

# Model documentation: Update models and guidance for DCP 423 (Request F03-1)

DCUSA/ElectraLink

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## Contents

<b>1. INTRODUCTION .....</b>	<b>4</b>
<b>2. SPECIFICATION .....</b>	<b>4</b>
2.1. Overview .....	4
2.2. Reference files.....	4
2.3. New files.....	4
2.4. Assumptions and clarifications .....	5
2.5. Outstanding legal text issues .....	5
<b>3. MODEL REVISIONS.....</b>	<b>7</b>
3.1. Structural changes.....	7
3.2. Additional or modified information sections.....	7
3.3. Additional or modified input sections.....	7
3.4. Additional or modified calculation sections.....	7
3.5. Additional or modified output sections .....	8
<b>4. IMPACT STATEMENT.....</b>	<b>9</b>
4.1. Summary.....	9
4.2. Validation.....	9
4.3. Impacts .....	10

## 1. INTRODUCTION

This document describes charging models and supporting documentation developed for DCUSA to support DCUSA Change Proposal (DCP) 423. The following sections set out the:

- specification for the new files, including the identity of the reference files for the revisions noted here within and the new file names;
- revisions to the models; and
- the impact of those changes.

## 2. SPECIFICATION

### 2.1. OVERVIEW

The models and supporting documentation described herein were developed in response to a request to produce versions of the CDCM, ARP and EDCM (LRIC & FCP) models that implement DCP 423 – “LDNO Discounts for Negative Scaling”.

The intent of DCP 423 is to ensure that for any demand tariffs, where any of the all the way tariff (ATW) components (Unit rate 1, Unit rate 2, Unit rate 3, Fixed charge, Capacity charge, Exceeded capacity charge and Reactive power charge) are a negative value then the LDNO discount percentages be set to zero for those tariff components. This will prevent LDNO tariffs from being greater than ATW tariffs.

The reference files noted below were developed in line with draft DCUSA text shared with the modelling team on 7<sup>th</sup> November 2023.

The change in the legal text is in paragraph 98 of schedule 16. It now includes clarification that tariff components below zero, no discount is applied.

### 2.2. REFERENCE FILES

The following table sets out the reference versions of the charging models used as the starting point for the revisions described in this document.

Table 2.1: Reference files

Model	Model file name	Date sent
CDCM	CDCM_v10_20231106	06/11/23
ARP	ARP_v8_20231106	06/11/23
EDCM (FCP)	EDCM-FCP_v11_20231106	06/11/23
EDCM (LRIC)	EDCM-LRIC_v11_20231105	06/11/23

### 2.3. NEW FILES

The following table sets out the versions of the charging models and impact assessment provided to the DCP 423 Working Group in response to the request described above.

Table 2.2: New files

Model	Model file name	Date sent
CDCM	CDCM_v10_20231106 - DCP 423	12/12/2023
ARP	ARP_v8_20231106 - DCP 423	12/12/2023
EDCM (FCP)	EDCM-FCP_v11_20231106 - DCP 423	12/12/2023
EDCM (LRIC)	EDCM-LRIC_v11_20231106 - DCP 423	12/12/2023
Impact assessment	ImpactAssessment_DCP423_121223	12/12/2023

We understand that the new files listed in Table 2.2 will be considered by the DCP 423 working group and may be shared for consultation.

## 2.4. ASSUMPTIONS AND CLARIFICATIONS

This section lists assumptions that we have made in our interpretation of the draft legal text. Some of these assumptions were informed by clarifications given by the DCP 423 working group. Others are our own interpretation of the intent of the DCP where the meaning of the text is ambiguous.

### 2.4.1. No residual charges for generation tariffs

To implement the change in accordance with the modelling principles employed by the CEPA-TNEI team, the change to the calculation was applied to **every LDNO tariff**. There are no discounts for generation tariffs for six of the seven components (Unit rate 1, Unit rate 2, Unit rate 3, Capacity charge, Exceeded capacity charge and Reactive power charge). For these components the change in calculation therefore has no effect because the discount is zero whether the ATW tariff is negative or positive. For the remaining generation tariff component (Fixed charge), there is a discount (100%). However, this component is always positive for generation tariffs since they do not pay residual charges. Consequently, the change in calculation will never impact this component since it only applies to negative values.

This reasoning relies on the fact that generation tariffs do **not** pay residual charges. If this changes in the future due to other methodological changes then adjustment may be required for generation tariff calculations.

### 2.4.2. Discrepancy between legal text and specification

There is a small discrepancy between the legal text and a line in the model specification.

The legal text states that “the discount percentages are applied to all tariff components in all-the-way tariffs, except for instances where they would be applied to tariff components below zero”. Meaning that discounts are not applied if the ATW tariff **before discounting** is below zero. However, the modelling specification states that if “all the way tariff components are a negative value (post-adders & discounting) then the LDNO discount percentages be set to zero for those tariff components”. Here the specification suggests that discounts are not applied if the ATW tariff **after discounting** is below zero.

