Department for
Business, Energy
& Industrial Strategy

Hydro Benefit Replacement Scheme and Common Tariff Obligation

Three-yearly review of statutory schemes

Closing date: 23rd September 2022

July 2022

Any enquiries regarding this publication should be sent to us at:
enquiries@beis.gov.uk

Contents

General information

Why we are consulting

The Government must review the Hydro Benefit Replacement Scheme and the Common Tariff Obligation every three years. These schemes help protect consumers in the North of Scotland from the inevitably high costs of electricity distribution in the region. This consultation forms part of the review process, and views are invited from any interested parties on whether the schemes continue to meet their policy objectives and are operationally effective. The Government is proposing to retain both schemes in their current form, subject to some minor technical improvements to the funding arrangements of the Hydro Benefit Replacement Scheme.

Consultation details

Issued: 29 July 2022

Respond by: 23 September 2022

Enquiries to:

Net Zero Electricity Networks Team
Department for Business, Energy and Industrial Strategy
3rd Floor
1 Victoria Street
London, SW1H 0ET

Tel: 0207 215 5000
Email: hydrobenefitreview@beis.gov.uk

Consultation reference: Hydro Benefit Replacement Scheme and Common Tariff Obligation

Audiences:

This consultation is particularly relevant to any parties with a direct interest in the level of electricity prices in the North of Scotland, as well as to electricity suppliers across Great Britain. This consultation is not limited to these parties; responses are welcome from any organisation or individual.

Territorial extent:

Great Britain

How to respond

Your responses will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Respond online at: beisgovuk.citizenspace.com/energy-development/hydro-benefit

or

Email to: hydrobenefitreview@beis.gov.uk

Write to:

Net Zero Electricity Networks Team
Department for Business, Energy and Industrial Strategy
3rd Floor
1 Victoria Street
London, SW1H 0ET

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Confidentiality and data protection

Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system on delivery of your information to us will not be regarded by us as a confidentiality request nor any acceptance by us (actual or implied) that confidentiality will be preserved.

We will process your personal data in accordance with all applicable data protection laws. See our privacy policy.

We will summarise all responses and publish this summary on GOV.UK. The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

Quality assurance

This consultation has been carried out in accordance with the government's consultation principles.

If you have any complaints about the way this consultation has been conducted, please email: beis.bru@beis.gov.uk.

1. Introduction

This section describes a number of Government measures that help protect consumers in the North of Scotland from the high costs of electricity distribution in that region, and explains why these measures must be reviewed periodically.

Purpose of these statutory schemes: Hydro Benefit Replacement Scheme, Common Tariff Obligation and Shetland cross-subsidy

Electricity networks are divided into the high voltage transmission network, which transfers large volumes of electricity across the country, and the lower voltage distribution networks which connect customers to the national transmission network. There are separate charges for electricity transmission and distribution, and this consultation relates specifically to electricity distribution charges.

The challenges of electricity supply in the North of Scotland – primarily related to the relatively large and sparsely populated terrain – mean that it inevitably costs more to distribute electricity here than elsewhere in Great Britain. The following paragraphs describe three complementary measures that ensure consumers in the North of Scotland do not bear an unreasonable burden of these electricity distribution costs, while maintaining the fundamental approach of cost-reflective charges and the benefits this can bring.

The Hydro Benefit Replacement Scheme protects domestic and non-domestic consumers from the high costs of distributing electricity in the North of Scotland. In 2021/22, it has provided an annual assistance amount of £92.7million[1] to consumers in the North of Scotland, which Ofgem estimates to be worth around £60 per household in that area. The scheme is funded by charges on all licensed electricity suppliers across Great Britain. It is established under the Energy Act 2004 (Assistance for Areas with High Distribution Costs) Order 2005, which is made under section 184 of the Energy Act 2004. The assistance from the scheme ensures that electricity distribution network charges in the North of Scotland[2] are not markedly higher than those for the next highest charging regions, without weakening each network company's local accountability to its customers and hence risking an overall increase in network costs across the country. Scottish Hydro Electric Power Distribution (SHEPD) is the licensed electricity distribution network operator for the North of Scotland.

