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Report

UNC678/A/B/C/D/E/F/G/H/I/J: Amendments to Gas Transmission Charging Regime: final impact assessment

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Following the publication of our minded to decision and draft impact assessment (MTD) on 23 December 2019, we are publishing this final impact assessment of UNC678/A/B/C/D/E/F/G/H/I/J: Amendments to Gas Transmission Charging Regime.

This final impact assessment should be read alongside our final decision on these modifications and CEPA's final quantitative report (which sets out more detail on how the UNC678 changes lead to benefits), both available on the Ofgem website.

This final impact assessment is updated versions of two sections from our MTD: 'Quantifying potential impacts of reform' (originally section 5 in our MTD), and 'Ofgem impact assessment' (originally appendix 2 in our MTD). Our final decision sets out the reasons for the differences between the draft and final impact assessments.

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Quantifying potential impacts of reform

Section summary

In this section we present the results of modelling undertaken by CEPA to quantify the potential impacts of the modification options put forward by the industry. We consider the impacts on transmission tariffs and on the wider system – for example on wholesale market prices and on producer and consumer welfare. As this decision concerns gas charging, our primary focus is on the impacts on gas consumers, but we have also considered potential impacts on the electricity market and electricity consumers.

Based on the central modelling scenario – the 2019 FES Two Degrees scenario – the expected benefits to gas consumers from the two compliant modifications - UNC678 and UNC678A - compared to the status quo are set out below.

Expected benefits from 2022 - 2031 (NPV £bn, discounted to £18/19) under Two Degrees

	UNC678 (CWD)	UNC678A (Postage Stamp)
Gas domestic consumers	£0.75bn	£0.72bn
Gas non-domestic consumers	£0.46bn	£0.43bn
Gas-fired power generators (gas market impacts only) [1]	£0.06bn	£0.08bn
Total gas consumers	**£1.28bn**	**£1.23bn**

Tariff reform is also likely to affect electricity market prices as a result of changes to input prices of gas-fired power generation. CEPA's estimates of potential impacts on electricity consumers are included in its technical report.

[1] We note that this does not include any impacts on the electricity market revenues of gas-fired power generators which we would also expect to be affected.

Quantifying potential impacts

1.1. In reviewing the modifications put forward under UNC678, and reaching our minded-to decision, we have conducted a principles-based assessment of the modifications based on, amongst other things the UNC charging methodology objectives and our statutory duties.

1.2. In addition to our principles-based assessment, we have carried out modelling in order to understand the potential mechanisms for the impacts of the proposed modifications on consumers and gas market participants. This includes the impacts of modifications on tariffs for different types of gas network users, consideration of potential savings for the system and for individual consumer and producer groups.

1.3. To quantify these impacts, we have combined analysis of the distributional impacts of tariffs on consumers and producers with systems analysis of aggregated effects. Our distributional analysis allows us to consider how the various options may impact on different types of consumers and depending on their regional location. It also allows us to consider the impacts of the different options on different types of gas producer. Our systems analysis allows us to consider the potential impacts on market prices and, in turn consumer welfare and producer surplus.

1.4. The quantitative analysis summarised here was undertaken to support our principles-based assessment of the modifications proposed under UNC678. In a number of areas, the modelling is sensitive to actual outcomes in the market, such as the merit order of gas and electricity supply in future years. It should therefore be taken as indicative of the outcomes which may be expected from reform[2].

[2] A full description of the methodology employed for the modelling and the results of analysis are set out within CEPA's UNC678 Analytical Support, published as a subsidiary document to this consultation.

Summary of modelling approach

1.5. The modelling undertaken by CEPA included two stages. In the first stage, the proposed tariff reforms were applied in a tariff model[3] in order to model the direct impact on tariffs.

1.6. Tariffs are a factor in network users' operational decision making in relation to flows of gas and capacity bookings. Therefore, in the second stage of modelling, a gas market model was used to consider the changes to behaviours in relation to use of the gas system. The gas market model was coupled with an electricity market model to reflect implications for gas fired power stations in the electricity market and hence evaluate impacts on electricity consumers.

1.7. CEPA's gas market model provides a representation of the gas wholesale market. It uses assumed marginal costs of gas production and a combination of derived supply and demand elasticities with the objective of maximising social welfare. In this context, maximisation of social welfare reflects minimisation of total costs while meeting a number of production, transmission and demand constraints.

1.8. CEPA's electricity market model incorporates all existing generation assets in the North West Europe electricity market region, and assumes market coupling to minimise costs of meeting electricity demand. CEPA used the electricity market model to provide demand elasticities of gas-fired power generators. This model allows CEPA to measure gas-fired power generation in the electricity market and estimate impacts on the electricity market price.

1.9. The tariff and market modelling stages were iterated until convergence was achieved to identify the equilibrium tariff and flow combinations, i.e. after taking account of the behavioural impacts of tariff reform.

1.10. As with any modelling, particularly modelling of a complex nature looking at multi-year impacts, we are conscious of the need to apply caution when drawing conclusions from results. The uncertain nature of future gas and electricity demand, technological

[3] The original tariff model was built by NGGT but was adapted by CEPA in order to consider the full range of tariff reform options

developments and commodity prices, mean that actual outcomes will inevitably differ from forecasts and that outcomes identified in the modelling may be sensitive to market trends.

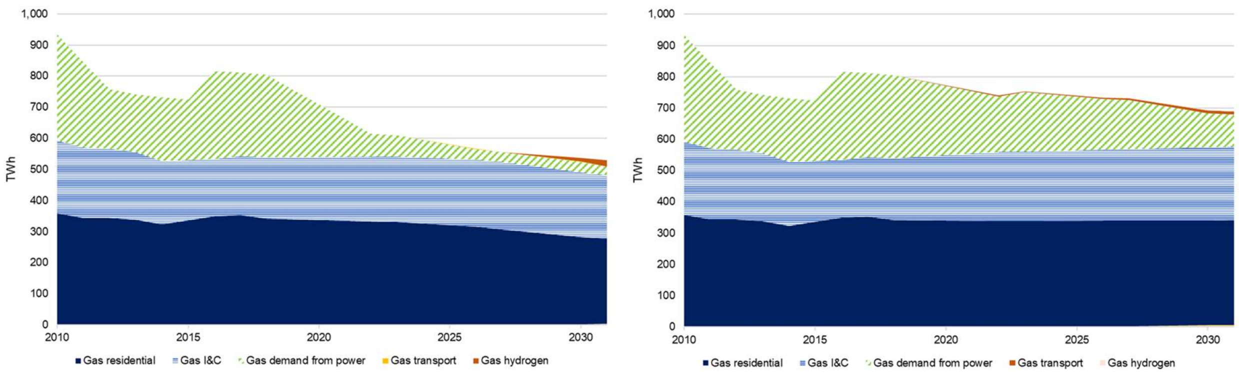
1.11. Due to uncertainty regarding future market trends, CEPA carried out analysis using two scenarios from National Grid ESO ("National Grid") FES 2019 report. These scenarios are used by National Grid and the wider industry to consider different possible versions of the future and the consequences of changes to the system under these possible future scenarios. CEPA used the Two Degrees (TD) and Steady Progression (SP) FES scenarios as these incorporate high and low levels of gas use, respectively. The Two Degrees scenario assumes that Government meets the previous commitment of an 80% reduction in greenhouse gas emissions by 2050 (which has now been superseded by a commitment to a 100% reduction by 2050). The Steady Progression scenario assumes that Government fails to meet the previous 80% reduction target by 2050.

1.12. In light of the Government's decision to adopt a legally binding target of 100% reduction, we consider that for the purposes of assessing the modifications in front of us, the Two Degrees scenario should be used as the central scenario for consideration, and that the Steady Progression scenario provides a sensitivity assessment to this central scenario. National Grid has not yet produced a full scenario which achieves the net zero target and so it was not possible for CEPA to readily conduct a quantitative sensitivity. However, they provided a qualitative assessment that gives a good understanding of how the TD scenario might differ from a net zero scenario.[4] In addition, when calculating monetised impacts on the environment CEPA used BEIS's high carbon price as a sensitivity, in line with our updated Impact Assessment Guidance.[5] This is to reflect the government's increased environmental ambition until revised CO_2 values that are consistent with the new target of Net Zero in 2050 become available.[6]

[4] The detail of the qualitative assessment can be found in Section 5 of CEPA's analytical report.
[5] Ofgem's IA guidance: https://www.ofgem.gov.uk/system/files/docs/2020/05/impact_assessment_guidance_1.pdf
[6] Estimates of the impact on the environment can be found in Section 4.3 of CEPA's analytical report.

Figure 0.3: Demand forecasts under the FES Two Degrees and Steady Progression scenarios

Two Degrees *Steady Progression*



Source: *National Grid ESO – FES 2019*

1.13. CEPA also carried out analysis over three separate gas years; 2021/22, 2026/27 and 2030/31 to explore the extent of impact in each of these years. Given the interaction between gas demand, flows and tariffs, the key differences between years were driven partly by system demand.

1.14. CEPA's analysis considered the short-term impacts on gas entry and exit flows, gas market prices and producer and consumer surplus. Drawing on these results, they also developed qualitative analysis of the potential investment and closure decisions of gas supply sources and of power stations.

1.15. CEPA also modelled the potential for system users to invest in bypass infrastructure which would allow them to avoid use of the National Transmission System (NTS) and the corresponding transmission tariff.

1.16. In general, demand decreases under both the SP and TD scenarios. Under TD, in the gas year 2030/31, demand on the system is the lowest of any of the years and scenarios modelled. The impacts on the transmission tariffs are therefore most significant. Given this, unless otherwise stated, we present the impacts of the modification options for TD 2030/31 throughout. In general, the direction of the results in this case are representative of the full range of gas years and scenarios. However, because the change in gas demand is most significant under this scenario and in 2030-31, and because of the inverse relationship between gas demand and unit tariffs, the magnitude of change is likely to be greater than for other scenarios and gas years. The full range of results are presented in Appendices A and B of CEPA's analytical report.

1.17. In the remainder of this section we summarise the impacts estimated under CEPA's modelling. We firstly present the impacts of tariff reform on the tariffs at entry and exit points themselves before summarising estimates of wider system impacts, including market prices, consumer and producer welfare and potential longer term impacts on investment and closure of gas supply facilities and large gas consumers.

Options modelled

1.18. In total, 11 modification proposals were submitted to us for consideration. Each modification incorporates several consistent features with only one or two characteristics changing. In order to constrain the modelling to a pragmatic number of options, some options were consolidated. In summary:

- Options UNC678D/G/H/J were consolidated into two options for the purposes of the modelling given the parallels between them. The only difference between UNC078 D and UNC678J is the nature of the revenue recovery exclusions. Only the broadest revenue recovery exclusion option (UNC678D) was included within the modelling. The same applies for UNC678H and UNC678J in which case only UNC678J was modelled. In both cases the options which include narrower revenue recovery exclusions have been considered in our principles-based assessment above.
- UNC678F includes a 'Capacity Surrender Rule' but is otherwise identical to UNC678E. The Capacity Surrender Rule was not modelled but has been considered within our principles-based assessment above.

1.19. We summarise the options modelled in Figure 0.4:

Figure 0.4: Options modelled (Source: CEPA)

Option	Label in analysis	RPM	Capacity used for tariff calculation	Storage discount	Revenue recovery exclusions	Optional charge (short-haul)	Mod (with closest alignment)	Also applies to:
Status quo	SQ	Long Run Marginal Cost + commodity charge	Obligated capacity	None	N/A - Existing Contracts are liable for commodity charges	Optional Commodity Charge		
Capacity Weighted Distance (CWD) baseline	CWD	CWD	Forecasted Contracted Capacity (FCC) by National Grid, excluding Existing Contracts.	50%	Existing contracts	None	0678	
Postage stamp (PS)	PS	PS		50%	Existing contracts	None	0678A	
CWD with storage discount	CWD storage	CWD		80%	All storage sites - all other Existing Contracts included	None	0678E	0678F: The 'surrender rule' proposed in 0678F will be considered separately
PS with storage discount	PS storage	PS		80%	All storage sites - all other Existing Contracts included	None	0678C	
CWD with NTS Optional capacity charge (NOC) - Methodology 1	CWD NOC 1	CWD		50%	Existing contracts	NOC: Using 'Methodology 1'	0678B	
CWD with NOC - Methodology 2	CWD NOC 2	CWD		50%	Existing contracts	NOC: Using 'Methodology 2'	0678D	0678G: This mod is identical but only existing storage contracts are excluded from the revenue recovery adjustment
PS with NOC - Methodology 2	PS NOC 2	PS		50%	Existing contracts	NOC: Using 'Methodology 2'	0678J	0678H: This mod is identical but only existing storage contracts are excluded from the revenue recovery adjustment
CWD with Wheeling NOC and Ireland Security Discount	CWD Wheeling	CWD		50% (and 95% Ireland Security Discount)	Existing contracts	NOC: Using 'Wheeling charge'	0678I	

Impacts on tariffs

1.20. CEPA estimated the potential distributional impacts of transmission tariff reform on a range of market participants. In this section, we consider the estimated impacts on gas tariffs, drawing on CEPA's analysis.