The latter case (as per the model specification) would still apply LDNO discounts if the ATW tariff before discounting was negative but the ATW tariff after discounting and adders was positive. In these cases, the LDNO tariffs would be higher than the ATW tariff and thus the change would not solve the issue it intended to resolve. It was therefore assumed that the line in the model specification was an error, and therefore, the change was implemented according to the legal text.

## 2.5. OUTSTANDING LEGAL TEXT ISSUES

The legal text provided to the modelling team only included Schedule 16, which governs the CDCM model, and not Schedules 17/18, which cover the EDCM (FCP/LRIC). Changes were made in the EDCM ‘LDNO Calculations’ sheet

to implement DCP423 for end-users with EHV LDNO boundaries, in the same way as in the CDCM for end-users with HV/LV LDNO boundaries.

We assume that the working group will revise paragraph 25.2 of Schedules 17/18 in the same way as paragraph 98 of Schedule 16 to give effect to DCP423 in the EDCM, as introduced in the models. For instance:

*“In each case, the discount is applied to all CDCM tariff components, except for instances where they would be applied to tariff components below zero. Where they would be applied to tariff components below zero, no discount is applied. Discount percentages are capped to 100 per cent.”*

### 3. MODEL REVISIONS

#### 3.1. STRUCTURAL CHANGES

There are no structural changes in the CDCM, ARP, EDCM (LRIC) or EDCM (FCP).

#### 3.2. ADDITIONAL OR MODIFIED INFORMATION SECTIONS

In the CDCM, changes were made in the following sheets:

- **'Version control'**.
- **'Cover'**.

In the ARP, changes were made in the following sheets:

- **'Version control'**.
- **'Cover'**.

In the EDCM (LRIC), changes were made in the following sheets:

- **'Version control'**.
- **'Cover'**.

In the EDCM (FCP), changes were made in the following sheets:

- **'Version control'**.
- **'Cover'**.

#### 3.3. ADDITIONAL OR MODIFIED INPUT SECTIONS

There are no additional or modified input sections in the CDCM, ARP, EDCM (LRIC) or EDCM (FCP).

#### 3.4. ADDITIONAL OR MODIFIED CALCULATION SECTIONS

In the CDCM, changes were made in the following calculation sheets:

- **'Rounding'**. *"Section 117-G: Tariff forecast, post-adders & discounting"* –
  - In *"LDNO LV tariff forecast, post-adders & discounting"* the calculations were changed for each tariff component for all tariffs.
  - In *"LDNO HV tariff forecast, post-adders & discounting"* the calculations were changed for each tariff component for all tariffs.

In the ARP, changes were made in the following calculation sheets:

- **'Rounding'**. *"Section 117-G: Tariff forecast, post-adders & discounting"* –
  - In *"LDNO LV tariff forecast, post-adders & discounting"* the calculations were changed for each tariff component for all tariffs.
  - In *"LDNO HV tariff forecast, post-adders & discounting"* the calculations were changed for each tariff component for all tariffs.

In the EDCM (LRIC), changes were made in the following calculation sheets:

- **‘LDNO Calculations’.** *“Section 215-B: Discounted tariffs”* –
  - In *“Calculation of 0000 LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of 132kV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of 132kV/EHV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of EHV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of HVplus LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.

In the EDCM (FCP), changes were made in the following calculation sheets:

- **‘LDNO Calculations’.** *“Section 215-B: Discounted tariffs”* –
  - In *“Calculation of 0000 LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of 132kV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of 132kV/EHV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of EHV LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.
  - In *“Calculation of HVplus LDNO discounted tariffs”* the calculations were changed for each tariff component for all tariffs.

### **3.5. ADDITIONAL OR MODIFIED OUTPUT SECTIONS**

There are no additional or modified output sections in the CDCM, ARP, EDCM (LRIC) or EDCM (FCP).



## 4. IMPACT STATEMENT

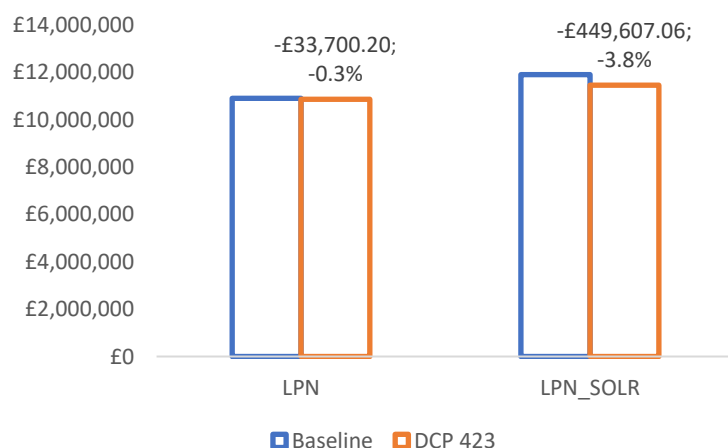
### 4.1. SUMMARY

This impact assessment submitted under this service request compares charges before and after DCP423 using published inputs to the CDCM for the 2023/24 charging year because this was the most recent year in which negative residuals are observed (within the LPN licence area only). DNOs originally published CDCM models for 2023/24 in December 2021, but republished charges a year later following an Ofgem derogation to include additional supplier-of-last-resort (SoLR) pass-through costs. We use inputs from the original CDCM models for consistency (since some of the revised charges were not accompanied by a republished CDCM). However, results for LPN are shown both before and after the SoLR derogation to demonstrate a range of possible impacts and the importance of the value of pass-through costs in instances for which residual revenue is negative.

