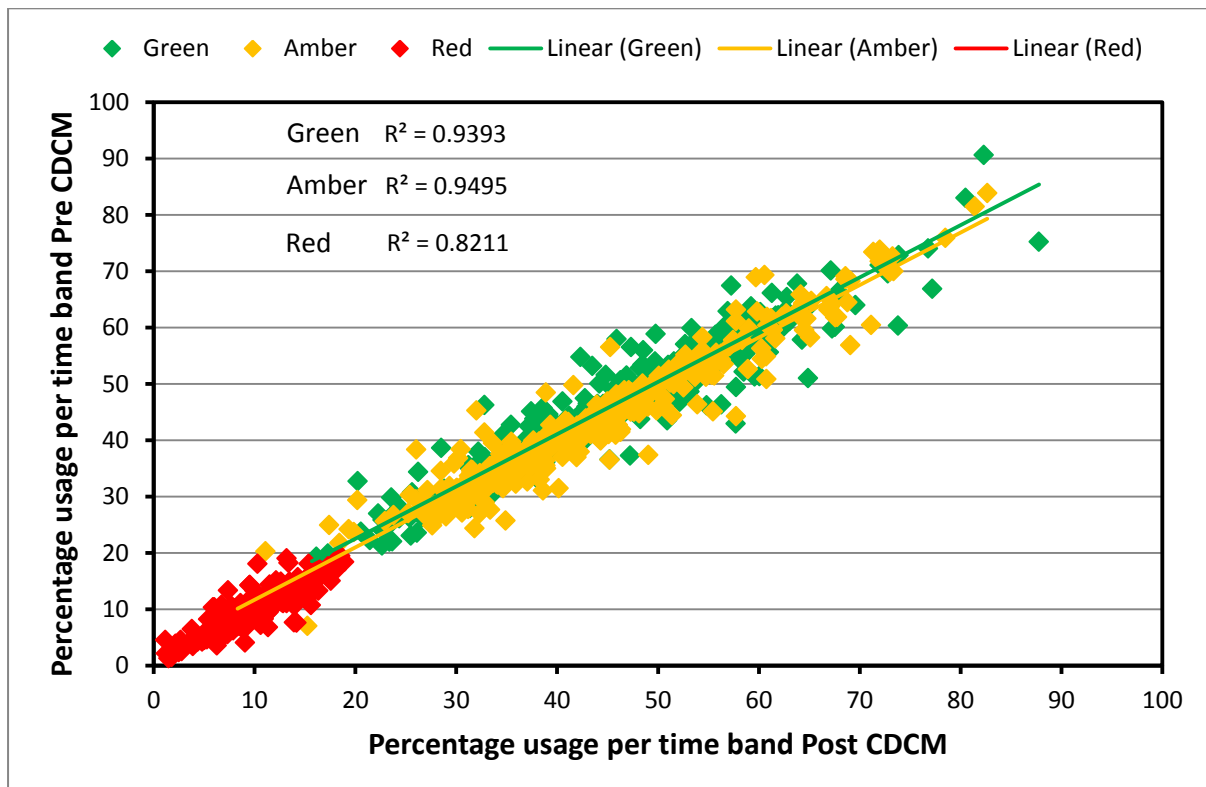


Figure 1 – Change in Demand post CDCM introduction

The graph shows that there has been very little change in the proportion of demand per time band after the implementation of the CDCM.

In order to further analyse the impact of the CDCM’s introduction with regards to demand shifting, the percentage usage per time band was calculated for the chosen period before and after the DUoS reform. A typical plot of the percentage differences for a given class of customer is shown in Figure 2.