1.21. In order to compare like with like, we present the estimated impacts on annual gas tariffs (in p/kWh/day). In the case of the modification options, this allows for consistent comparison between options. In addition, annual tariff levels apply equally to other capacity product timeframes as multipliers are set equal to one[7]. The only exception is for the interruptible capacity product for which a 10% discount is applied. Given the different proportions of the interruptible capacity product that are used at different entry and exit points, the average tariff weighted by use of different capacity products at any entry or exit point[8] may be affected to some degree, though this will be limited given the 10% discount.

1.22. The presentation of annual capacity tariffs is of greater relevance under the status quo in which discounts for products within different timescales can be more significant. For example, the reserve price of the interruptible product is set to zero, and allows some users to purchase gas capacity for free.

1.23. Also of relevance to comparison of the status quo and the modification options is the commodity element of the tariff which is included within the status quo. In order to allow for direct comparison of the total costs of flowing gas between the status quo and the modification options, the commodity element of the tariff is included when presenting the status quo results. This form of presentation allows for consistent comparison between the status quo and the modification options where both sets of tariff results effectively represent the cost of flowing a unit of gas and using the annual capacity product to do so.

[7] ie there is an equivalent tariff for products within all time horizons, from the annual to the daily product.
[8] Note that our definition of the weighted average annual tariff is slightly different from this. Here we refer to the tariff weighted by the type of product used (e.g. annual, daily, interruptible). When we refer to the weighted average annual tariff, we are considering only the annual tariff (for the SQ we also include the commodity element of the charge) weighted by the amount of booked capacity at each entry/exit point of a certain type.

1.24. CEPA applied the assumption that market participants would book capacity equal to their actual gas flow requirements on the grounds that capacity within all timescales would come at a similar cost under the modification options.

1.25. The only exception to this assumption is for GDN exit points which CEPA assume book capacity to meet a 1-in-20 supply standard. This is consistent with the interpretation that GDNs have of their licence.

Choice of reference price methodology (RPM)

1.26. For a set level of revenue, the impacts of the RPM on tariffs are purely distributional – i.e. the same total amount of revenue is recovered in different proportions from different users. Relative to the PS RPM which applies an equivalent tariff for capacity to all entry points and all exit points respectively, a CWD RPM will increase or decrease the tariff at that point based on the distance between entry and exit capacity. This compares with the LRMC methodology in which the capacity tariff is dependent on estimates of the cost of expansion of capacity at the respective point.

1.27. Therefore, both the CWD and LRMC methodologies derive tariffs which are dependent on the specific characteristics at a particular point. This results in a range of tariffs at entry or exit points of a certain type.

1.28. In evaluating the relative merits of an RPM, we consider both the levels of tariffs and the tariff dispersion across entry and exit points of different types and within entry and exit points of the same type.

1.29. CEPA's analysis shows that the level of the charges associated with flowing one unit of gas using the annual capacity product reduces under the modification options relative to the status quo.[9] This is partly driven by the large entry commodity tariff element, which applies equally to all entry point flows. A large entry commodity tariff results from the way in which the LRMC methodology is applied at entry.[10] The commodity tariff is also affected

[9] For the status quo, this includes the charge associated with the annual capacity product and the associated commodity charges.
[10] NTS entry capacity prices represent purely locational prices derived from the LRMC of providing transportation of gas from the different entry points. Residual revenue recovery is addressed via the application of the TO entry commodity charge. This differs from the application of the LRMC

by the extent of revenue which is not recovered from short-term capacity products which are currently priced at significant discounts.

1.30. The charges associated with gas flows booked using the annual capacity product at exit points are relatively consistent between the LRMC methodology and the modification options. The LRMC methodology at exit is applied in a different way than at entry resulting in a lower proportion of revenue being recovered through the commodity charge under CEPA's modelling assumptions.

1.31. The modelling shows that some types of entry and exit points are likely to face a lower weighted average annual tariff[11] under one RPM than the other, with the direction of the impact dependent on relative proximity of entry to exit capacity for each point.

1.32. At entry, all types of points other than beach terminals face a lower tariff under the CWD than the PS on average. The proportion of capacity bookings at beach terminals mean that even a relatively small increase in the tariff under CWD relative to PS is reflected in a lower tariff at other entry point types.

1.33. At exit, the effect is more muted as a result of broader locational dispersion. Industrial and commercial (I&C) consumers and interconnector exit points face a slightly lower weighted average annual tariff under the CWD methodology on average while for power stations and storage exit points, the tariff is slightly higher on average.

1.34. There is no tariff dispersion under the PS methodology by design[12]. Tariff dispersion for exit points decreases under the CWD methodology relative to the status quo while tariff dispersion is similar under the status quo and the CWD methodology for entry points.

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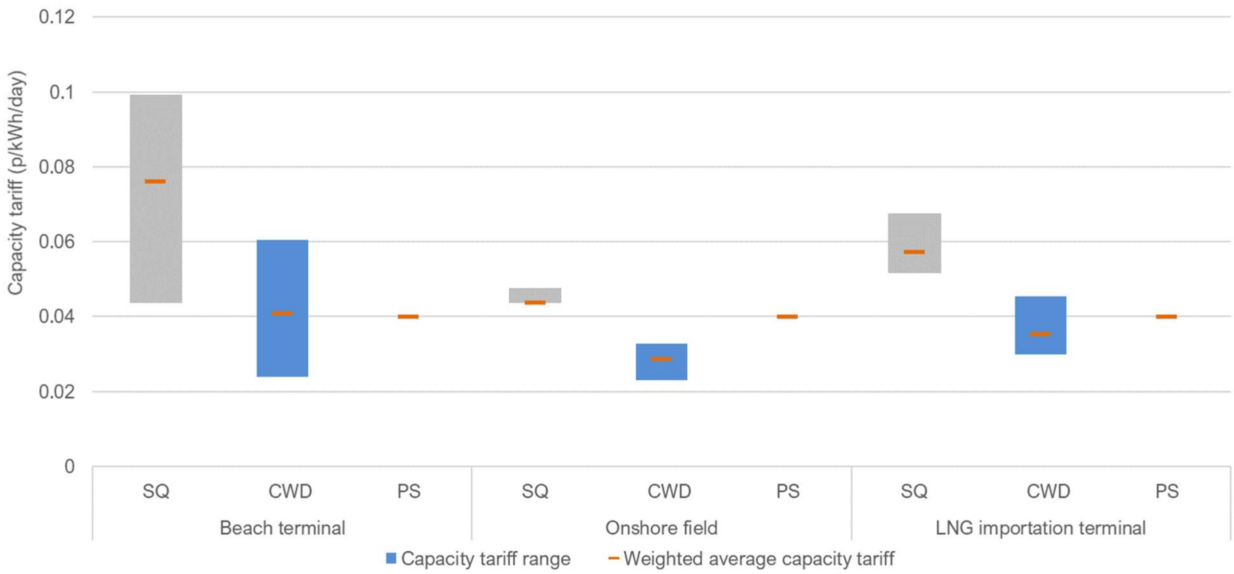
methodology at exit: NTS exit capacity prices are administered rates designed to recover 50% of transmission revenues when applied to obligated exit capacity levels, by scaling the raw LRMCs. As such, revenue under-recovery from NTS exit capacity tariffs could only result from under-utilisation of exit capacity, at below obligated levels. This typically means that the exit commodity charge required for residual revenue recovery is lower than the entry commodity charge. For a detailed description of the methodology, see Uniform Network Code (UNC), Transportation Principal Document (TPD), Section Y.

[11] ie. the tariffs for entry/exit points of a certain type weighted by the amount of capacity booked for each relevant entry/exit point included.

[12] The only exception is for GDN exit points given the assumption that they 'overbook' capacity to meet their licence interpretation.

1.35. Note that in the following charts, coloured columns are used to represent the range of tariffs under different modification options. For example, the grey column represents the tariff range under the status quo (SQ), blue columns (of different shades and patterns) represent the range of tariffs within options which use a CWD RPM and green columns (of different shades and patterns) represent the range of tariffs within options using a PS RPM. The same colour coding applies when considering wider systems impacts. The red lines indicate the weighted average annual tariff. Under the modification options this represents the capacity tariff for a particular entry/exit point type weighted by the booked capacity at each entry/exit point. Under the status quo, the TO commodity charges are also included in the tariff – i.e. the chart represents the tariff costs associated with flowing one kWh of gas using the annual capacity product under all options.

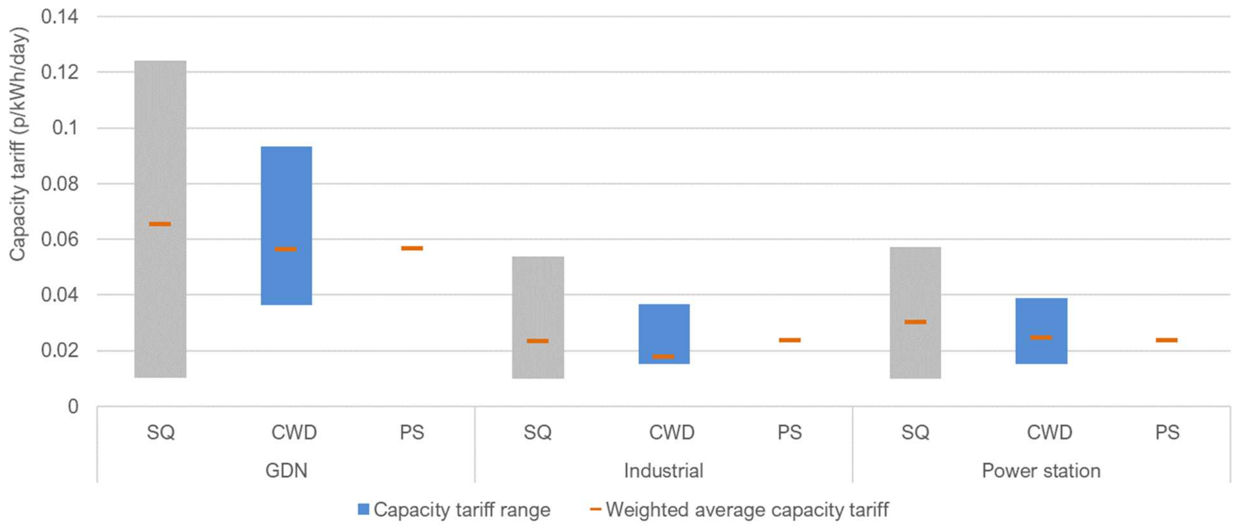
Figure 0.5: Weighted average annual tariffs at entry points under each option (TD, 2030-31, £18/19)[13]



Source: CEPA

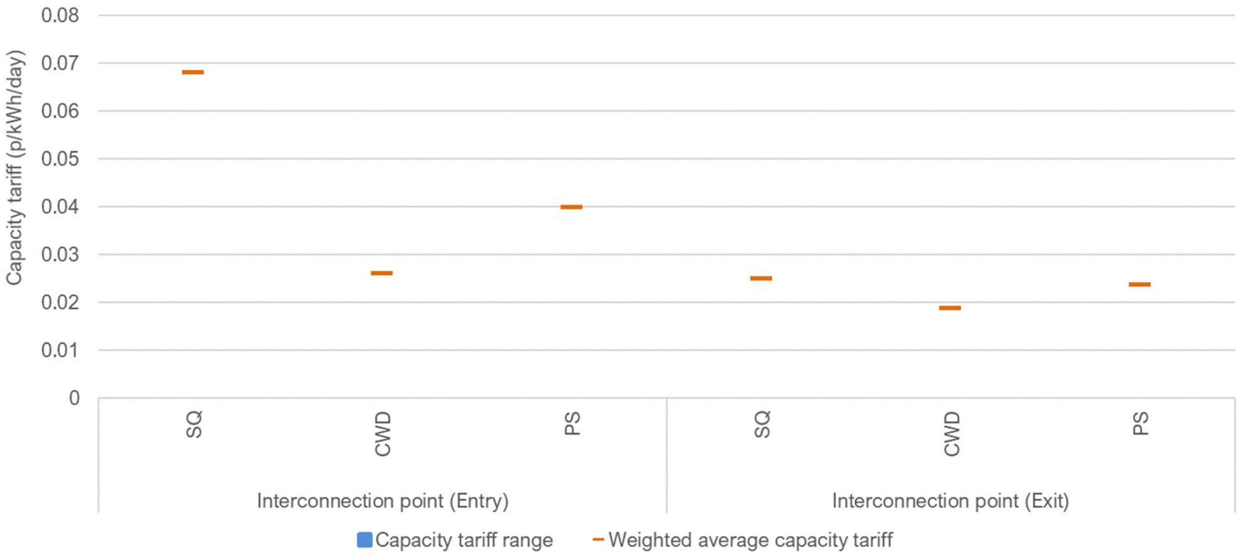
[13] As mentioned previously, we include the effects of the TO commodity tariff within the status quo estimates in all tariff charts.