The Common Tariff Obligation ensures electricity suppliers in the North of Scotland are not able to charge comparable domestic consumers different prices solely on the basis of their location within the region. This is designed to protect consumers in remote rural areas or islands from the relatively high costs of supplying electricity in these areas. The Common Tariff Obligation is set out in the Electricity Act 1989 (Uniform Prices in the North of Scotland) Order 2005, which is made under section 7B of the Electricity Act 1989.

[1] Charging Statement 2021-22, available at https://www.nationalgrideso.com/charging/assistance-areas-high-electricity-distribution-costs-aahedc

[2] Schedule 1 to the Energy Act 2004 (Assistance for Areas with High Distribution Costs) Order 2005 describes the geographic area covered by the Hydro Benefit Replacement Scheme.

These schemes also help to underpin a cross-subsidy arrangement for most electricity consumers on Shetland, who would otherwise face significantly higher electricity prices than comparable consumers on the mainland[3]. The requirements of the Common Tariff Obligation mean that Shetland consumers cannot be charged more than those in the rest of the North of Scotland, on the basis of their location. From April 2021 onwards, the resulting costs have been spread across all GB electricity consumers through the Hydro Benefit Replacement Scheme. Government set the Shetland-related element of the assistance amount at £27 million annually for the first year, based on the best estimates of the level of Shetland cross-subsidy produced by SHEPD and approved by Ofgem. This sum increases with inflation in subsequent years. Previously, the costs of the Shetland cross-subsidy were funded solely by electricity consumers in the North of Scotland.

Background information on the three measures is set out at Annex A.

Why the schemes are being reviewed

The Energy Act 2004 requires the Hydro Benefit Replacement Scheme to be reviewed every three years. A Ministerial commitment was made to review the working of the Common Tariff Obligation in parallel as part of a statutory review of the Hydro Benefit Replacement Scheme. The last statutory review was undertaken in 2019/20[4], meaning that the next review is now due.

As part of this latest review, the Government is seeking views through this consultation on whether the schemes' policy objectives remain valid and whether they remain operationally effective. For the avoidance of doubt, this consultation does not relate to the measures being progressed to ensure Shetland's security of supply, which remain a matter for SHEPD and Ofgem.

[3] The cross-subsidy is for all domestic consumers on Shetland, as well as all existing non-domestic consumers at 1 April 2015 and, from the same date, all new non-domestic consumers with a maximum demand connection of 2 megawatts.
[4] https://www.gov.uk/government/consultations/hydro-benefit-replacement-scheme-and-common-tariff-obligation

2. Objectives of the schemes

This section seeks views on whether the policy objectives of the Hydro Benefit Replacement Scheme and Common Tariff Obligation remain valid. It sets out an assessment, followed by Government proposals and consultation questions.

Rationale for the schemes

Electricity distribution charges vary regionally to reflect the costs of running the distribution network in a specific area and the number of consumers those costs are spread across. This cost reflective approach helps to minimise overall network costs across Great Britain (GB) by ensuring that each network company has to account to its local stakeholders for the costs it has incurred. The typical GB household has seen a real terms reduction in electricity distribution charge of £12 from April 2015 to April 2021 (see Annex B). At the same time, there have been service improvements for customers. For example, the number of customer interruptions across GB has fallen by 10% while the duration of interruptions has reduced by 7%[5]. The Government therefore believes that, in general, cost reflective charging continues to represent the right approach to achieve value for consumers.

However, the Government also believes that it should consider intervention if one region has markedly different charging levels to any other. This forms the rationale for the Hydro Benefit Replacement Scheme. The assistance amount provided by the scheme, which is adjusted annually to take account of inflation, plays an important part in helping to alleviate the inevitably high costs of electricity distribution for consumers in the North of Scotland. Without this support, costs would be significantly higher in the North of Scotland than any other region, with resulting impacts on affordability and levels of fuel poverty.

Whilst the Hydro Benefit Replacement Scheme protects consumers as a whole across the North of Scotland, it does not (and never could) provide an efficient or effective way of providing targeted support to a specific group of vulnerable consumers within a region. Instead, it is the purpose of other schemes to provide more targeted assistance for households where appropriate.