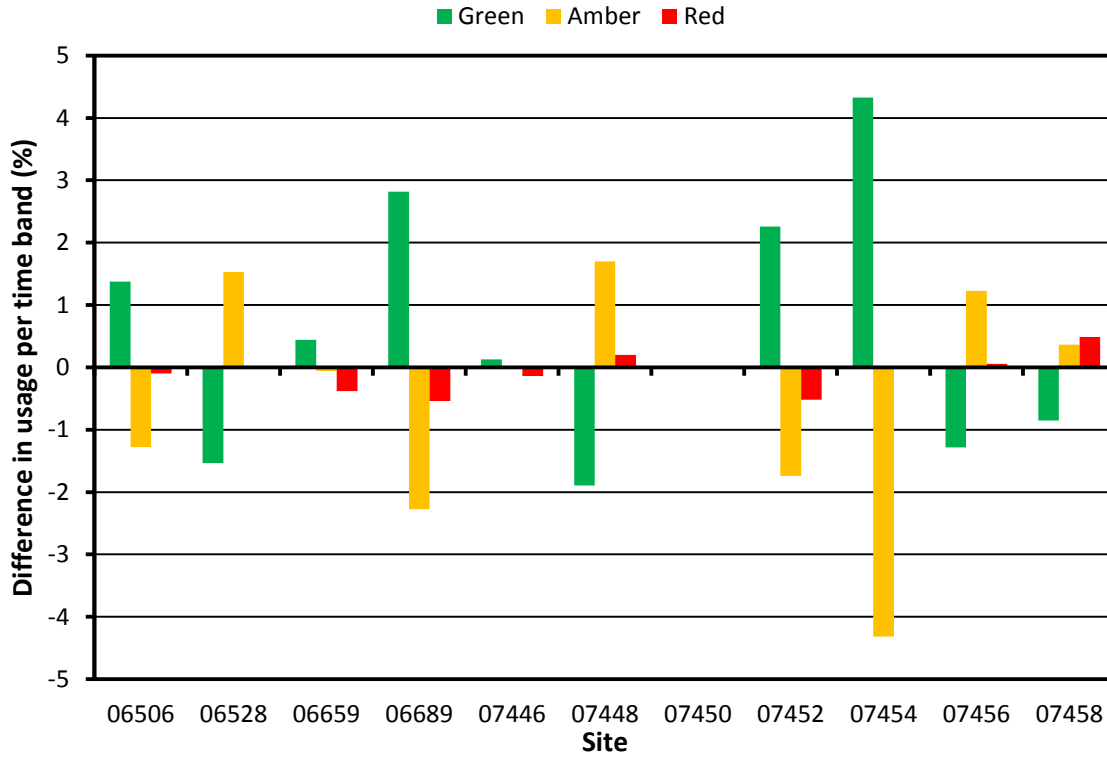


Figure 2 – Northeast banking typical demand shifts after CDCM introduction

Figure 2 shows the variability between sites in their demand shift per time band. An ideal scenario would result in a shift to the Green tariff band from the Red in order to minimise DUoS charges. The Green time period is however, limited to the hours of midnight to 8am and from 10pm to midnight Monday to Friday and all-day Saturday and Sunday.

	Percentage Shifts		
Site	Green	Amber	Red
06506	1.38	-1.28	-0.10
06528	-1.53	1.53	0.00
06659	0.44	-0.06	-0.38
06689	2.82	-2.28	-0.54
07446	0.13	0.01	-0.14
07448	-1.90	1.70	0.20
07452	2.26	-1.74	-0.52
07454	4.33	-4.32	-0.01
07456	-1.28	1.23	0.06
07458	-0.85	0.36	0.49
AVERAGE	0.58	-0.48	-0.09
STDEV	2.08	1.92	0.32
SKEW	0.54	-0.80	0.16

Table 2 – Percentage shifts for Northeast Banking Sites

Table 2 shows the data plotted in Figure 2. The average percentage shifts for each of the time bands are lower than 1% with a maximum of +0.58% in the Green tariff period. Green and Amber values vary in both the positive and negative direction, leading to a conclusion that the take up of the new DUoS scheme has not been uniform.