Figure 0.6: Weighted average annual tariffs at exit points under each option (TD, 2030-31, £18/19)



Source: CEPA

Figure 0.7: Weighted average annual tariffs at interconnector entry and exit points under each option (TD, 2030-31, £18/19)[14]



Source: CEPA

[14] Note that there is only one interconnector entry point (Bacton) and so we do not observe any tariff dispersion. The tariff shown is for the Moffat exit point. Based on price differentials between the continent and GB in the TD scenario in 2030-31 (and noting the deterministic nature of the modelling), we do not observe exit flows to the continent.

Gas storage

1.36. CEPA's modelling suggests that, on average, gas storage would face an increase in the entry tariff but a reduction in the exit tariff relative to the status quo under the modification options. Under the existing arrangements, storage is exempt from the commodity charge and a number of storage facilities face a relatively low capacity charge.

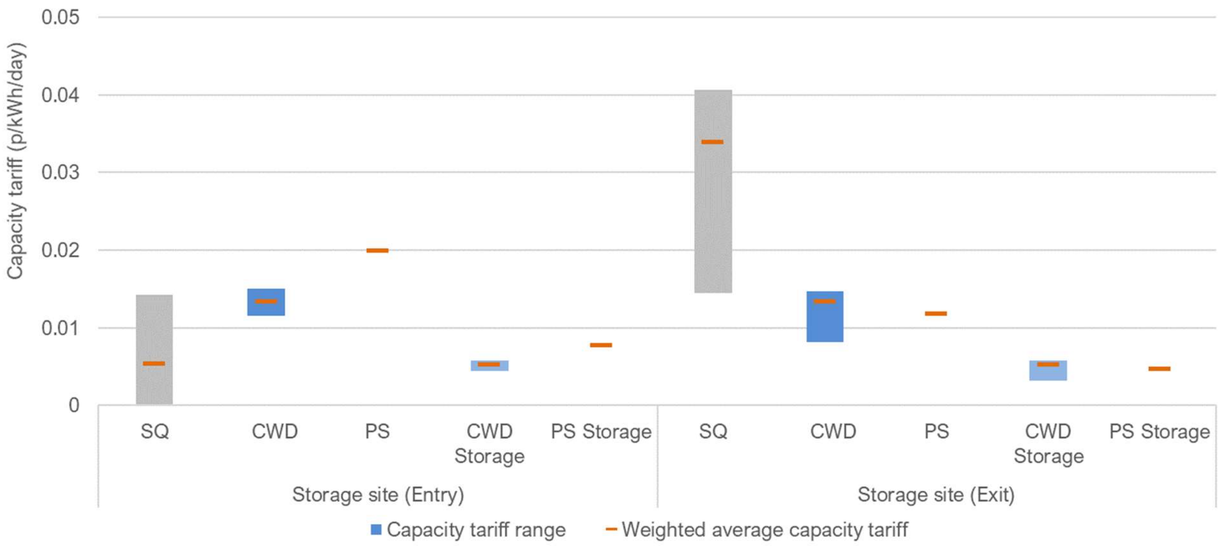
1.37. CEPA note that their results for the tariff at storage exit points partly results from modelling outcomes which suggest that some storage facilities may withdraw but not inject gas into storage (i.e. exit from the NTS) over the course of the modelled year[15]. In addition, we note that more than 70% of capacity at storage exit points was booked using the heavily discounted interruptible product under the current arrangements. In combination, this results in an overestimate of the weighted average exit tariff which may be expected to be lower under the status quo arrangements in practice. CEPA therefore applies some caution in interpreting results for gas storage facilities.

1.38. Comparing CWD and PS, we can observe that the tariff for storage at entry is higher under the PS RPM while the tariff at exit is higher under the CWD RPM. The difference in the entry tariff between the RPMs is estimated to be larger than that at exit.

1.39. The reduction in the tariffs in the presence of an 80% storage discount (as proposed under UNC678C/E/F) can also be observed. Given the small proportion of cost recovery which is contributed by storage facility entry and exit bookings, CEPA find that the additional revenue recovery requirements resulting from an 80% discount only lead to a marginal change in the tariffs at other entry and exit points on the system.

[15] As CEPA did not constrain gas storage to start and end the gas year with equal levels of gas in store, and as CEPA included a two year modelling horizon, some storage facilities could optimise by adopting this behaviour.

Figure 0.8: Weighted average annual tariffs at storage entry and exit points depending on choice of RPM and storage discount (TD, 2030-31, £18/19)[16]



Source: CEPA

NTS Optional Capacity Charge (NOC) options

1.40. CEPA's modelling also shows the impact of the introduction of a NOC. All three NOC methodologies are considered with PS and CWD variants of the methodology proposed in UNC678D/G/H/J captured.

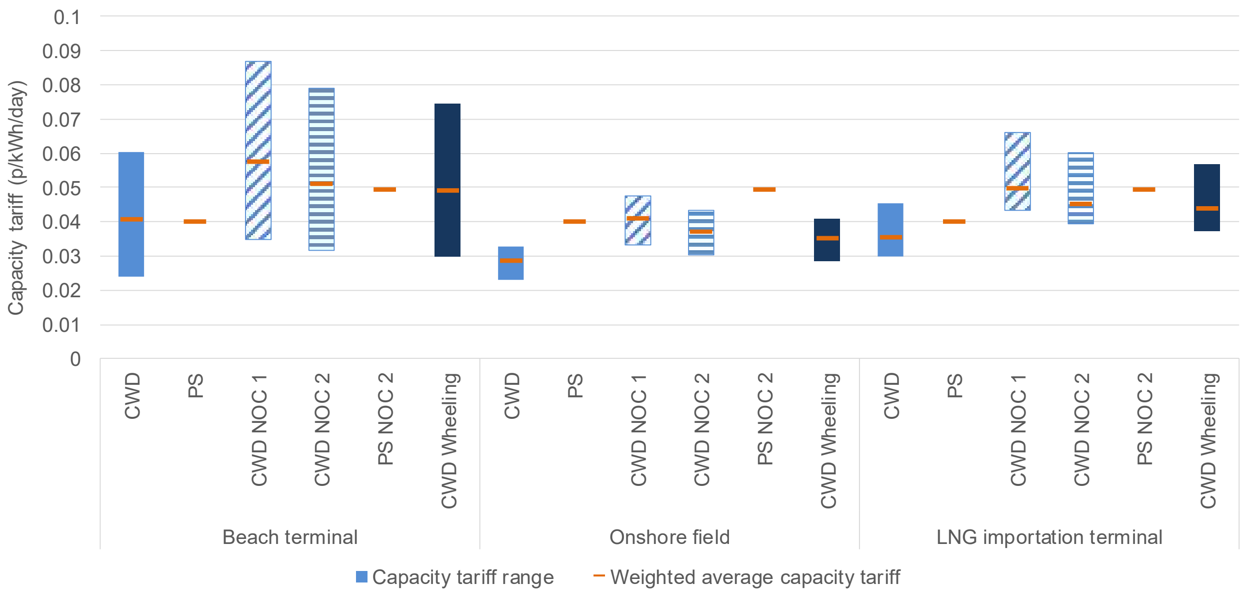
1.41. The analysis presented in Figures 0.5 – 0.8 shows the annual standard capacity tariff (not including any NOC discounts). A NOC would lead to additional revenue recovery requirements and would generally raise the tariff for capacity which did not make use of the NOC. The increase in tariffs would apply equally to storage and interconnector entry and exit points.

1.42. The NOC methodology proposed in UNC678B (Methodology 1) leads to the greatest increase in the tariff in most cases, with the relative impact of the methodology proposed under UNC678D/G/H/J (Methodology 2) depending on whether the PS or CWD methodology is more favourable at the relevant entry or exit point type. The Wheeling methodology

[16] As explained above, we expect the capacity tariff at storage exit points under the status quo to represent an over-estimate relative to what we would expect to see in practice.

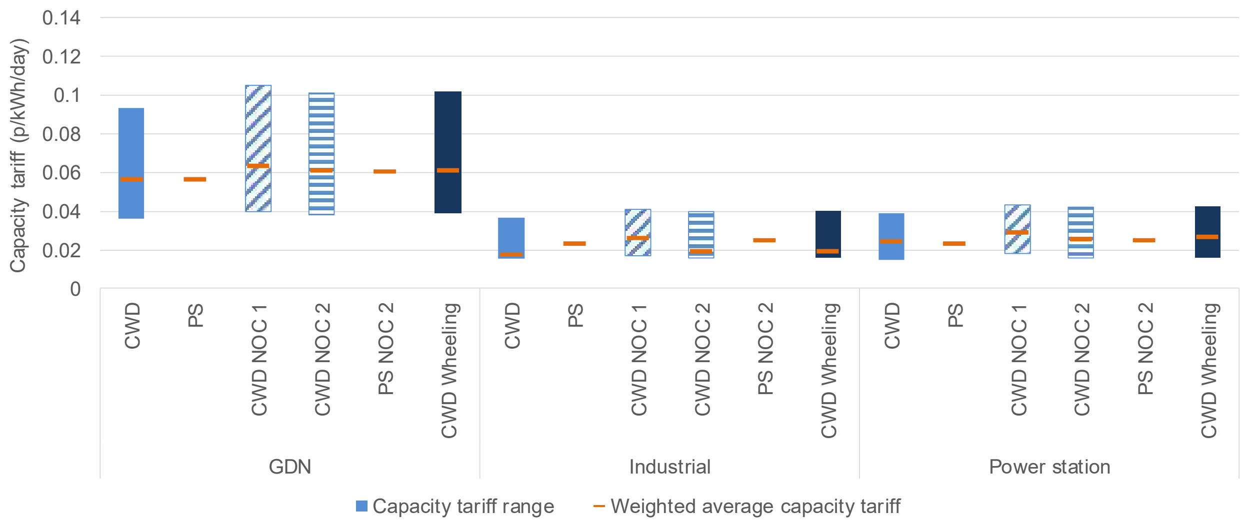
(UNC678J) generally results in the smallest additional revenue recovery requirements across other entry and exit points.

Figure 0.9: Impact of NOC proposals on weighted average annual tariffs at entry (TD, 2030-31, £18/19)



Source: CEPA

Figure 0.10 Impact of NOC proposals on weighted average annual tariffs at exit (TD, 2030-31, £18/19)

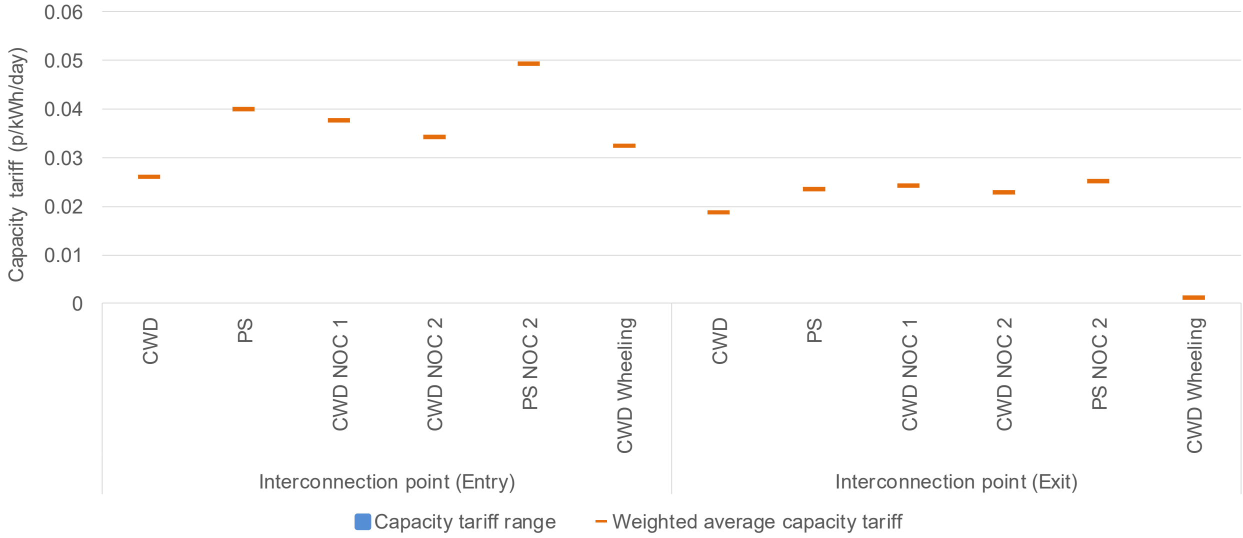


Source: CEPA

1.43. Alongside the Wheeling charge[17], UNC678I proposes a 95% discount for exit flows over the Moffat interconnector.

1.44. The impact of the 95% Ireland Security discount on interconnector tariffs is shown in Figure 0.11. As with storage facilities, the revenue that is lost under an Ireland Security Discount would be recovered from other exit points. Given that the discount is only included at one exit point, the impact on other tariffs is muted.