The impact assessment does not include EDCM outputs because we do not have access to actual EDCM data. Likewise, all impacts are presented before resolution of inter-model circularities, as we do not have access to the actual EDCM data needed to resolve these circularities.

In summary, DCP423 has no impact for DNOs with positive residual revenue. For DNOs with negative residual revenue, DCP423 reduces the revenue that DNOs can recover from LDNOs. The revenue shortfall is not resolved within the charging year, so will result in higher residual charges for all relevant demand customers in future years (via the correction factor). The size of the transfer to LDNOs depends on the size of the negative residual and the value of pass-through costs being recovered from end-users served by LDNOs. For instance, LPN's original 2023/24 CDCM model contained very small pass-through costs, so the transfer to LDNOs under DCP423 would have been only £33,700.20 (0.3% of original LDNO revenue); whereas the large increase in pass-through costs following Ofgem's SoLR derogation would have increased the transfer to £449,607.06 (3.8% of original LDNO revenue).

Figure 4.0: LPN net revenue from users with LDNO boundaries - before/after DCP423 & the SoLR derogation



### 4.2. VALIDATION

The following steps were used to check and validate post-DCP 423 model data (implemented in Python):

- a post-DCP 423 populated Excel model was produced for the 2023/24 LPN case (the DNO where DCP 423 has an impact) and the ENW case (a DNO where DCP 423 has no impact). These models were used as test

cases to verify that the Python model<sup>3</sup> produces the correct outputs after implementing the DCP 423 changes;

- workbook review software was used to demonstrate model changes and highlight inconsistent formulae;
- impact assessment results were sense-checked and explained; and
- impact assessment can be replicated manually, with the 2023/24 LPN results reproduced as part of the QA process.

### 4.3. IMPACTS

#### Impact on revenue recovered

Implementation of the DCP 423 changes has a minimal impact on net revenue by DNO. This is in line with the expectations of the working group as noted in the model specification that DCP 423 “*is only expected to have a minimal impact as there are very few negative tariffs for demand customers*”. In fact, for the 2023/24 charging year, the only DNO that this change affects is LPN. Even in this case, the impact is minimal as seen in Figure 4.1 where the difference between baseline revenue and DCP 423 revenue is graphically not noticeable.

Figure 4.1: Expected net revenue by DNO

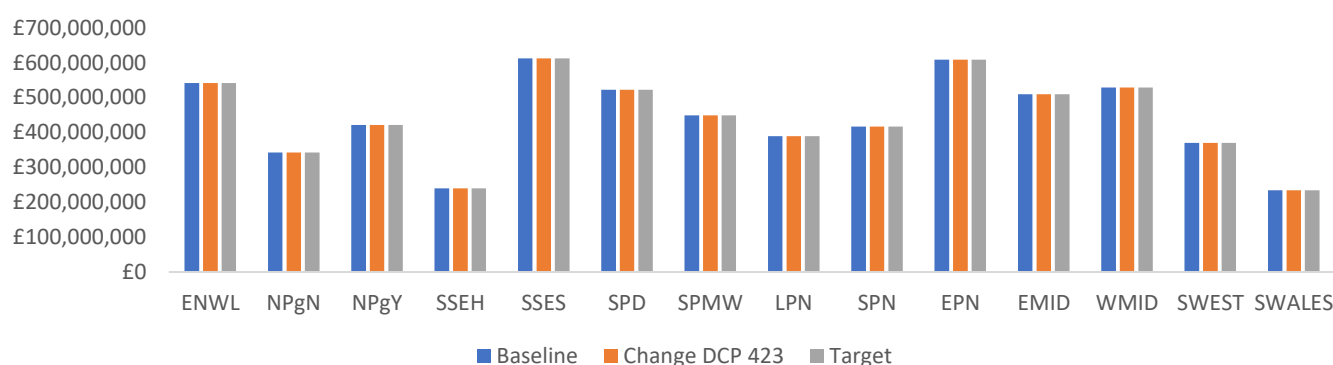


Figure 4.2 below provides a clearer representation of the impact of DCP 423 on net revenue by illustrating the deviation in expected net revenue from the target revenue, by DNO. This shows that there is a 0.01% difference between the baseline revenue and the DCP 423 revenue for the LPN case. All other DNOs have unchanged revenue.

<sup>3</sup> In 2023, the CEPA-TNEI team have begun to update parts of the impact assessment (IA) process. For this IA, the published versions of the CDCMs were used to provide inputs to a Python implementation of the CDCM, which has been rigorously tested to ensure it provides an exact match to the Excel models. Changes were made to that model to implement DCP 423 and the results were used to produce this IA. This change makes the process more efficient compared to previous IAs and allows for additional automated validation and testing of the outputs.