The costs of supplying electricity to remote, rural and island areas of the North of Scotland will inevitably remain higher than to urban areas in the North of Scotland. The Common Tariff Obligation continues to fulfil the social objective of ensuring that remote, rural households are not disadvantaged by a price differential in electricity distribution costs within the North of Scotland. It does not cover non-domestic consumers, and the Government has seen no evidence to suggest that its extension would be necessary, beneficial or practical.

The circumstances of Shetland are unique because it has the only licensed distribution network in GB which is not currently connected to the mainland electricity network. The isolated nature of Shetland's energy infrastructure means that costs are inevitably higher than elsewhere in GB. To support Shetland consumers, these additional costs have historically been shared with electricity consumers in the North of Scotland through a cross-subsidy arrangement. However, the Government concluded during the last statutory review of the

[5] Further information contained in Ofgem's RIIO Electricity Distribution Annual Report 2020-21 available at: https://www.ofgem.gov.uk/publications/riio-1-electricity-distribution-annual-report-2020-21

Hydro Benefit Replacement Scheme that rising energy costs for Shetland, due to the need to upgrade its energy infrastructure to maintain long-term security of supply, merited spreading these incremental costs more broadly. From April 2021 onwards, the resulting costs of around £27 million per year have therefore been shared across GB electricity consumers through the Hydro Benefit Replacement Scheme. Ofgem and SHEPD have confirmed that the process of upgrading Shetland's energy infrastructure is continuing[6].

Government proposal

The policy objectives of the Hydro Benefit Replacement Scheme and Common Tariff Obligation are based on balancing the benefits of cost-reflective charging with protecting consumers in the North of Scotland from the full impact of high electricity distribution costs. The Government believes that these objectives remain valid, and does not propose to change them.

Shetland's energy infrastructure costs will remain higher than elsewhere in GB in the near-term, and the Government continues to believe these should be funded by consumers across GB while this differential exists. The Hydro Benefit Replacement Scheme continues to provide an established and transparent mechanism to achieve this.

Consultation questions

1. Do you agree that the policy objectives of the Hydro Benefit Replacement Scheme and Common Tariff Obligation – which are focused on ensuring that consumers in the North of Scotland are not unreasonably disadvantaged by the price differential in electricity distribution costs – remain valid?

2. Do you agree that the costs of the Shetland cross-subsidy should continue to be shared across GB consumers through an additional assistance amount in the Hydro Benefit Replacement Scheme, rather than being met solely by North of Scotland consumers?

[6] See, for example, SHEPD's RIIO-ED2 Business Plan (https://ssenfuture.co.uk/)

3. Operational effectiveness of the schemes

This section seeks views on whether the Hydro Benefit Replacement Scheme and Common Tariff Obligation remain operationally effective. It sets out an assessment, followed by Government proposals and consultation questions.

Administration of the schemes

In establishing the Hydro Benefit Replacement Scheme, the Government sought to ensure that the scheme's administration would be cost efficient and that its operation would be clear and unambiguous for all parties. The Government considers that these requirements continue to be largely met through the existing arrangements, which are based around administration of the scheme by National Grid Electricity System Operator ("National Grid ESO"). Administration costs are provided for through a small, fixed fee linked to the Retail Price Index (RPI) which represents less than 0.2% of the total value of the assistance amount provided by the scheme. In order to ensure transparency of the scheme's operation, National Grid ESO is required to publish an annual statement[7]. This statement includes: the total actual metered demand by domestic and non-domestic consumers in the North of Scotland in the previous year; the total amount that was actually invoiced to licensed suppliers across GB; any over- or under-recovery from those suppliers; the value of the RPI which will be used to determine the assistance amount in the following year; and the total level of the assistance amount that will be required in the following year.

The Common Tariff Obligation is a self-sufficient scheme with no direct costs associated with it, given that it is essentially a prohibition on suppliers from charging comparable consumers different prices or offering different contractual terms on the basis of their location in the North of Scotland. This means that there is very little scope to make changes targeted at the scheme's operational effectiveness.