Figure 0.11: Impact of the NOC and Ireland security discount (Moffat exit tariff) on weighted average annual tariffs (TD, 2030-31, £18/19)



Source: CEPA

Take-up of the NOC

1.45. The relative increase in tariffs at other entry and exit points resulting from the NOC depends on the extent of take-up of the NOC and the scale of the discount which it provides to NOC users. CEPA has carried out analysis of the likelihood of take-up of each NOC product and the corresponding implications for revenue recovery[18]. Tables 0.1 and 0.2 show the results.

[17] The Wheeling charge provides a NOC product but only to those entry-exit combinations which NGGT define as having a 0km distance between entry and exit.
[18] Only the 48 routes that made use of the OCC product in 2017-18 have been included within the modelling as 'eligible routes'. Therefore, this places an upper bound on the routes and flows that

1.46. The results show that all NOC methodologies result in less take-up and lower flows than the optional commodity charge (OCC) under the status quo. However, in the case of NOC Methodology 1, the number of routes that use the NOC is similar to the status quo although with slightly lower flow volumes.

1.47. Methodology 2 results in lower take-up. While the number of routes that use the NOC and the volume of flows is similar under the PS and CWD methodologies, it is slightly lower for CWD than for PS. In both cases, the maximum distance of routes that make use of the NOC is around 25 km with an average route distance of 5.8 km for the CWD methodology and 10.2 km for the PS methodology.

1.48. As the Wheeling methodology is restricted to routes with a maximum route distance of 0 km, eligibility is significantly lower with only nine of the 48 routes that CEPA modelled considered as eligible under this arrangement[19]. Within those eligibility constraints, CEPA estimate take-up to be relatively high, with six of the nine routes and 56% of eligible flows making use of the Wheeling product.

1.49. CEPA also estimated the amount of 'lost revenue' that would have been recovered under the relevant RPM without a NOC in place (e.g. under CWD or PS). Not surprisingly, the lost revenue aligns relatively well with take-up of the NOC but is also linked to the magnitude of discount available under each option and the tariff that would have applied in the absence of a NOC (e.g. CWD or PS). Lost revenue under Methodology 1 is significant at almost £100 million (£18/19 real) in 2030/31 under the Two Degrees scenario. This compares to an estimated annual revenue recovery requirement of just over £700 million.

1.50. CEPA also estimated the amount of revenue recovered per unit of flow of gas which provides an indication of the amount contributed to revenue recovery by users of the NOC product. The analysis suggests that less revenue is recovered per unit of gas that uses the NOC under Methodology 1 than under the status quo. More than double the amount of

would use a NOC product.

[19] The short-haul distances used to determine eligibility under the Wheeling methodology represent the minimum straight-line distance between the offtaker and its specified entry point, using six figure grid references and reported to the nearest 0.1 km.

revenue that is recovered per unit of flow under the status quo is recovered when a PS RPM is combined with NOC Methodology 2.

Table 0.1: Take-up of the NOC (TD, 2030-31)

RPM	Modelled eligible routes	Number of routes that use short-haul	Total volume of short-haul flows (TWh/year)	Percentage of modelled eligible flows that use short-haul	Largest distance of route that uses short-haul (km)	Simple average route distance (km)
Status quo	48	36	171	46%	274[20]	67.5
CWD, Method 1	48	30	138	37%	165	37.6
CWD, Method 2	48	14	52	14%	24	5.8
PS, Method 2	48	18	72	20%	27	10.2
CWD Wheeling	9	6	22	56%[21]	1[22]	0.3

Source: CEPA

[20] This represents the largest distance of route that NGGT identify made use of the OCC under existing arrangements in the gas year 2017-18. The modelling suggests that routes of an even greater distance may have commercial benefits in making use of the OCC product. See: https://gasgov-mst-files.s3.eu-west-1.amazonaws.com/s3fs-public/ggf/book/2019-04/Optional%20Charge%20Analysis%20%28with%20changes%20tracked%29%20%28National%20Grid%29%20v1.3.pdf

[21] This represents the percentage of the nine modelled routes rather than the 48 that are modelled under other NOC options. In comparison to the full 48 routes, the percentage of modelled flows that use shorthaul would be 6%.

[22] While the Wheeling charge is restricted to entry and exit points separated by a 0km distance, a straight-line methodology is used to calculate this and it can differ from the pipeline distances registered by NGGT within its pipeline book. Therefore, it is possible for the registered physical distance to be slightly greater than 0km.

Table 0.2: Revenue recovered from NOC users (TD, 2030-31)

Tariff option	Total volume of short-haul flows (TWh/year)	Amount of revenue from NOC (£18/19m)	Average 'shadow' tariff per unit of flow (p/kWh) (£18/19)	Annual lost revenue that would be recovered from NOC users with standard tariff (£18/19m)[23]
Status quo	171	58[24]	0.0337	92
CWD, Method 1	138	26	0.0191	95
CWD, Method 2	52	18	0.0344	38
PS, Method 2	72	32	0.0447	52
CWD Wheeling	22	7	0.0323	17

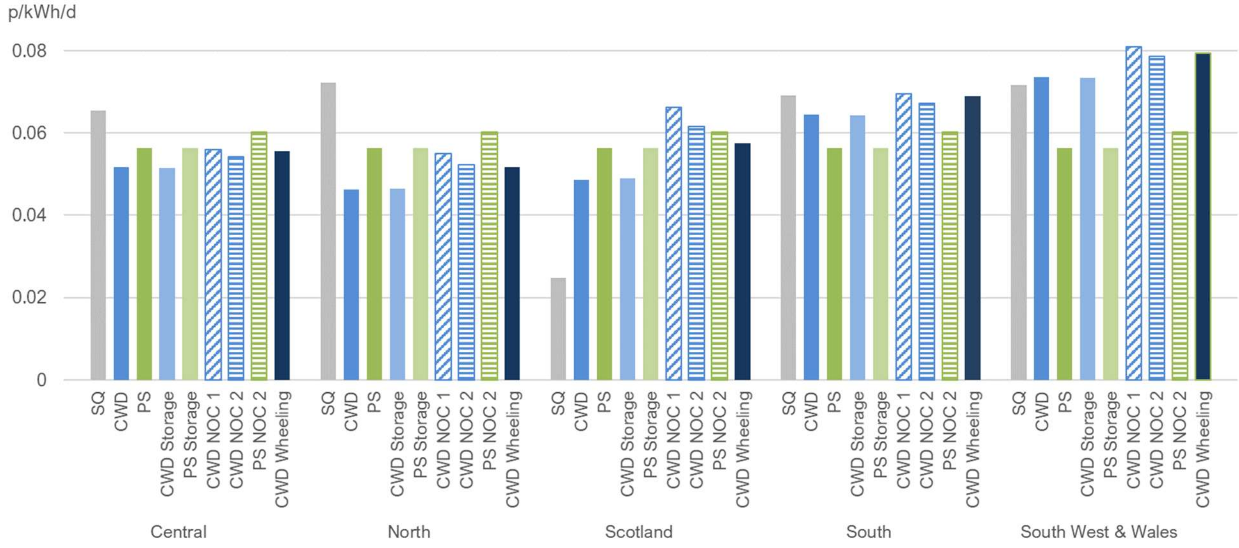
Regional variation of tariffs

1.51. Where regional dispersion is present within the tariff methodology, this is indicated by the range of tariffs which are set out in the analysis presented above. Given that the exit tariffs paid by shippers at GDN exit points are likely to represent a direct impact on the bills of consumers who are connected at that GDN, we consider in Figure 0.12 the impacts of the tariff options on GDN exit tariffs in each region.

1.52. This shows that all options are likely to reduce the regional dispersion of GDN tariffs relative to the status quo. The most significant reductions in tariffs are for Northern and Central GDN exit points whereas the most significant increase is observed for GDN exit points in Scotland. Options which include a CWD RPM retain some tariff dispersion and result in tariffs at some exit points going up while others are reduced relative to the status quo. PS options result in constant tariffs across all GDN exit points.

[23] Note that this does not account for the potential for any network user decisions to bypass the NTS.
[24] Note that under the status quo, this figure includes both capacity and OCC revenue from users that take up the OCC. This has no impact on the lost revenue, which continues to represent what would have been recovered if OCC users were liable for the standard entry and exit commodity tariffs.

Figure 0.12: GDN annual exit tariffs by region (TD, 2030/31, £18-19)



Wider systems impacts

1.53. As noted by CEPA in their modelling report, it is important to consider the mechanism for changes in consumer welfare arising from the modelling of changes to transmission tariffs. As they explain, changes to consumer welfare may result not only from the direct tariff impacts but also from the resulting changes in the gas wholesale market prices.

1.54. Wholesale gas prices are affected by the marginal price setting supply source and the effect that the tariff has on the costs of entry capacity at that source. Where tariff reform leads to an increase in the tariff of the marginal supply source, and where that marginal source is not replaced by another which becomes cheaper, then the wholesale market price will increase. On the other hand, where the tariff is lower for the marginal supply source, this would result in a decrease in the wholesale price.

1.55. In that context, CEPA note that assumptions used to approximate real world behaviours in the modelling should be taken into account in interpreting modelling results. In practice, the dynamics of supply and demand may differ from that modelled, leading to differences in the marginal source, which may impact on welfare estimates. We note that the Steady Progression sensitivity helps to test the impacts of reform under a different set of supply and demand assumptions.

1.56. CEPA also note that there are wider considerations beyond short-term consumer welfare which should be taken into account in protecting the ongoing interests of gas consumers. For example, to the extent that producer surplus is reduced, this may have some impact on investment and closure decisions of market participants.

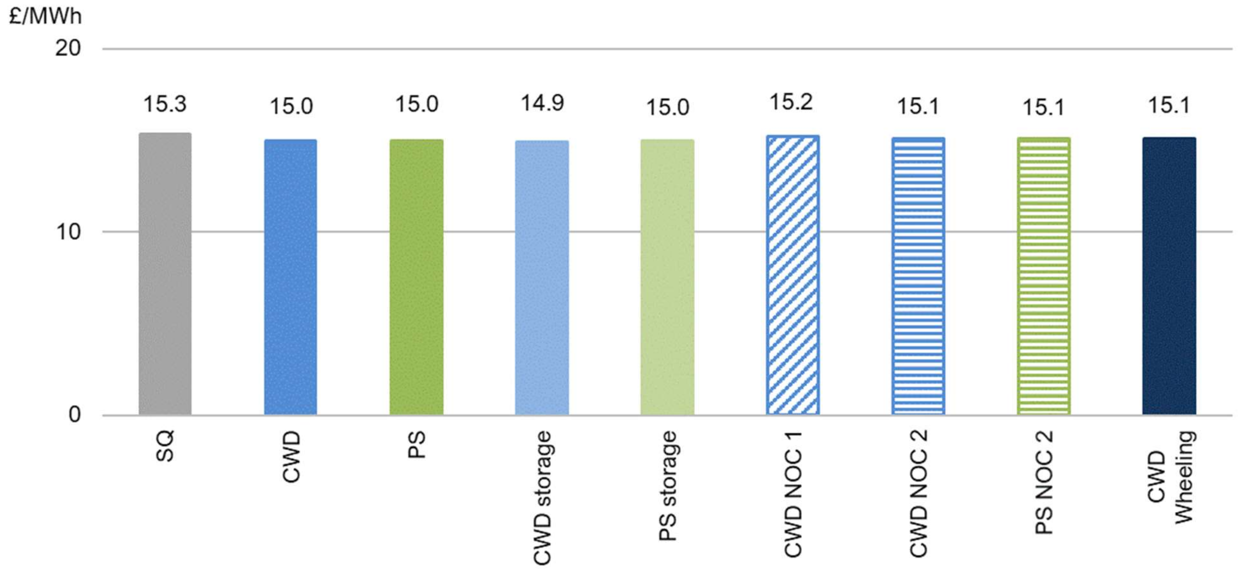
1.57. In this section, we firstly summarise CEPA's estimates of the impacts on the gas market price before summarising their consumer welfare results. We then present CEPA's estimated bill impacts for some key consumer types before summarising the impacts on gas producers, interconnectors, storage facilities and gas fired power stations.