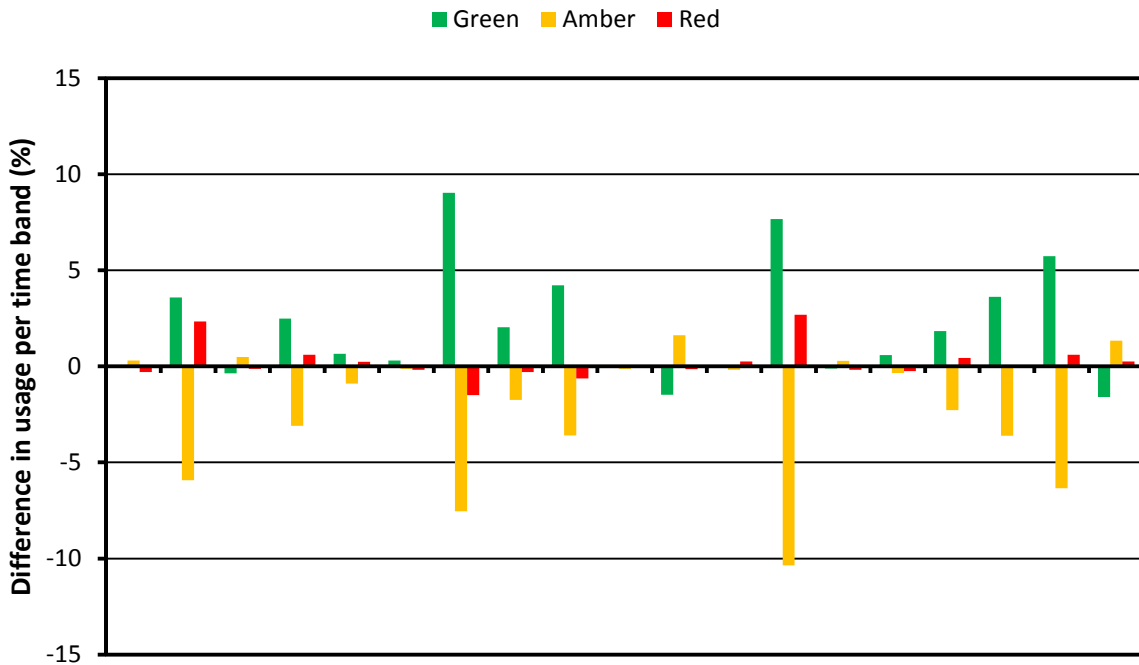


Figure 3 - Northeast Steel typical demand shifts after CDCM introduction

Figure 3 shows the same analysis as that in Figure 2 however for an industrial customer. Clearly visible are a number of sites where there has been a greater than 5% shift to the Green tariff band. Surveying these customers would show if the fluctuations are due to an active consideration of the new DUoS charges or are typical variations in energy usage with time.

Site	Percentage Shifts		
	Green	Amber	Red
07145	-0.01	0.31	-0.30
07552	3.59	-5.92	2.33
08001	-0.37	0.49	-0.12
08003	2.49	-3.10	0.61
08132	0.65	-0.90	0.25
08134	0.30	-0.12	-0.18
08136	9.04	-7.54	-1.50

	Percentage Shifts		
Site	Green	Amber	Red
08138	2.03	-1.74	-0.29
08140	4.23	-3.60	-0.63
09605	0.06	-0.14	0.07
09738	-1.48	1.62	-0.15
10063	-0.08	-0.18	0.26
11855	7.67	-10.36	2.69
12741	-0.11	0.28	-0.17
14101	0.59	-0.34	-0.24
14231	1.83	-2.27	0.44
18224	3.62	-3.61	-0.01
18235	5.73	-6.34	0.61
18243	-1.59	1.33	0.26
AVERAGE	2.01	-2.22	0.21
STDEV	2.98	3.30	0.94
SKEW	1.06	-1.09	1.41

Table 3 – Percentage shifts for Northeast Steel Sites

Table 3 shows the percentage shifts for the data in Figure 3. The largest shift from the Red period is a reduction of 1.5%, suggesting, again that the sharper price signals have failed to incentivise customers.



Figure 4 - Yorkshire Textile typical demand shifts after CDCM introduction

Figure 4 shows the results for textile customers in the Yorkshire area. This figure has been shown to detail that in some cases, singular sites can have a large impact on the average changes per customer group (Site 27259).

Figures 5 and 6 show the summary average percentage shifts across both the Northeast and Yorkshire DNO areas for a wider range of sectors. Whilst Figure 6 suggests that in the Yorkshire area, the percentage shifts to the Green period have been more common, it must be noted that the maximum average percentage shift is 1.48%. In the Northeast area the maximum average shift (in the Tool category) was 2.84%.