Basis of the Hydro Benefit Replacement Scheme tariff

Inflation index

Use of RPI as an inflation index has been consistent with the approach taken up to now by Ofgem in its electricity distribution price controls[8]. However, for the next electricity distribution network price control, Ofgem is moving from RPI to Consumer Prices Index including owner occupiers' housing costs (CPIH), as CPIH is considered to be a more comprehensive measure of inflation. Given that the assistance amount provided through the Hydro Benefit Replacement Scheme is intended to partially offset the level of electricity distribution costs in the North of

[7] https://www.nationalgrideso.com/charging/assistance-areas-high-electricity-distribution-costs-aahedc

[8] Ofgem sets price controls to ensure monopoly network companies, who run Great Britain's gas and electricity networks, continue to act in the best interests of energy consumers. Since 2013, Ofgem has used the RIIO (Revenue = Incentives + Innovation + Outputs) framework to set price controls. The current 8-year price control for electricity distribution, RIIO-ED1, will end on 31 March 2023. The next RIIO-ED2 price control will run from 1 April 2023 until 31 March 2028.

Scotland as determined through Ofgem's price control, it would make sense to maintain consistency in their inflator terms.

Embedded benefit

As part of the last statutory review of the Hydro Benefit Replacement Scheme, a concern was raised that an 'embedded benefit'[9] distortion may exist within the scheme's current operating arrangements. The Government has assessed this and found that an embedded benefit does arise from the net changing basis of the scheme, with the likelihood that this results in higher overall consumer costs. As the scheme is currently charged on the basis of a supplier's net demand from the transmission network, those suppliers who contract with embedded generators (i.e., generators connected to the distribution network) will reduce their demand from the transmission network, and hence reduce their liability for the scheme charge. In turn, this increases the scheme tariff for those liable to pay it because the same total assistance amount still needs to be recovered, but from a smaller number of suppliers. Moreover, embedded benefits can provide an incentive for suppliers to contract with embedded generators, even in those circumstances where transmission-connected generators could potentially be more efficient for the overall system.

The Government estimates that the scheme tariff in 2021/22 would be almost 18% lower with removal of the embedded benefit – and over 18% lower on average for the entire review period between 2019/20 – 2021/22 (see Annex C). Removal could be achieved by calculating the tariff based on a supplier's gross demand (i.e. the demand it places on both the transmission and distribution network), instead of its net demand (i.e. the demand it places only on the transmission network). Further analysis on the embedded benefit is set out at Annex C.

Possible ambiguity in the licence requirement

A possible ambiguity has been identified in the wording of the licence requirements placed on National Grid ESO as part of the last statutory review of the Hydro Benefit Replacement Scheme. Standard Licence Requirement C21 could be interpreted as requiring National Grid ESO to charge electricity suppliers twice to recover that element of the assistance amount relating to the Shetland cross-subsidy. Clearly, it was not the intention to double-charge electricity suppliers, and Ofgem issued an interim clarification letter on 20 July 2021[10].

Level of Shetland-related assistance amount

The Government's inclusion of a Shetland-related assistance amount within the Hydro Benefit Replacement Scheme ensures that the Shetland cross-subsidy is funded by all GB consumers, rather than solely consumers in the North of Scotland. It is for Ofgem to approve the level of the Shetland cross-subsidy (i.e. the total level of Shetland related costs that SHEPD is able to recover from distribution charges paid in the North of Scotland) through the price control. In doing so, Ofgem ensures that these costs represent value for money for consumers. The process is ongoing to procure the services needed for operation of the Shetland electricity

[9] Embedded benefits relate primarily to network charging arrangements, and their exact nature varies depending on the specific context. Broadly, they arise where generators connected to the lower voltage distribution network can access revenues or cost reductions which are not available to generators connected to the high voltage transmission network. As an example, a distribution connected generator can reduce a supplier's demand from the transmission network, thereby reducing the supplier's liability for transmission charges, and be paid by the supplier for doing so. A concern with this arrangement is that, if it is assumed that the supplier's action does not reduce the total level of transmission costs that need to be recovered, other suppliers (and ultimately end-consumers) will have to pick up the shortfall.