Impacts on gas market prices

1.58. Given the scale of the transmission tariff in proportion to other elements of the wholesale gas price, CEPA estimates relatively small changes in the wholesale gas price (see Figure 0.13).

1.59. CEPA's modelling estimates that the wholesale gas price will be lower for all modifications than is observed under the status quo. Figure 0.13 below shows the modelled change in gas wholesale market prices for each option under the Two Degrees scenario in 2030-31.

Figure 0.13: Estimated gas wholesale market price impacts under each option ((TD, 2030-31, £18/19))



Source: CEPA

Consumer welfare estimates

1.60. Although the differences in the wholesale gas price is relatively small, the impacts on consumers are magnified by the quantity of demand. CEPA estimate that gas demand in 2030-31 is approximately 750 TWh per year. Therefore, even a reduction in the wholesale gas price of £0.1/MWh leads to a consumer welfare benefit of approximately £75 million each year.

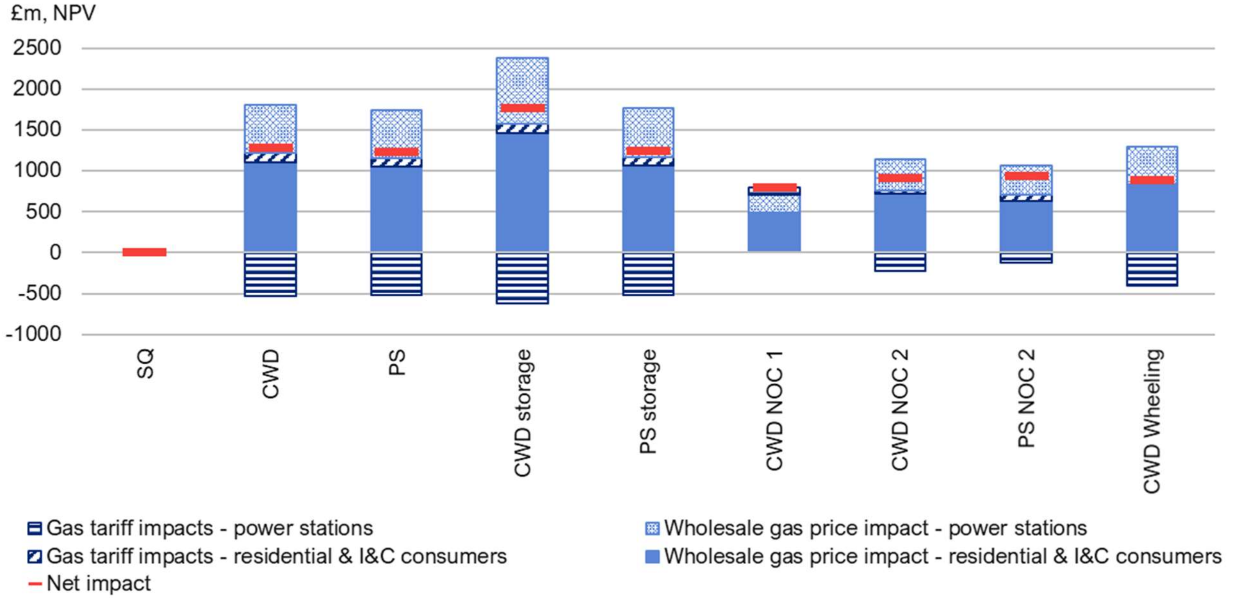
1.61. In addition to the benefits resulting from changes to the gas wholesale price, consumer welfare will also be affected directly by the tariff at GDN exit points which we assume is passed onto domestic consumers directly. We presented the impacts on GDN tariffs in general in Figure 0.12. In addition to tariffs paid by NTS-connected consumers, we include the impact of the GDN tariff in our estimates of total consumer welfare.

1.62. In practice we observe the magnitude of consumer welfare benefits of the change to the market prices significantly outweighing the direct benefits of the transmission tariff.

1.63. We present consumer welfare relative to the status quo resulting from gas market impacts in Figure 0.14. The consumer welfare estimates reflect the market price impacts that we observed in the section above. Where the gas price is lower, we observe higher consumer welfare and vice versa.

1.64. All options lead to higher consumer welfare than the status quo, with marginally higher welfare observed under the CWD than PS RPM. Welfare is further increased where the CWD RPM is coupled with an 80% storage discount. In general, those options which do not include a NOC result in a higher level of welfare than those that do. However, we note from CEPA's modelling that this result is more muted under the SP scenario.

Figure 0.14: Consumer welfare impacts resulting from gas market (TD, NPV, 2022-31, discounted to £18-19)



Source: CEPA

Benefits from 2022 - 2031 (NPV £bn, discounted to £18/19) under Two Degrees

	UNC678 (CWD)	UNC678A (Postage Stamp)
Gas domestic consumers	£0.75bn	£0.72bn
Gas non-domestic consumers	£0.46bn	£0.43bn
Gas-fired power generators (gas market impacts only) [25]	£0.06bn	£0.08bn
Total gas consumers	**£1.28bn**	**£1.23bn**

Source: CEPA

[25] We note that this does not include any impacts on the electricity market revenues of gas-fired power generators which we would also expect to be affected.

Bill impacts for specific consumer types

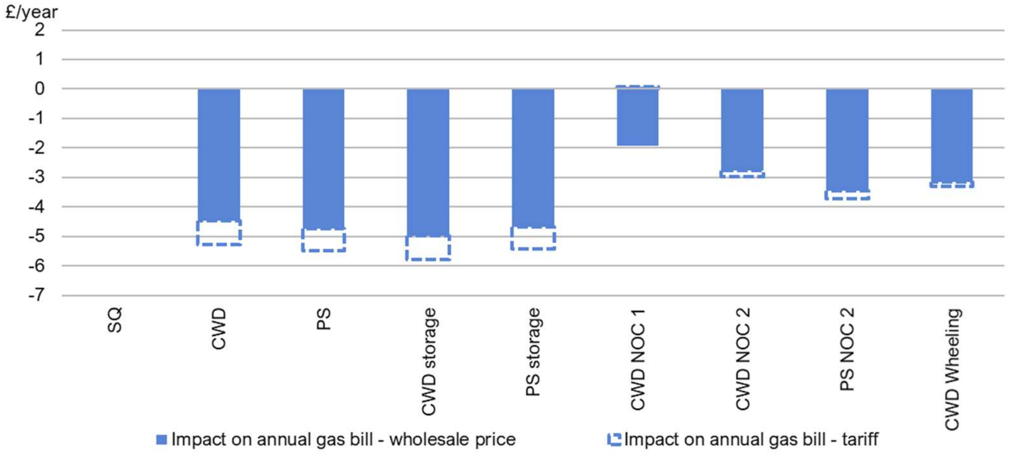
1.65. CEPA estimated the impact on annual gas and electricity bills for a range of consumers with different assumed levels of consumption. Here, we present the estimated bill impacts for a representative domestic consumer with the median level of gas consumption. We also show the bill impact for an LDZ connected non-domestic consumer with median gas consumption and an NTS connected non-domestic consumer.

1.66. Given that that the wholesale gas price affects *each* type of consumer in the same way, proportionate to their volume of gas consumption, we observe the same trend for the wholesale gas price impact for each consumer type. For LDZ connected consumers, the same applies to the impact of changes to tariffs at GDN exit points.

1.67. However, the impact on bills resulting from changes to tariffs is different for NTS connected consumers, many of whom use the shorthaul product for some proportion of their flows under the status quo. While NTS-connected I&Cs benefit from the reduction in the gas price in a similar way to other consumers, loss of the shorthaul discount means that they face an increase in their gas tariff on average under the modification options. Combining the two effects and considering the average across this consumer class, CEPA estimate a slight increase in bills under all modification options except for CWD NOC 1 and the CWD Wheeling option. The tariff increase component is slightly higher under PS methodologies than under CWD.

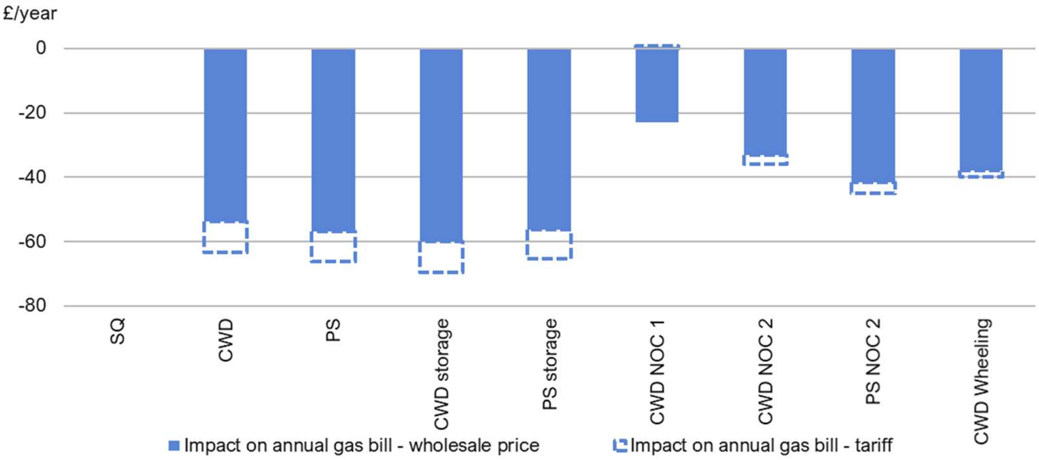
1.68. The following figures show the total bill impacts on different types of consumers resulting from the modification options. We show the combined impact of the change to the wholesale gas price and the change to the tariff at the relevant exit point. For example, the total impact on bills for the median consumption domestic gas consumer is a reduction of approximately £5.50 per year (£18/19) under the postage stamp option relative to the status quo. This results from the wholesale price effect which makes up close to £5 per year and the reduction in the LDZ exit tariff which makes up just over £0.50 per year.

Figure 0.15: Estimated bill impact for median consumption domestic gas consumers (TD, 2030-31, £18/19)



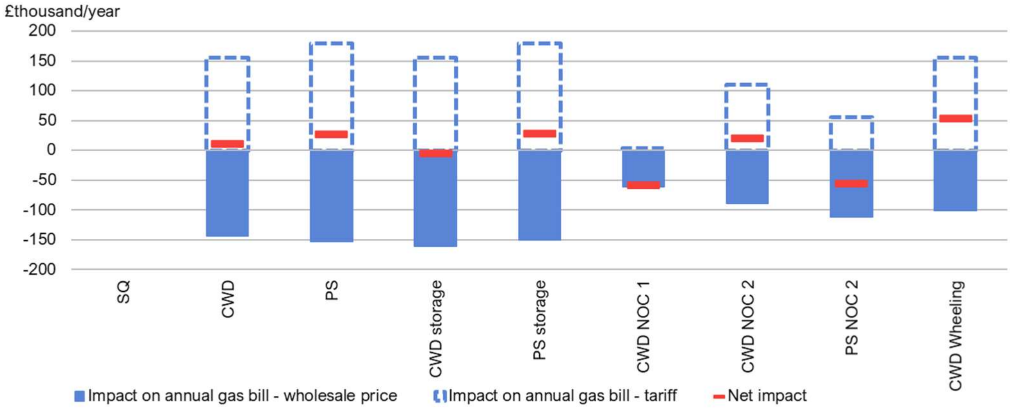
Source: CEPA

Figure 0.16: Estimated bill impact for the median non-domestic consumer connected to the LDZ gas network (TD, 2030-31, £18/19)



Source: CEPA

Figure 0.17: Estimated bill impact (gas only) for the median non-domestic consumer connected to the NTS (TD, 2030-31, £18/19)