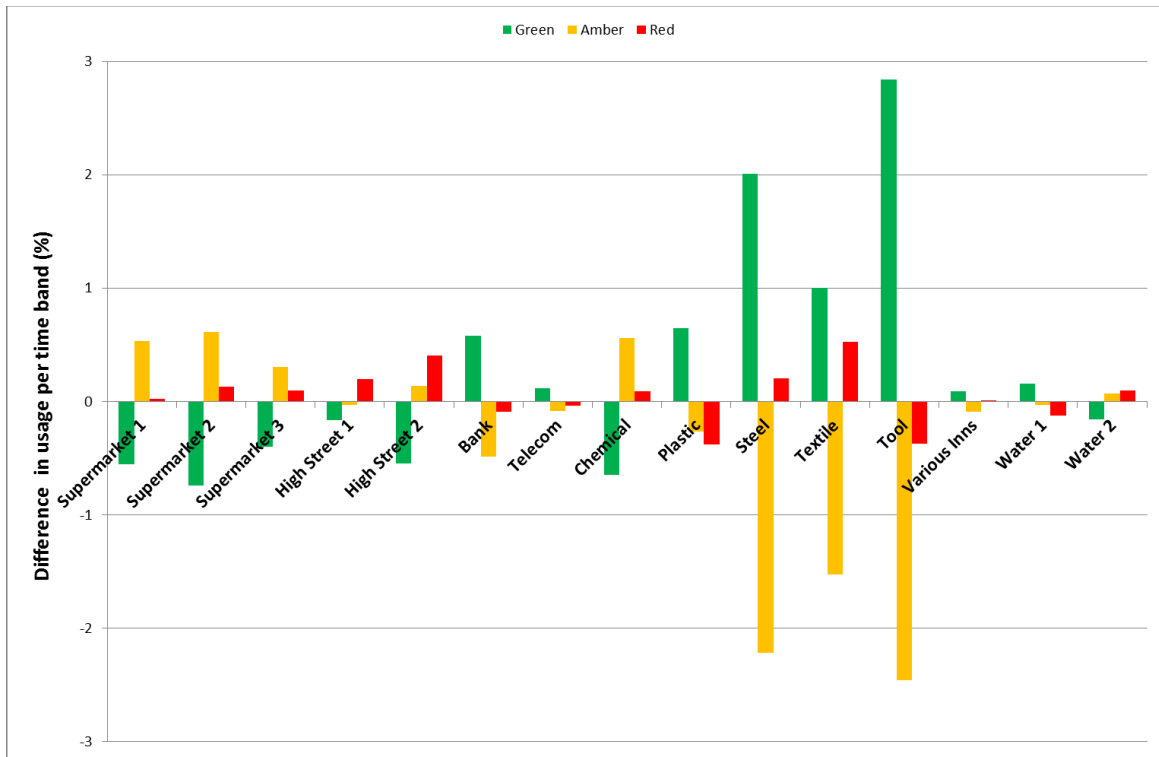


Figure 5 – Average Percentage Demand Shifts Northern Powergrid (Northeast)

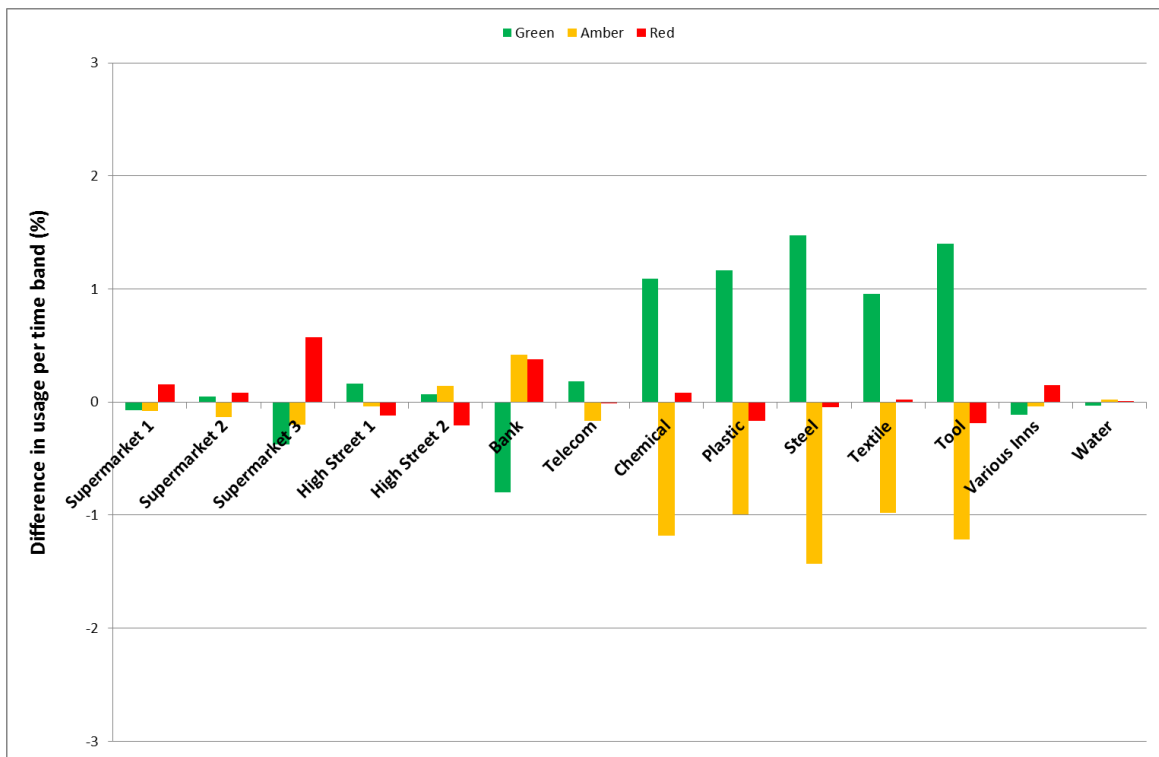


Figure 6 – Average Percentage Demand Shifts Northern Powergrid (Yorkshire)

3 Conclusions

The aim of this report has been to investigate the effect of the CDCM with regards to demand shifting. Figure 1 shows linearity in demand variations across the time periods, suggesting insensitivity to the price signals of the CDCM and therefore minimal resultant demand shifting.

Customers who have shown a more significant than average change in their usage per time band have been identified. Whilst demand shifting has been shown to occur at some sites, differences have been minimal. It is therefore most likely that this can be attributed to typical fluctuations in energy consumption on a yearly basis.



For enquires about the project
contact info@networkrevolution.co.uk
www.networkrevolution.co.uk