[10] https://www.ofgem.gov.uk/publications/clarification-standard-licence-condition-c21

system and upgrading its energy infrastructure, with proposals currently being considered through the RIIO-ED2 price control process. The RIIO-ED2 expected costs for Shetland, exclusive of certain potential cost components, are just under £100 million for the five-year RIIO-ED2 period of 2023/24 to 2027/28, or £20 million per year on average, with the expectation that more of these costs will arise in the first two years. There is uncertainty on the level of costs for some aspects of the energy solution for Shetland as the tender process is ongoing at this stage. The timing of the transmission link and the number of times that the standby solution needs to be called upon are also likely to have an impact on the costs. On this basis, the Government believes that it would be reasonable to assume continuation in the very near-term of a similar funding level to now as an annual average.

For the Hydro Benefit Replacement Scheme, this would imply continuation of the Shetland-related element of the assistance amount at the current level (i.e., the £27 million per year value established in April 2021, with adjustment in subsequent years for inflation). Continuation on the current basis would have the advantage of ensuring predictability of the scheme's charging level for interested parties, as well as supporting an efficient approach to administering the scheme. The next statutory review of the scheme is scheduled to begin in 2025, and this will provide an opportunity to revisit the appropriate level of the Shetland-related assistance amount.

Government proposals

The Government believes that administration of the schemes remains effective. As set out below, there are some minor technical improvements that the Government believes would be beneficial to the funding arrangements of the Hydro Benefit Replacement Scheme. Subject to the outcome of this consultation, the Government would intend to progress these improvements through secondary legislation.

The Government proposes that the inflator for the Hydro Benefit Replacement Scheme should switch from the Retail Price Index to CPIH, to maintain consistency with the approach used in Ofgem's RIIO price control process.

Where a particular approach has the potential to over-reward market participants and distort the market, it is appropriate that Government should take any necessary action to address this market distortion. To address potential distortions arising from embedded benefits, the Government proposes that the scheme's supplier charge should be calculated on the basis of gross rather than net demand, so that suppliers are charged according to their total share of electricity use irrespective of its source. This will bring the Hydro Benefit Replacement Scheme into line with the supplier charging arrangements already in place for the Capacity Market and Contracts for Difference.

As regards the ambiguity in Standard Licence Requirement C21 which could be interpreted as requiring National Grid ESO to charge electricity suppliers twice to recover the Shetland cross-subsidy, the Government intends to follow up Ofgem's clarification letter of 20 July 2021 by revising the legal terms of the scheme's operation.

Following discussions with Ofgem and SHEPD, an aspect of Hydro Benefit Replacement Scheme funding that the Government does not propose to change at this time is the value of the Shetland-related assistance amount. This would continue at £27 million per year, adjusted for inflation. This approach should ensure that the Shetland cross-subsidy continues to be funded by all GB consumers, rather than just North of Scotland consumers. However, for the

avoidance of doubt, any Government decision does not change the actual level of the Shetland cross-subsidy, which continues to be a matter for agreement between SHEPD and Ofgem through RIIO ED2 settlement and is not set by Government.

Consultation questions

3. Do you agree that the Hydro Benefit Replacement Scheme and Common Tariff Obligation remain operationally effective, and main features should be retained in their current form?

4. Do you agree that the inflator for the Hydro Benefit Replacement Scheme should switch from the Retail Price Index to the Consumer Prices Index including owner occupiers' housing costs (CPIH), in line with Ofgem's RIIO price control process?

5. Do you agree that the embedded benefit associated with the Hydro Benefit Replacement Scheme should be removed by changing the basis on which suppliers are charged, from net to gross charging?

6. Do you have any comments on the embedded benefit analysis undertaken by BEIS, as set out at Annex C?

7. Do you agree that the level of GB-wide funding provided through the Hydro Benefit Replacement Scheme for the Shetland cross-subsidy should remain unchanged over the next three years (i.e., £27 million per year, adjusted for inflation)?

4. Catalogue of consultation questions

Consultation questions

1. Do you agree that the policy objectives of the Hydro Benefit Replacement Scheme and Common Tariff Obligation – which are focused on ensuring that consumers in the North of Scotland are not unreasonably disadvantaged by the price differential in electricity distribution costs – remain valid?