Source: CEPA

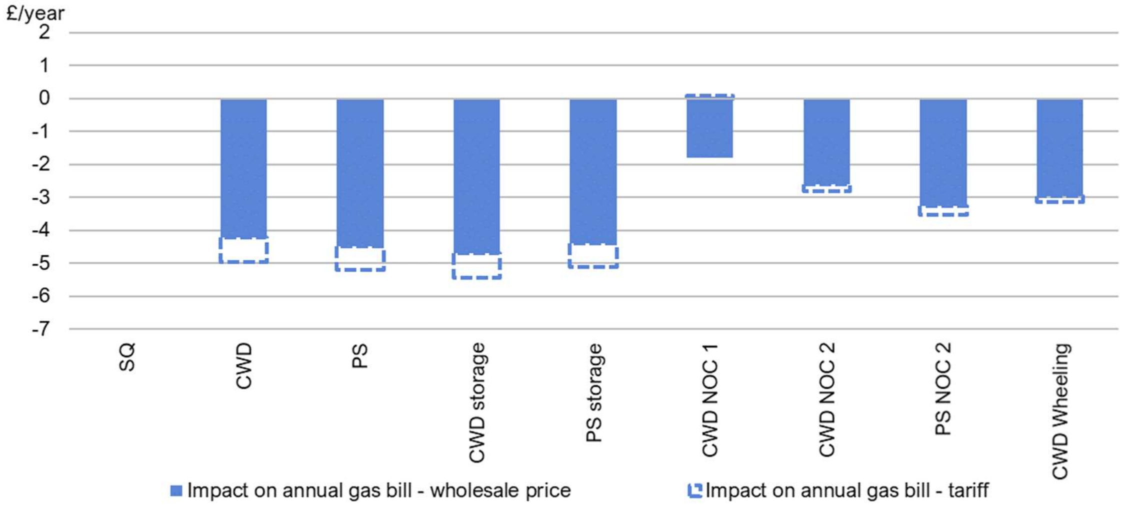
Impacts on vulnerable consumers

1.69. In the context of vulnerability, CEPA focussed on the potential impacts on fuel poor consumers. They measured the impact on annual gas bills for the most fuel poor quintile domestic gas consumers drawing on BEIS National Energy Efficiency Data-Framework (NEED) statistics.

1.70. CEPA also considered the regional variation of impacts which may result from the dispersion of GDN exit tariffs as shown in Figure 0.1. This may result in variation of the tariff portion of the impact, though we note that this is smaller than the wholesale gas price impact.

1.71. Figure 0.18 shows the combined impacts on the most fuel poor quintile of domestic gas consumers resulting from the change to the wholesale gas price and to the GDN exit tariff. These impacts combine to give the total impact on the most fuel poor quintile domestic consumer. In all cases tariff reform is expected to lead to a decrease in the level of the gas bill.

Figure 0.18: Estimated bill impact for the most fuel poor quintile domestic gas consumers (TD, 2030-31, £18/19)



Source: CEPA

Impacts on market participants

1.72. In addition to the impacts on consumers, CEPA estimated the effects on the revenues of market participants. Given a lack of accurate cost information, CEPA noted that their estimates are based on a number of assumptions and so, should be considered indicative.

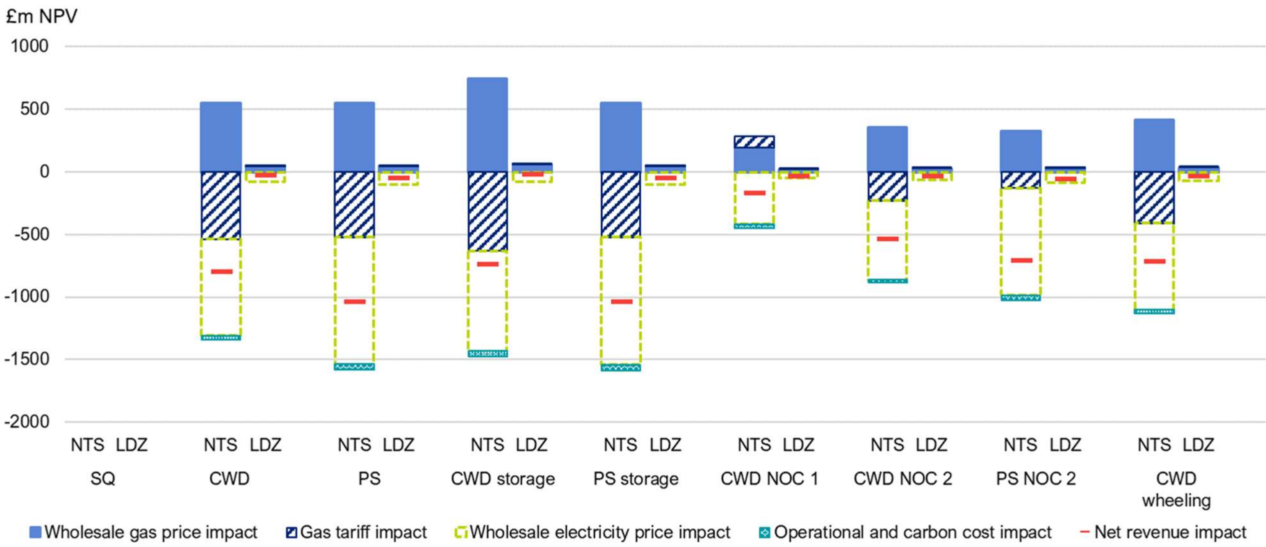
Impacts on gas-fired power stations

1.73. CEPA analysed the impacts of the options on NTS and LDZ connected gas-fired power stations. Their results are shown in Figure 0.19.

1.74. In addition to the direct impact of any changes to the exit tariff, power stations are affected by both the reduction in the gas market price (positive revenue impact) and the reduction in the wholesale electricity price (negative revenue impact). CEPA discussed the fact that the net effect of both impacts depends on the level of tariff dispersion which results from the tariff methodology. Where the level of dispersion is high, inframarginal generators can benefit from larger revenues based on the wider differential in the gas costs between the marginal and inframarginal units. The upwards pressure on the electricity price allows inframarginal generators to make greater inframarginal rents. A low dispersion of tariffs results in less of a differential in the costs between marginal and inframarginal units and hence a greater reduction in revenues for power stations as a whole.

1.75. This explains the expected reduction in revenues relative to the status quo (in which tariff dispersion is greatest) and that the most significant reduction in power station revenues is observed where a PS RPM is used.

Figure 0.19: Estimated impacts of modification options on gas-fired power stations



Source: CEPA

Impacts on gas producers

1.76. CEPA estimated the gross revenues of beach terminals, onshore fields and LNG terminals under each option. For the analysis of these forms of supply, any reduction in flows is priced at the NBP with no operational costs included in calculations. Importantly, neither do CEPA value the option of selling gas to other markets (where relevant) or the value of gas held in store. [26]

1.77. The results suggest that beach terminal surplus is likely to reduce under most options given the reduction in the wholesale gas price. CEPA found that revenues reduce to

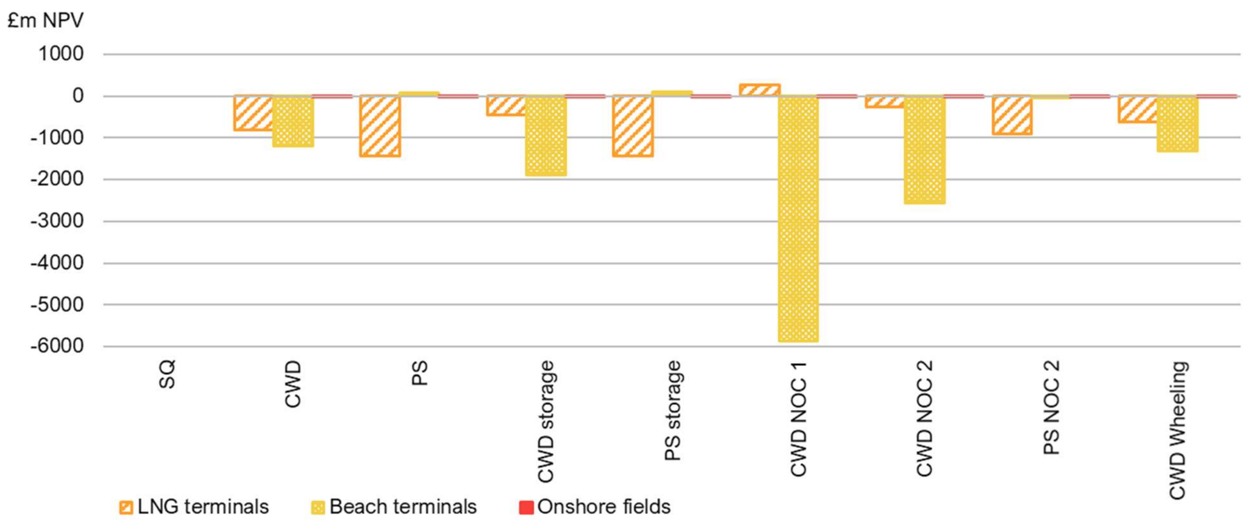
[26] I.e. analysis of impacts on revenues only consider the internal GB market rather than the global gas market, and within the period 2022-31 only.

a greater degree within those options which include a CWD RPM as a result of the higher tariff faced by beach terminals relative to other entry points.

1.78. The results also show that the revenues of beach terminals are particularly affected by the combination of the CWD RPM with the CWD NOC Methodology 1 in which some flows from beach terminals are substituted by entry flows from interconnectors (see Figure 0.21).

1.79. LNG revenues are also affected by the lower gas price but the reduction in revenues is less under the CWD options than with a PS RPM. In combination with NOC Methodology 1, LNG terminals make higher revenues than under the status quo despite the reduction in the wholesale price.

Figure 0.20: Impacts on revenues of LNG terminals, beach terminals and onshore fields (NPV, 2022-2030, £2018/19)



Source: CEPA

Impacts on interconnectors and cross-border gas flows

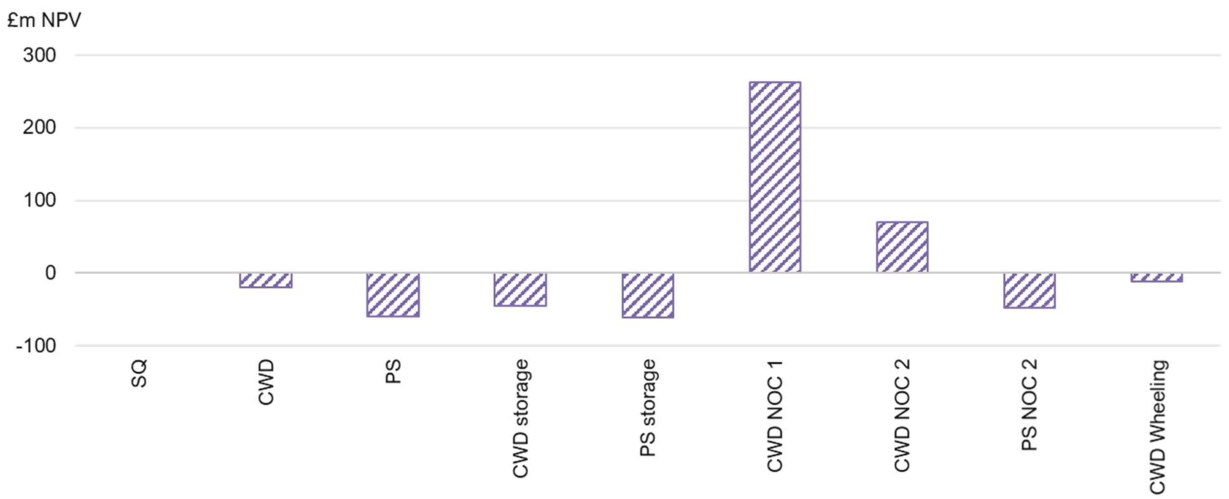
1.80. CEPA estimated revenues for continental gas interconnectors based on the price spread between GB and neighbouring countries[27] and after discounting entry and exit

[27] In the modelling this includes Ireland, Belgium and the Netherlands.

tariffs. Continental gas interconnector revenues are estimated to be slightly lower than under the status quo under most modification options other than for the CWD NOC 1 and CWD NOC 2 options. In practice we note that these revenues will be highly dependent on price spreads between GB and the continent.

1.81. Considering the Moffat exit point, CEPA discuss the potential impacts on Irish, Northern Irish and Isle of Man gas consumers. They assume that wholesale price changes and exit tariff changes are likely to be passed onto these consumers to some extent. Based on that assumption, they identify opposing impacts under most modifications. They assume that lower NBP prices would be passed onto Irish, Northern Irish and Isle of Man consumers but identify a higher effective exit tariff[28] at Moffat as exit flows can no longer make use of the shorthaul discount (Figure 0.22). The only exception to the higher exit tariff at Moffat is under the CWD Wheeling methodology in which exit flows at Moffat receive a 95% discount on the exit tariff.