Figure 4.2: Change in expected net revenue by DNO

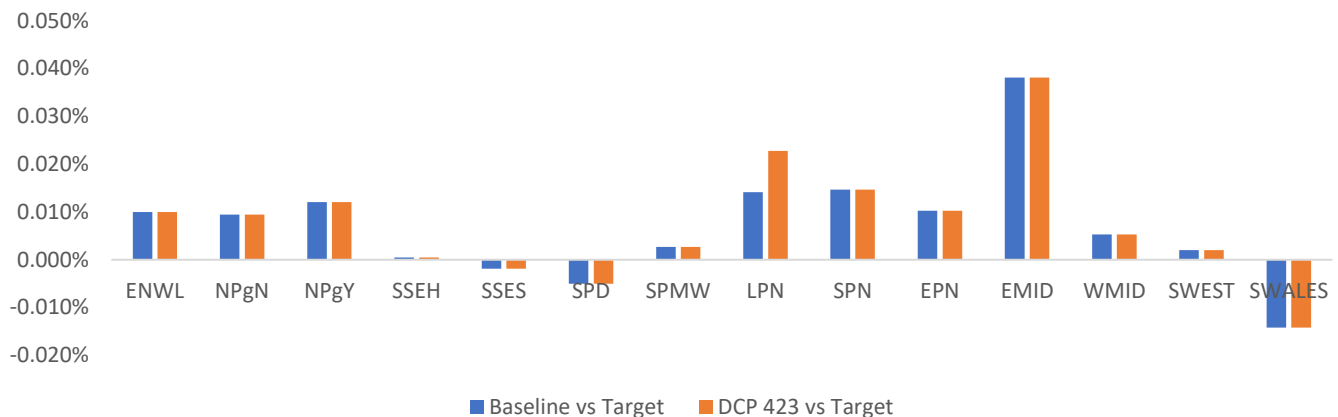
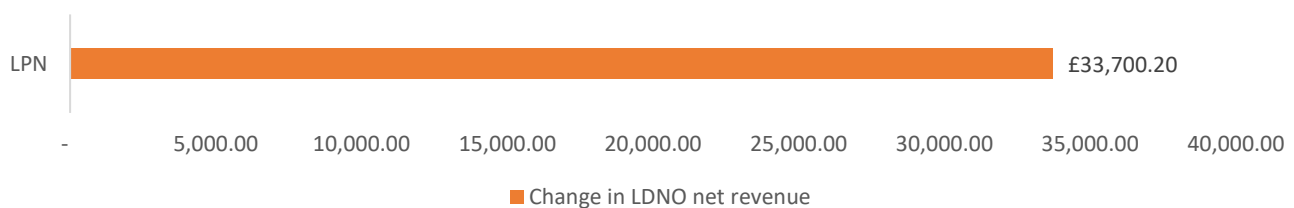


Figure 4.3 shows the increase in revenue from the baseline case to the DCP 423 case for LDNOs in the LPN license area. Only the LPN license area is shown as this value is unchanged for LDNOs in other DNOs license areas. The revenue of the LDNOs is calculated by assuming they pay the discounted tariff and charge their customers the ATW tariff. Note that this is equal to the reduction in the DNO's revenue associated with the change.

Figure 4.3: Increase in LDNO net revenue in LPN's license area



## Impact on typical bills

Like net revenue, the impact of DCP 423 on typical bills is minimal. The LPN bills are the only DNO bills impacted by DCP 423. Figure 4.4 shows typical bills for Non-Domestic Aggregated Band 2 customers on the LDNO LV boundary level. This group was chosen for this impact assessment since it is impacted by DCP 423 (for the LPN case). However, the impact is minimal. In this case, for LPN the typical bills go down from £81.37 for baseline to £81.26 for DCP 423. As expected, bills after DCP 423 will either be lower (where residuals are negative) or they stay the same (where they aren't) in comparison to DCP 423. This change won't result in higher bills for other customers within the same set of tariffs, although any under-recovery of allowed revenues would presumably lead to higher tariffs in future years.