2. Do you agree that the costs of the Shetland cross-subsidy should continue to be shared across GB consumers through an additional assistance amount in the Hydro Benefit Replacement Scheme, rather than being met solely by North of Scotland consumers?

3. Do you agree that the Hydro Benefit Replacement Scheme and Common Tariff Obligation remain operationally effective, and main features should be retained in their current form?

4. Do you agree that the inflator for the Hydro Benefit Replacement Scheme should switch from the Retail Price Index to Consumer Prices Index including owner occupiers' housing costs (CPIH), in line with Ofgem's RIIO price control process?

5. Do you agree that the embedded benefit associated with the Hydro Benefit Replacement Scheme should be removed by changing the basis on which suppliers are charged, from net to gross charging?

6. Do you have any comments on the embedded benefit analysis undertaken by BEIS, as set out at Annex C?

7. Do you agree that the level of GB-wide funding provided through the Hydro Benefit Replacement Scheme for the Shetland cross-subsidy should remain unchanged over the next three years (i.e. £27 million per year, adjusted for inflation)?

Annex A: Background to the schemes

There are three complementary Government measures that ensure consumers in the North of Scotland do not bear an unreasonable burden of the high electricity distribution costs that inevitably arise in this area.

Hydro Benefit Replacement Scheme

The aim of the Hydro Benefit Replacement Scheme is to protect consumers in the North of Scotland from very high electricity distribution charges.

The scheme was established in the 1940s, on the basis that the high costs of providing power to remote Scottish Highlands and Islands consumers should be offset to some extent by the relatively low running costs of small hydro stations and dams located in the north west of Scotland. The scheme was unique in that Northern Scotland was the only area where cross-subsidy of this sort was explicitly allowed. It was formalised on the privatisation of the Scottish electricity industry in the 1990s.

It took its current form on 1 April 2005 under the Energy Act 2004 (Assistance for Areas with High Distribution Costs) Order 2005, made under section 184 of the Energy Act 2004 which allows the Secretary of State to establish schemes to require authorised transmission licence holders to make a payment to distributors serving a specified area where distribution costs are significantly higher (when calculated on a per customer basis) than in other areas of Great Britain. The payment must be passed from the relevant distributors to licensed suppliers within the area, through reduced use of system charges. The scheme must be funded by charges on licensed suppliers across Great Britain (GB).

The Hydro Benefit Replacement Scheme is administered by the Electricity System Operator, which is National Grid Electricity System Operator (ESO). National Grid ESO has a licence condition that obliges it to collect the assistance amount from licensed suppliers across GB and pass it on to the relevant distributor for the North of Scotland to reduce distribution costs in that geographic area (Scottish Hydro Electric Power Distribution). The assistance amount is recovered from licensed suppliers based on the total amount of electricity they supply to their customers.

In 2021/22 the assistance amount totals £92.7m which includes a small payment to National Grid ESO to cover the costs of administering the scheme[11]. Ofgem estimates that this assistance equates to an average bill reduction of around £60 a year to the 715,000 domestic consumers in the North of Scotland, with the remainder of the assistance enabling bill savings for the 85,000 non-domestic consumers in this region. The average cost of this assistance for each GB domestic consumer is around £1 per year.

[11] National Grid Charging Statement available at: https://www.nationalgrideso.com/charging/assistance-areas-high-electricity-distribution-costs-aahedc

Common Tariff Obligation

The Common Tariff Obligation prohibits suppliers from charging comparable consumers different prices or offering different contractual terms on the basis of their location in the North of Scotland. It only covers domestic consumers, not non-domestic consumers. Suppliers can offer different terms to consumers, provided they ensure that these differences are not determined on the basis of the customers' geographical location within the North of Scotland. Similarly, it prohibits the holders of transmission and distribution licences from charging suppliers of domestic premises different prices on the basis of geographic location in the North of Scotland.

It has the same geographic extent as the Hydro Benefit Replacement Scheme.

The Common Tariff Obligation became law under the Electricity Act 1989 (Uniform Prices in the North of Scotland) Order 2005, which was made under an enabling power in Section 7B of the Electricity Act 1989.