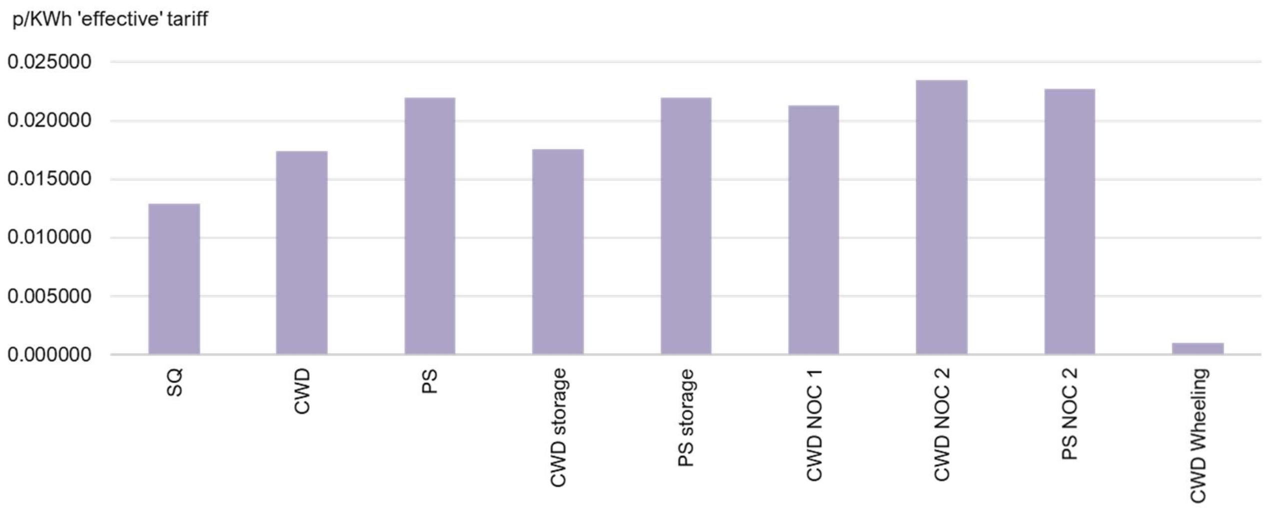
Figure 0.21: Impacts on revenues of bidirectional gas interconnectors (NPV, 2022-2030, £2018/19)



Source: CEPA

[28] I.e. incorporating the historic proportion of flows that use different products and including the existing shorthaul discount.

Figure 0.22: Impacts on Moffat interconnector effective tariff (p/kWh(/day) 2030/31, £2018/19)



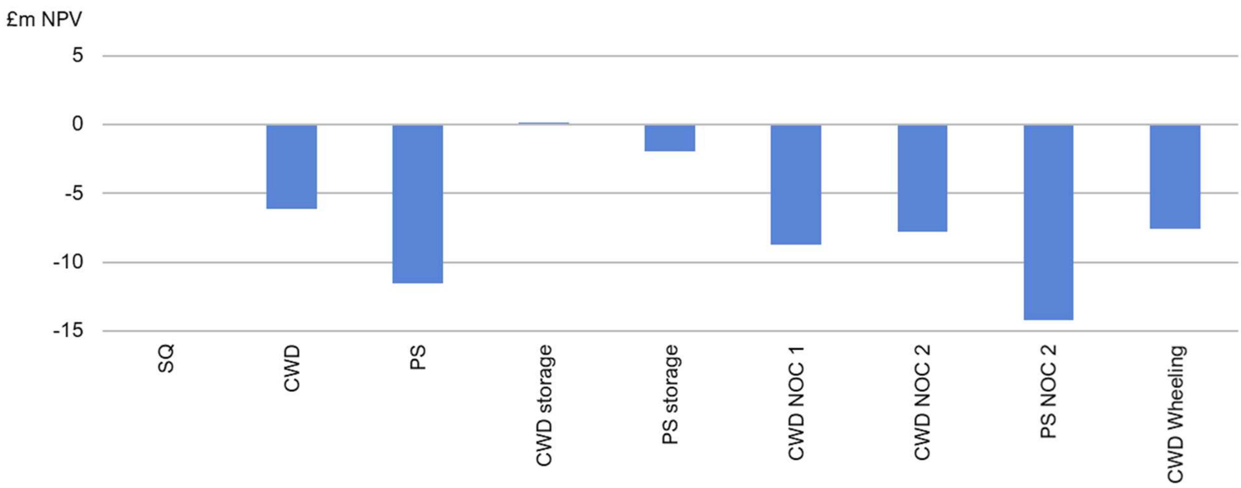
Source: CEPA

Impacts on storage operators

1.82. As gas is both injected and withdrawn from storage, the revenues associated with the change in the wholesale price are likely to be more sensitive to assumptions which impact on entry and exit gas flows than for other points. CEPA therefore focussed primarily on the direct impact of the tariff on gas storage revenues.

1.83. Their analysis shows that storage operator revenues may be significantly affected by changes to the tariff arrangements. Reductions in revenues are lower where a CWD RPM is used. The impact of tariff reform on storage revenues is significantly smaller where an 80% storage discount is included.

Figure 0.23: Impacts of tariff arrangements on storage operator revenues (NPV, 2022-2031, discounted to £18/19)



Source: CEPA

Potential impacts on investment and closure decisions

1.84. Based on their analysis of the impacts on market participant revenues, CEPA considered the potential for tariff reform to affect investment and closure decisions of gas supply sources and of power stations.

1.85. For power stations, CEPA developed estimates of the levelised impact on revenues in order to compare these with BEIS estimates of the levelised cost of electricity ("LCOE")[29]. They found that even under the option with the greatest potential impact on revenues of gas-fired power station, the impact on revenues would be approximately 1.3% of the LCOE for a power station commissioning in 2025, suggesting that this would only impact on investment decisions at the margin. Considering the operational costs of a plant only, they estimated that the impact may rise to approximately 1.8% of LCOE, but that this would represent an over-estimate. Therefore, CEPA did not expect tariff reform to have a significant impact on power station closure.

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29 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/566567/BEIS_Electricity_Generation_Cost_Report.pdf

1.86. CEPA considered whether there may be an impact on plant location by comparing the impact of tariff options with locational TNUoS charges. They suggested that the reduction in tariff dispersion as a result of a move away from the status quo could reach a maximum of approximately 29% of the dispersion of TNUoS charges for an LDZ-connected power station and 12% of TNUoS charges for an NTS-connected power station under the PS RPM. There may be some impact of tariff reform on location but CEPA expect this to be relatively small in comparison to the TNUoS charge.

1.87. While revenues for continental gas interconnectors fall slightly relative to the status quo under most modification options, CEPA's analysis suggests that tariff reform is unlikely to result in early closure of gas interconnectors whom they would expect to retain positive overall revenues and continue to recover operating costs. However, they note that the choice of RPM could have an impact on investment and refurbishment decisions at the margin[30].

1.88. CEPA do identify the potential for the choice of tariff option to contribute to storage investment and closure decisions. The nature of tariff arrangements that are in place at storage entry and exit points under the status quo means that almost all options are likely to lead to an increase in transmission tariffs at storage points[31] (potentially with the exception of the CWD RPM coupled with an 80% storage discount). This could have the knock on impact of reducing flows of gas into and out of gas storage facilities impacting on revenues.

1.89. After deducting the costs of gas at the wholesale price and estimates of operational costs, they note that based on their NPV estimates of storage surplus, the impacts of the tariff could be significant, representing a reduction in surplus of up to 76%.

[30] For example, they note the potential for this to impact on the investment case for bidirectional flow capability for BBL.

[31] We note that CEPA advised caution in interpreting results given complexities of modelling behaviour of gas storage facilities.

Table 0.3: Percentage change in total storage revenues as a result of changes to tariffs (tariff impact only – no wholesale gas price impact included) (TD, NPV, 2022-31)

Option	Percentage change in revenues of gas storage facilities as a direct result of changes to entry and exit tariffs
SQ	N/A
CWD	-33%
PS	-62%
CWD storage	1%
PS storage	-10%
CWD NOC 1	-47%
CWD NOC 2	-42%
PS NOC 2	-76%
CWD Wheeling	-41%

Source: CEPA

Potential for bypass of the NTS

1.90. CEPA also performed analysis of the risk of profitable bypass of the NTS.[32] Drawing on NGGT estimates of the costs of building gas pipelines, they compared the NPV of the costs associated with a bypass pipeline with the NPV of the savings results from avoiding NTS tariffs.

1.91. CEPA noted that a number of cost areas are difficult to establish. For example, they did not include costs relating to use of land, legal costs, or risks associated with supply or network constraints over the gas pipeline. Hence, they consider that their results of the extent of possible bypass are indicative and represent an over-estimate. We note also that we have received confidential representations from several stakeholders that indicate the actual likelihood of bypass is likely to be site-specific.

[32] CEPA estimated bypass to be 'profitable' where the avoided costs to a network user resulting from no longer paying network tariffs for use of the NTS would allow the estimated costs of building a bypass pipeline to be recovered within a five year period. To estimate the costs of building a bypass pipeline, CEPA adapted a cost function developed by NGGT. For an explanation of how costs of building a bypass pipeline were estimated and for CEPA's discussion of the costs which were and were not included, please see section 2.1.4 of CEPA's analytical report.

1.92. CEPA carried out analysis assuming a five-year payback time requirement for those considering NTS bypass. We consider this time horizon to be broadly consistent with commercial timeframes of many market participants.

Table 0.4: Indicative number of routes and volume of flows additional to the status quo that may present a credible risk of bypass of the NTS (TD, 2030-31, five year payback time)

Tariff option	Number of routes additional to the status quo that may present a credible risk of bypass[33]	Modelled eligible flows additional to the status quo that may present credible bypass risk (TWh/year)	Potential additional lost transmission revenue if all additional credible bypass routes choose to bypass the NTS (TD, 2030-31, £m 18/19)[34]
CWD	2	12	32
PS	3	25	36
CWD storage	2	12	32
PS storage	3	25	36
CWD NOC Method 1	0	0	0
CWD NOC Method 2	0	0	0
PS NOC Method 2	0	0	0
CWD Wheeling	1	7	19

1.93. CEPA's analysis suggests that the number of routes that present a credible bypass risk may increase in the absence of a NOC. Depending on whether the CWD or PS RPM is used, the volume of flows additional to the status quo which may present a risk of bypass is either 12 or 25 TWh/year respectively. We note that the differences between eligible flows that may present credible threat of bypass under the CWD and PS (i.e. 12 TWh/year and 25 TWh/year respectively) is more significant than the potential lost revenue under each

[33] There is a total of 48 eligible routes that made use of the OCC in the gas year 2017-18. These are the routes that we have modelled as 'eligible' within the bypass modelling.
[34] Note that the relationship between the volume of flows that might bypass the NTS and the amount of lost revenue is not linear. Instead, this depends on the revenue contributions associated with the bypass route in the presence of the relevant tariff arrangements (e.g. they would be different depending on whether a CWD or PS RPM was used).

option (£32m and £36m respectively). This is because flows on some routes contribute more revenue than others under the relevant RPM in the absence of bypass.

1.94. The eligibility criteria applied within the Wheeling methodology leads to the potential for one additional route posing a bypass risk relative to the status quo. Under all other NOC methodologies, the credible risk of bypass is no higher than under the status quo.

Appropriate design of NOC products

1.95. Combining their analysis of the take-up of the NOC and risk of bypass of the NTS, CEPA also considered whether the design of each NOC methodology proposed was appropriately targeted and with an appropriate level of discount. They considered two separate questions in relation to the NOC:

1) Is the NOC methodology appropriately *targeted* so that it is only available to those routes that present a credible risk of bypass in the absence of a NOC?