Figure 4.4: Typical bills for LDNO LV Non-Domestic Aggregated Band 2 by DNO

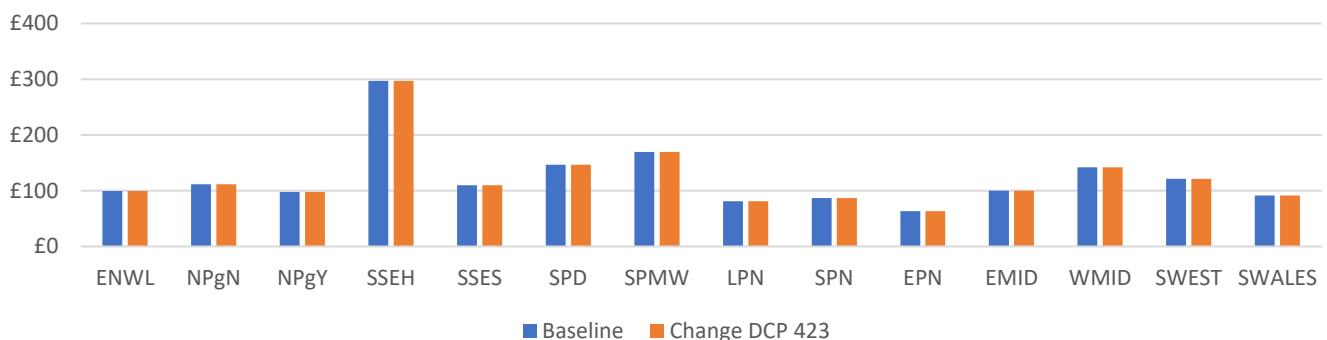
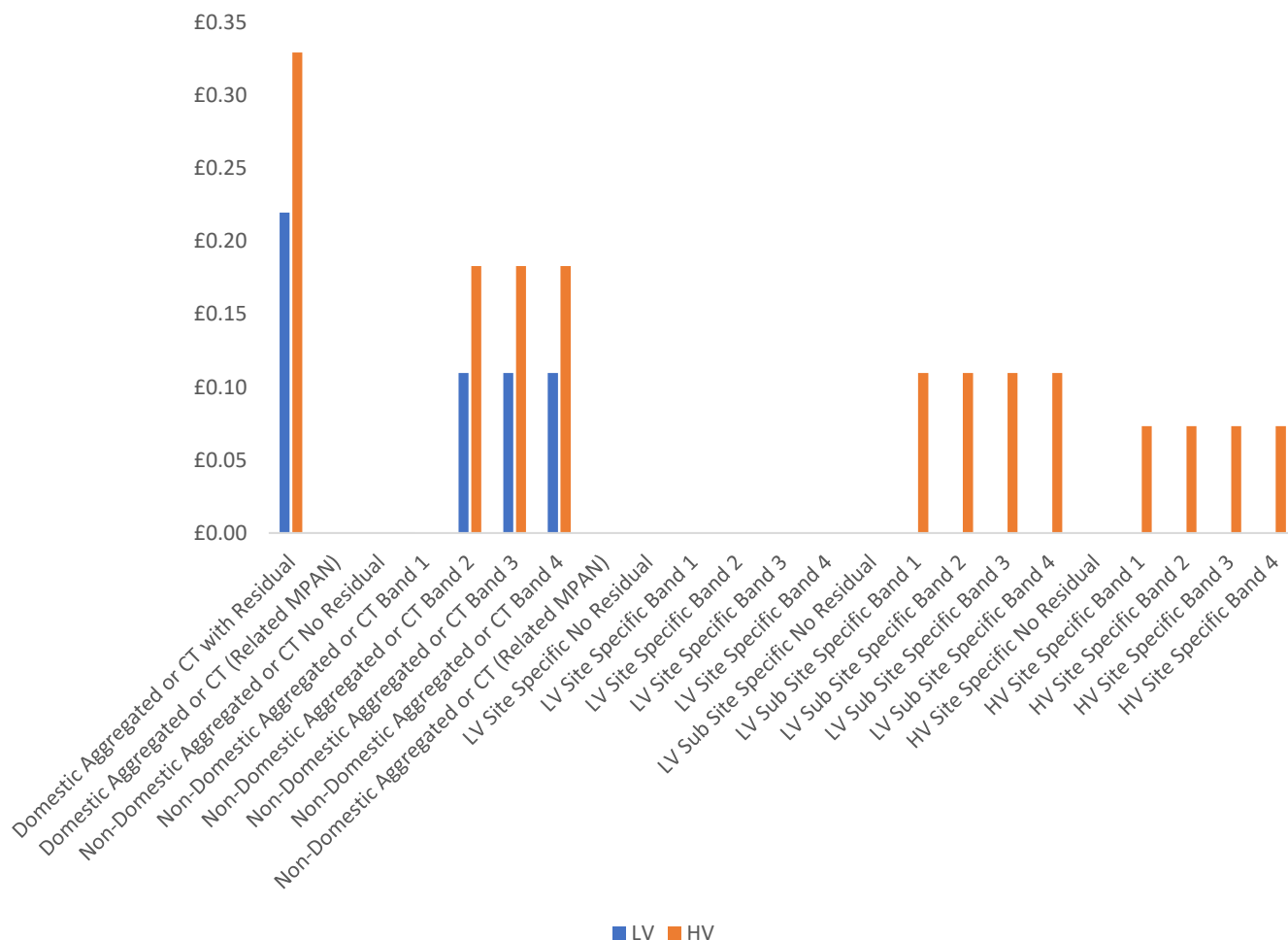


Figure 4.5 shows the magnitude of decrease (from baseline to DCP 423 case) in typical bills for LDNOs in the LPN license area for different tariffs. This is shown for both LV and HV boundary levels. Generation tariffs and unmetered supplies have been excluded from the plot since they are unchanged by DCP 423.