Shetland cross-subsidy

Shetland is in a unique position in that it is not connected to the GB electricity grid currently, and only has a local distribution network. Local generation is required to meet all electricity demand, which leads to high average costs of electricity supply. This means there is good justification for providing support to Shetland consumers at the present time.

All domestic consumers on Shetland, and all but the largest non-domestic consumers, benefit from a cross-subsidy arrangement which prevents price differentiation in electricity supply prices across the North of Scotland on the basis of location. From April 2021, the resulting costs have been spread across all licensed GB suppliers, as a defined element of Hydro Benefit Replacement Scheme.

As the electricity distribution network company whose remit covers Shetland, SHEPD's licence sets out a formula for calculating the level of subsidy, which is based on the overall costs of the electricity system for Shetland minus income received from suppliers. An efficiency incentive is applied to those elements under SHEPD's direct control.

Annex B: Distribution charges by region

Ofgem publishes the following regional estimate of electricity distribution network charges for households[12]. It is based on a typical electricity consumption of 3,100 kWh for single rate households.

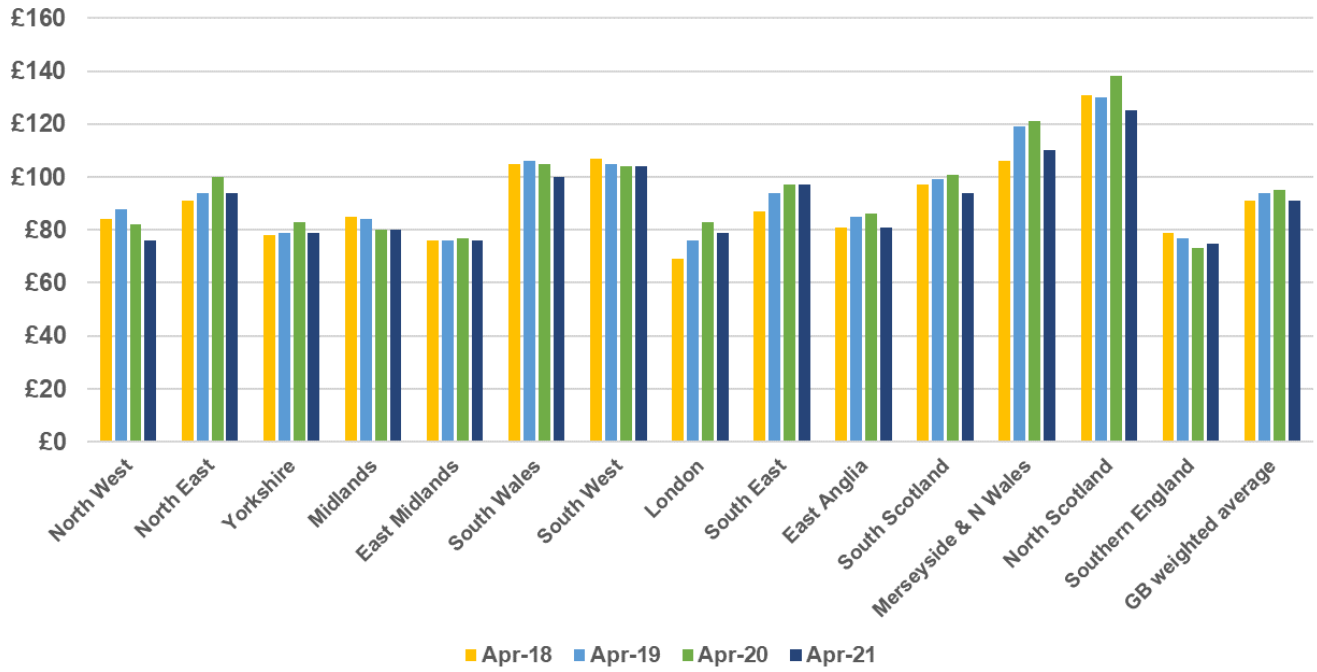
This estimate includes the positive impact of the Hydro Benefit Replacement Scheme in reducing electricity distribution charges in the North of Scotland. Without the scheme, it is clear that the North of Scotland would have significantly higher charges than any other region.