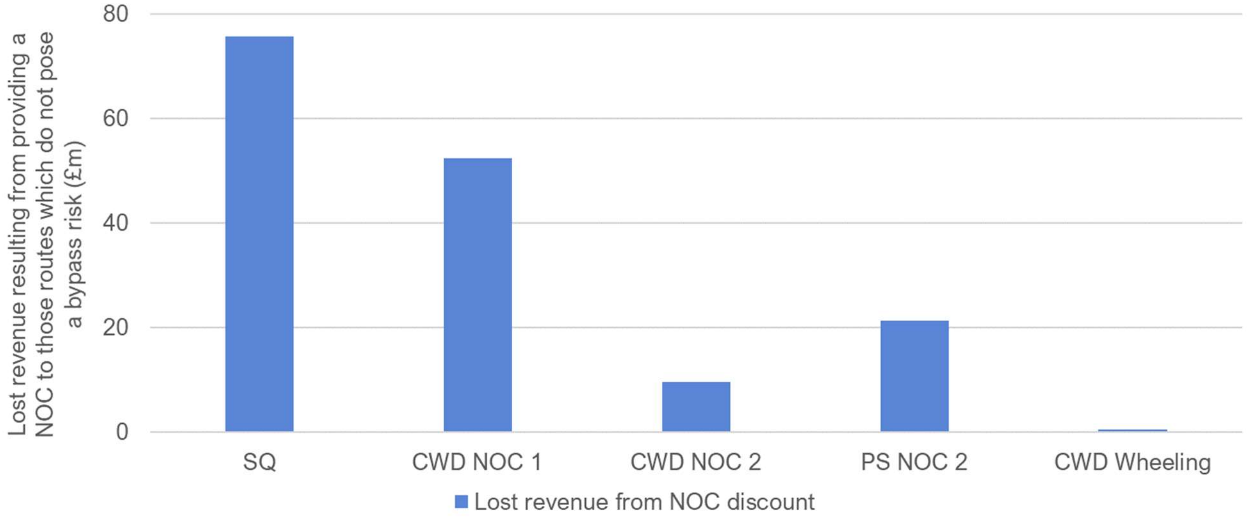
2) For those routes that do present a credible risk of bypass, is the *level* of NOC appropriate so that it achieves the optimal balance between avoiding bypass and avoiding lost revenue due to the level of the discount?

1.96. In the context of question 2, CEPA noted that their analysis could allow for consideration of the level of the NOC in the *aggregate* but that the appropriate level of the NOC for each individual route would be dependent on its particular characteristics.

1.97. We present CEPA's estimates of lost revenue as a result of inappropriate targeting (question 1) in Figure 3. This suggests that the existing OCC and NOC Methodology 1 are inappropriately targeted in that they provide a NOC discount to a number of routes that do not present a credible bypass risk.

1.98. The appropriateness of targeting under NOC Methodology 2 partly depends on the risk of bypass under the counterfactual RPM (i.e. CWD or PS). Given the eligibility restrictions, the level of lost revenue due to inappropriate targeting is low for the Wheeling methodology.

Figure 0.24: Annual lost revenue by providing the NOC to routes that do not present a risk of profitable bypass of the NTS (2030-31, £18-19, assuming required payback time of five years for bypass to be commercially attractive)



Source: CEPA

1.99. We present CEPA's analysis of the appropriate level of the discount (i.e. question 2) in Figure. The diagonal striped column shows the total amount of revenue that may be lost as a result of bypass of the NTS. The dark blue column shows the amount of revenue which is lost as a result of the discount provided to those routes that present a risk of bypass without a NOC but no longer bypass once the NOC is introduced.

1.100. CEPA note that the theoretical optimum is to reduce the diagonal striped bar to zero so that there are no routes which continue to present a credible bypass risk, while minimising the amount of discount which is provided to achieve this (the dark blue bar). The discount provided to achieve zero credible bypass cannot be reduced completely to zero as some discount will always be required to prevent bypass, resulting in lost revenue.

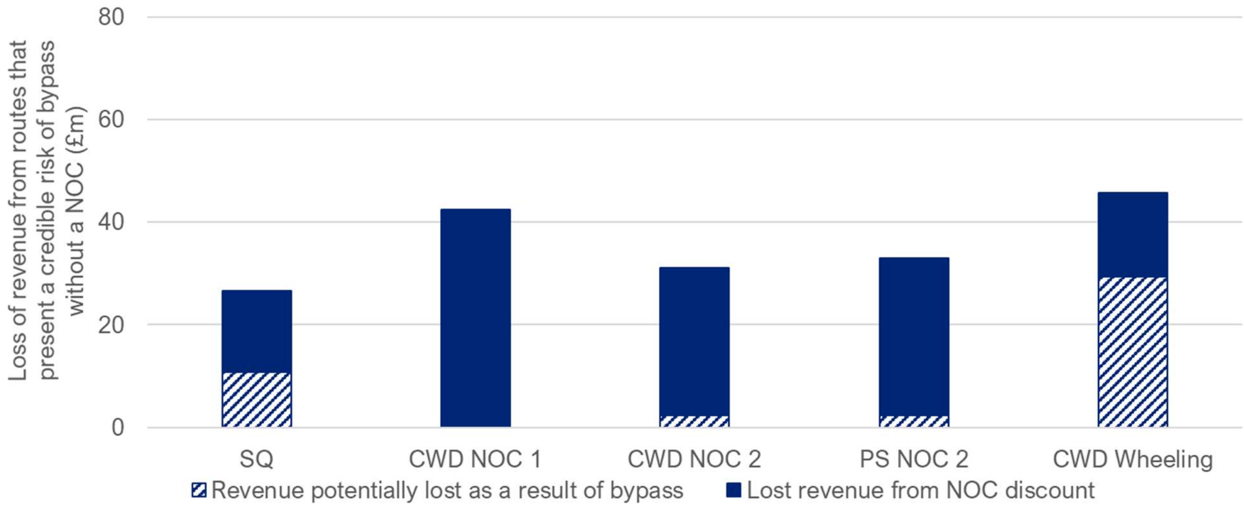
1.101. CEPA's analysis shows that, for those routes that do present a bypass risk, NOC Methodology 1 may provide a more significant discount than is needed to prevent bypass. On the other hand, the CWD Wheeling methodology may not sufficiently capture those routes that present a bypass risk, suggesting potential for lost tariff revenue as a result.

1.102. CEPA note that this analysis helps to show the appropriateness of the level of the revenue in the aggregate but does not consider the distribution of the NOC discount. For example, while a small amount of revenue is lost from bypass under NOC Methodology 2 (both CWD and PS), a significant amount of revenue is lost from the level of the discount.

It may therefore be possible to design a more effective NOC discount which eliminates bypass risk but is more efficiently levied, relative to the levelised cost of bypass of individual route combinations.

1.103. As noted in paragraph 1.91, CEPA noted a number of cost areas that are not included within the analysis which lead them to conclude that their analysis over-estimates the credible risk of bypass. This is demonstrated in the figure below which shows that some risk of bypass is present within the status quo. We do not believe that this likelihood is high with the present design of the OCC, particularly given the observed actual rate of bypass.

Figure 0.25: Annual lost revenue from those routes that present a credible bypass risk in the absence of the NOC (dark blue = revenue lost as a result of bypass, diagonal stripes = revenue lost as a result of the NOC discount from those presenting risk of bypass, TD, 2030-31, £18-19)



Source: CEPA

Impacts on the environment

1.104. A reduction in the wholesale gas price could lead to an increase in demand for gas, and thus to increased carbon emissions. CEPA's modelling assumes that residential and I&C consumers have inflexible demand in response to price (other than some demand side response for I&C consumers at very high gas prices), which we consider to be an appropriate assumption for the small variations in price being considered under this IA. Variation in demand in response to price is hence only modelled for gas-fired power stations. CEPA estimates that there would be a relatively small increase in carbon emissions from power generation as a result of the options under consideration. Given the small increment of change to the wholesale gas price, we would expect the overall impact on gas demand and hence on emissions also to be small.

Appendix 2: Ofgem impact assessment

Summary: Intervention and Options

0678/A/B/C/D/E/F/G/H/I/J - Amendments to Gas Transmission Charging Regime			
Division:	Systems and Networks	**Type of measure:**	Gas Transmission Charging
Team:	Gas Systems	**Type of IA:**	Qualified under Section 5A UA 2000
Associated documents:	CEPA analytical report and final decision, published alongside this document	**Contact for enquiries:**	Gas.TransmissionResponse@ofgem.gov.uk

We have been asked to make a decision on proposals[35] to change the UNC relating to the GB gas transmission charging arrangements. The proposals have been through an industry workgroup process and consultation. As a result of the impact that the changes may have, we have decided to publish an Impact Assessment.

What is the problem under consideration? Why is Ofgem intervention necessary?

The network is largely operating below capacity due to lower demand, falling domestic production, and increased imports via interconnectors and shipped LNG. Declining gas volumes have a negative impact on National Grid Gas Transmission's ("NGGT") revenue collection, which is made more problematic by the existing capacity allocation and charging

[35] The proposals consist of the original Modification Proposal and 10 Alternatives. In this document we refer to them all collectively as "proposals".

arrangements. As a consequence of these arrangements, NGGT recover an increasing proportion of their revenues from commodity-based charges.

Changes to the gas transmission charging regime are also necessary to implement the European network code on Gas Tariffs ("TAR NC").

What are the policy objectives and intended effects including the effect on Ofgem's Strategic Outcomes

By making a policy decision on the proposed modifications, we intend to respond to these significant and ongoing structural changes in the GB gas market, and to ensure compliance with EU legislation (Regulation (EU) 2017/460 ("the European Network Code on harmonised transmission tariff structures for gas") (TAR NC)).

What are the policy options that have been considered, including any alternatives to regulation? Please justify the preferred option (further details in Evidence Base)

We have considered UNC678 and the full range of alternative modification proposals put forward to us (11 modifications in total). The modifications share a number of features but differ in respect of several characteristics which are set out in the main document.

Preferred option: Monetised Impacts (£m)

Preferred option	**UNC678A Postage Stamp (PS)**
Business Impact Target Qualifying Provision	N/A
Business Impact Target (EANDCB)	N/A
Net Benefit to GB gas consumers	Central case (2019 FES Two Degrees): £1,232 million (TD, NPV, 2022-31, £18/19) Sensitivity (2019 FES Steady Progression): £830 million (SP, NPV, 2022-31, £18/19)

Explain how was the Net Benefit monetised

Costs and benefits have been modelled for the gas years 2022/23, 2026/27 and 2030 (gas years from 1st October). These have then been interpolated (straight line) between the three modelled years for the period 2022-2031. We use 2018-19 prices and we apply the standard social time preference rate (STPR) discount rate of 3.5%.

These benefits are limited to the gas market and do not include the effects that changes in tariffs and in the wholesale gas price may have on electricity consumers. CEPA has estimated potential electricity market impacts in its technical report.

Preferred option: Hard to Monetise Impacts

Describe any hard to monetise impacts, including mid-term strategic and long-term sustainability factors following Ofgem IA guidance

By enhancing competition and removing distortions from the gas transmission tariff arrangements, the chosen option should facilitate effective competition and an efficient supply mix. This should support medium and long term security of supply objectives.

Where tariff reform leads to a reduction in the wholesale gas price (compared to the status quo counterfactual), as our modelling suggests, this may lead to an increase in gas demand from domestic consumers and from I&Cs. This in turn may lead to an increase in carbon emissions. We would expect the impact to be small, given typically low price elasticity of demand for gas for domestic heating, and the small magnitude of the change to the wholesale gas price. CEPA's modelling assumes that domestic and I&C gas demand is inflexible (which is appropriate given the small variations in price being considered) and so the impact of an increase in gas demand on carbon emissions in all sectors other than the power sector are not modelled.

As our analysis has suggested, tariff reform may impact on the revenues of gas producers, gas storage, interconnectors, I&C consumers, and gas-fired power generators. In most cases, we would only expect impacts of the magnitude that we have identified to impact on the investment or closure decisions of these market participants at the margin. The exception is for gas storage facilities where we do identify the potential for more significant impacts on revenues.

We expect the preferred option to have some distributional impacts across regions and across different groups of consumers. CEPA's report outlines some of the potential distributional impacts, for instance on fuel-poor households.

The modelling undertaken by CEPA indicates that there may also be benefits to electricity consumers from this decision, as set out in CEPA's Analytical Support document. We can have regard to the potential impacts on the electricity market when making our decision. Our primary focus was on the impacts on gas consumers.

Key Assumptions/sensitivities/risks

A number of assumptions have been made within the modelling that are set out in full in the consultants' analytical report.

The benefits for consumers are likely to be sensitive to supply and demand fundamentals which are observed in practice. Given that different options may have quite different impacts depending on the effect that they have on the marginal unit of gas or electricity supply, where the marginal unit differs from that modelled, the consumer welfare impacts may change from that estimated.

The reductions in the electricity wholesale price may reduce the revenues of electricity generators. If they seek to recover any revenues which are lost from the capacity market, some of the benefits may be counterbalanced by higher capacity market costs. We think the impact is likely to be limited.

Will the policy be reviewed? Yes

If applicable, set review date: As required by the TAR NC and ad-hoc in response to changes in the gas market

Is this proposal in scope of the Public Sector Equality Duty? Yes