Figure 4.5: Magnitude of decrease in typical bills for LDNOs in LPN license area by tariff type



## Impact on tariffs

The impact of DCP 423 is most easily illustrated by the impact on tariffs. Figure 4.6 shows a specific example of the impact that DCP 423 has on the fixed charge tariff component for Domestic Aggregated or CT with Residual customers on the LDNO LV boundary level. It should be noted that the fixed charge is the **only** tariff component which currently has an adder that is applied after discounting and that is negative before discounting. Therefore, it is the only tariff component impacted by this change.

Figure 4.6: LDNO LV tariff forecast, post-adders & discounting, Domestic Aggregated or CT with Residual, Fixed charge by DNO (y-axis units are p/MPAN/day)

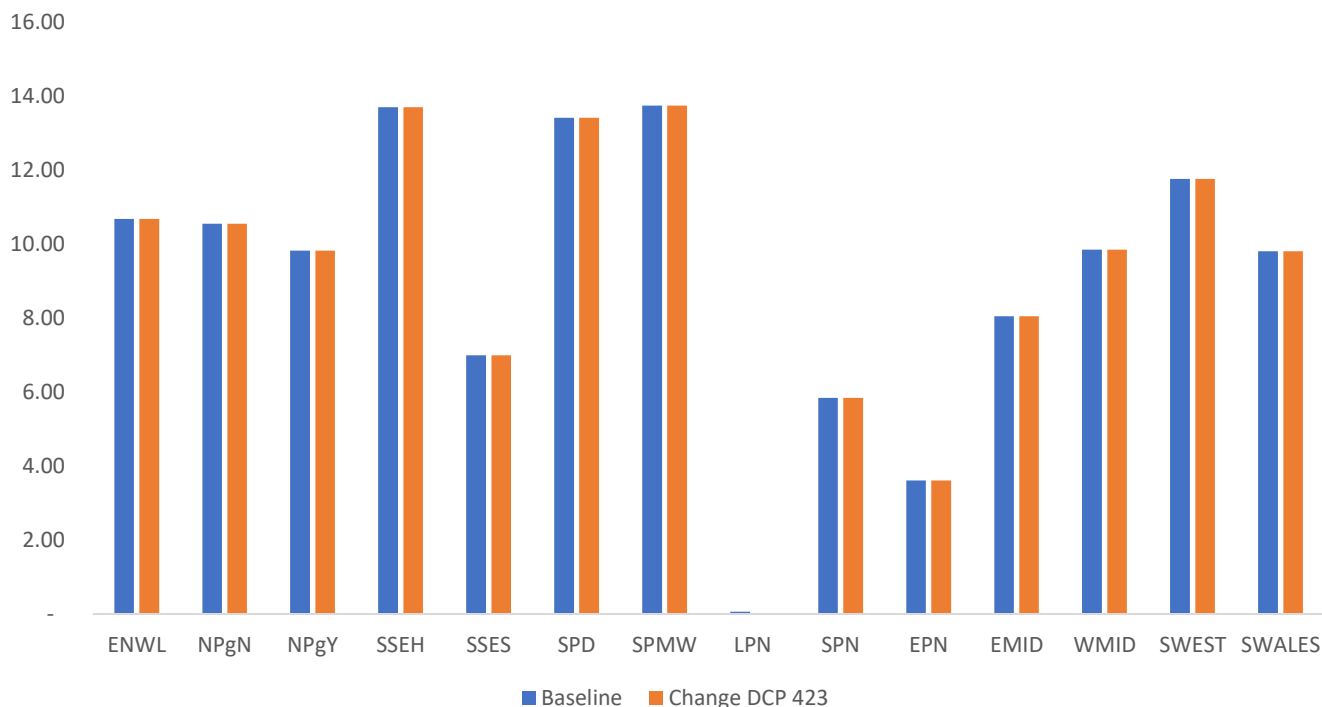
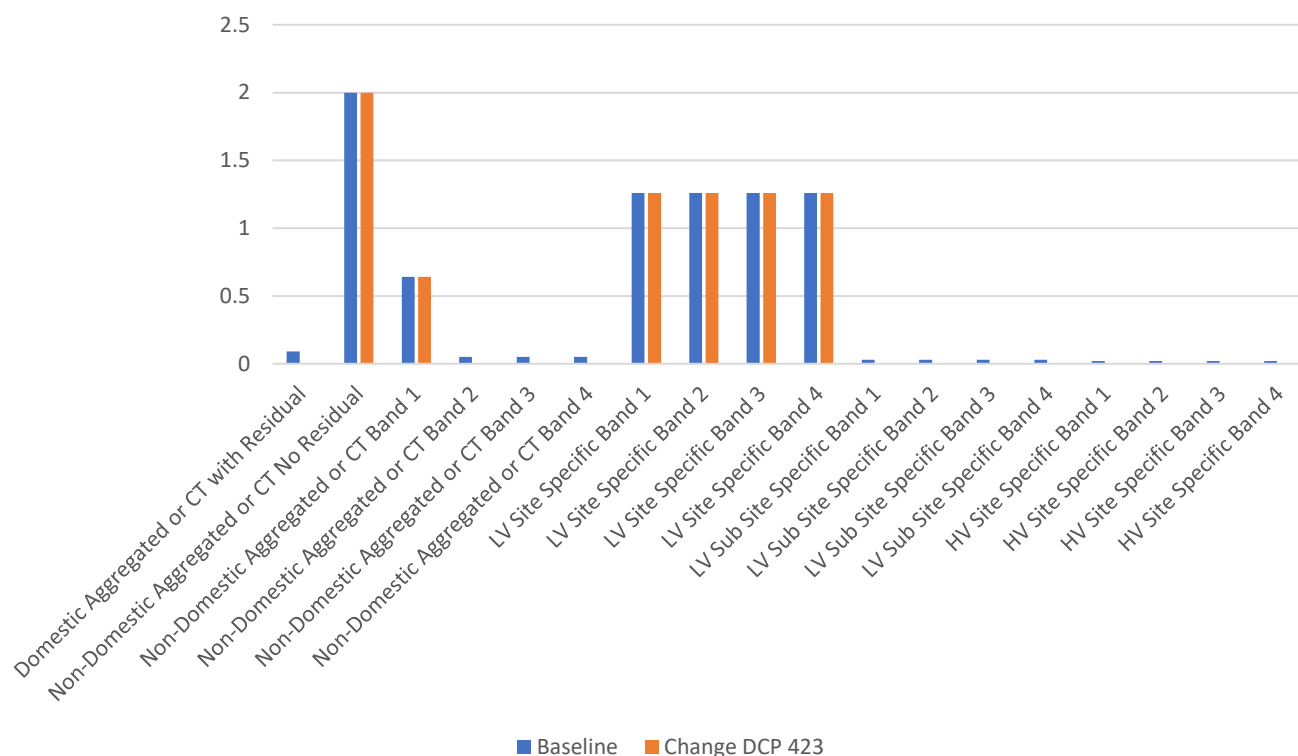


Figure 4.6 shows that the tariff component is unchanged for every DNO other than LPN as expected. For LPN the tariff component becomes zero after DCP 423 is implemented, since the ATW tariff was negative (before discounting & adder). For this case the LDNO LV tariff would equal the ATW tariff (both zero), whereas, in the baseline case the LDNO LV tariff is positive and non-zero (as shown in Figure 4.6), meaning that the LDNO LV tariff would be greater than the ATW tariff. This is a perfect example of how DCP 423 rectifies this issue.

Since the LPN case is impacted by DCP 423 (and the other DNO cases are not) and therefore of most interest for this impact assessment, Figure 4.7 has been included, to show the impact on the fixed charge tariff component for a selection of tariffs on the LDNO HV boundary level.<sup>4</sup> Figure 4.7 shows that for some tariffs, the fixed charge goes from positive in the baseline case to zero in the DCP 423 case. This is for the tariffs where the ATW tariff was negative and thus, for DCP 423, the LDNO discount is set to zero. As there is no discount, the LDNO tariffs post-adders and discounting are equal to the ATW tariff post-adders and discounting, which in this case is zero (adder was equal to the negative ATW tariff).

<sup>4</sup> Figure 4.7 does not include the tariffs with no residuals. These tariffs are much larger than the other values, since the residuals are negative, so tariffs that pay residuals experience a subtraction from tariff components, whereas these do not. Therefore, these tariffs skew the plot and are also unchanged by DCP 423 in this case, so they have been excluded from the plot. The plot also does not include any of the generation tariffs, tariffs for related MPANs and tariffs for Unmetered Supplies since DCP 423 has no effect on these.

Figure 4.7 LPN, LDNO HV tariff forecast, post-adders & discounting, Fixed charge (y-axis units are p/MPAN/day)



## Impact with revised LPN 2023/24 inputs

LPN's revised inputs for their 2023/24 charges included a significant increase in the SoLR costs, from less than £1million to over £22million. This led to fixed charge adders for pass through costs for Domestic Aggregated or CT tariffs being much higher, increasing from 0.2 p / day to 2.8 p./day. As a result, there is far more "headroom" for a negative fixed charge for revenue matching before it is necessary to start reducing unit rates. In the initial version of the 2023/24 charges, the fixed charge adder for revenue matching for this tariff is -3.5p/day, with additional revenue returned through unit rates, but with the updated SoLR costs it reduces further to -6.12p/day, with no revenue returned through the unit rates.

As a result, the all-the-way charges before discounting and applying pass-through costs are, for some tariffs, significantly more negative with the SoLR increase. The impact of DCP423 is therefore greater when applied to these inputs.

Figure 4.8 shows the increase in revenue from the baseline case to the DCP 423 case for LDNOs in the LPN license area after increasing the SoLR costs. Note that, as before, this is equal to the reduction in the DNO's revenue associated with the change. With the higher SoLR costs, the increase in revenue is over ten times greater compared to the previous result.

Figure 4.8: Increase in LDNO net revenue in LPN's license area, with increased SoLR costs

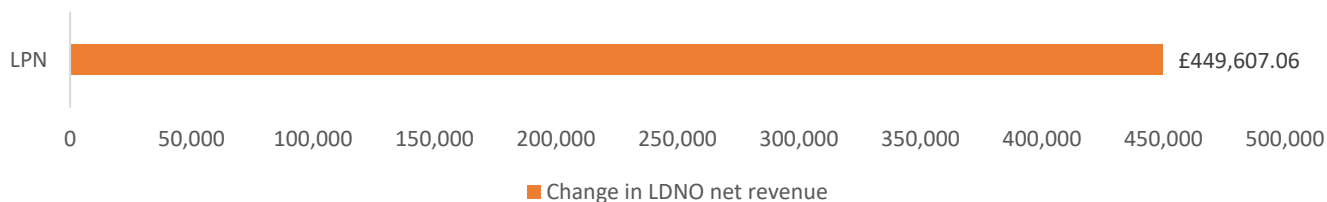
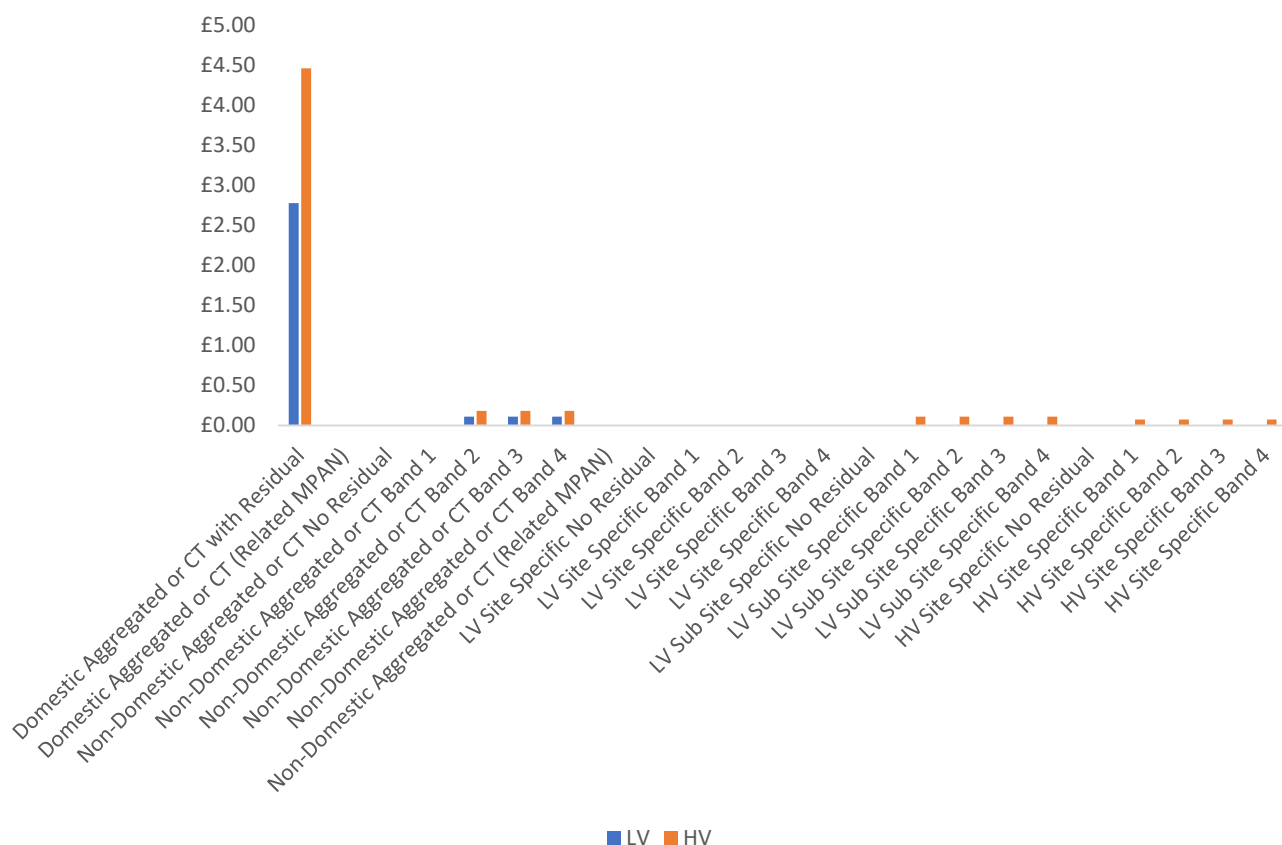


Figure 4.9 again shows the magnitude of decrease (from baseline to DCP 423 case) in typical bills for LDNOs in the LPN license area for different LDNO Boundary tariffs, after the increase in SoLR costs. This is again shown for both LV and HV boundary levels, with generation tariffs and unmetered supplies excluded. The impact on bills associated with non-domestic customers is unchanged compared to the previous figure. However, for Domestic Aggregated or CT customers, the decrease in LDNO bills is much more significant, at just under £3 for LV customers and just under £4.50 for HV customers.

Figure 4.10: Decrease in LPN typical bills for customers on the LDNO boundary, with increased SoLR costs





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