Table 1: Regional estimates of typical GB customer cost (£ real prices per typical domestic customer)

Region	Apr-15	Apr-16	Apr-17	Apr-18	Apr-19	Apr-20	Apr-21
North-West	101	103	85	84	88	82	76
North-East	111	108	97	91	94	100	94
Yorkshire	95	89	81	78	79	83	79
Midlands	90	103	89	85	84	80	80
East Midlands	86	92	81	76	76	77	76
South Wales	109	124	110	105	106	105	100
South-West	121	135	121	107	105	104	104
London	74	84	72	69	76	83	79
South-East	97	114	98	87	94	97	97
East Anglia	86	88	85	81	85	86	81
South Scotland	109	106	98	97	99	101	94
Merseyside & N Wales	137	120	111	106	119	121	110
North Scotland	139	152	134	131	130	138	125
Southern	91	96	87	79	77	73	75
GB weighted average	103	108	96	91	94	95	91

[12]Ofgem (2022), https://www.ofgem.gov.uk/publications/riio-1-electricity-distribution-annual-report-2020-21.

Figure 1: Regional estimates of typical GB customer cost (£ real prices per typical domestic customer)



Annex C: Embedded benefits

Background

This section quantifies the size of embedded benefit that exists under the existing charging regime for Assistance for Areas of High Electricity Distribution Costs (AAHEDC) – more commonly referred to as the Hydro Benefit Replacement Scheme. The embedded benefit arises due to AAHEDC being charged to suppliers on a net demand basis.[13] This means that some suppliers who contract with embedded generators on the electricity distribution network can have AAHEDC charges than they would otherwise. Suppliers with more exports than gross demand would receive a net payment rather than a charge – and in aggregate, embedded exports reduce the AAHEDC invoice that would otherwise be paid by those suppliers. This increases the scheme tariff for those liable to pay it because the same total assistance amount still needs to be recovered, but from a smaller number of suppliers. This could also impact incentives with regards to optimal placement of generation and can in some cases result in a net loss to the consumer. The rationale behind the analysis presented in this section is based around the notion that the current charging structure of the AAHEDC tariff in effect rewards distribution connected generation at the expense of transmission connected generation. Our concern is that this may deliver suboptimal results for the system as a whole – and ensuring a level playing field between suppliers would help alleviate these risks.

To estimate the impact on the AAHEDC tariff that arises because of this embedded benefit, we used settlement metering data from Elexon covering the last three-year review period (**2019/20 – 2021/22**). Most of the analysis presented in this section is based on an extract of Elexon's P0210 return, which provides volumes for Primary Supplier BMUs (Balancing Mechanism Units).[14] The P0210 extract from Elexon contains data on all Primary Supplier BMUs, enabling us to extract and aggregate Non-Half-Hourly (NHH) consumption, Half-Hourly (HH) Gross Demand and Half-Hourly Embedded Export for each BMU. We aggregated the NHH consumption and HH gross demand to arrive at a total 'gross demand' figure and we calculated the net demand for each BMU using the HH embedded export data. Note that the P0210 return does not include the volumes of seven BMUs that are chargeable for AAHEDC and collected in a different Elexon return, the i014. However, the impact of this omission is marginal, as these seven BMUs account for less than 0.5% of the total export volumes and overall embedded benefit.[15]

Estimating the size of the embedded benefit

Table 2 shows the calculated net demand volumes of primary supplier BMUs under which the AAHEDC tariff is charged. Embedded exports accounted for approximately 151 TWh over the

[13] Net demand is defined as the demand that is placed only on the transmission network. Gross demand is the demand that is placed on both the transmission and distribution networks. The relationship between gross demand, net demand and embedded exports can be explained via this simple equation:
[Gross demand] – [Exports] = [Net demand].
[14] Primary BMUs are the units used under the Balancing and Settlement Code (BSC) to account for all energy that flows on or off the Total System (the Transmission System and each Distribution System combined). A Primary BM Unit is the smallest grouping of generation and / or demand equipment that can be independently metered for Settlement and all generation and demand equipment must be captured in a Primary BM Unit. Please see the following guide for further details: https://www.elexon.co.uk/operations-settlement/balancing-mechanism-units/.
[15] Based on internal analysis by National Grid ESO, 2021.

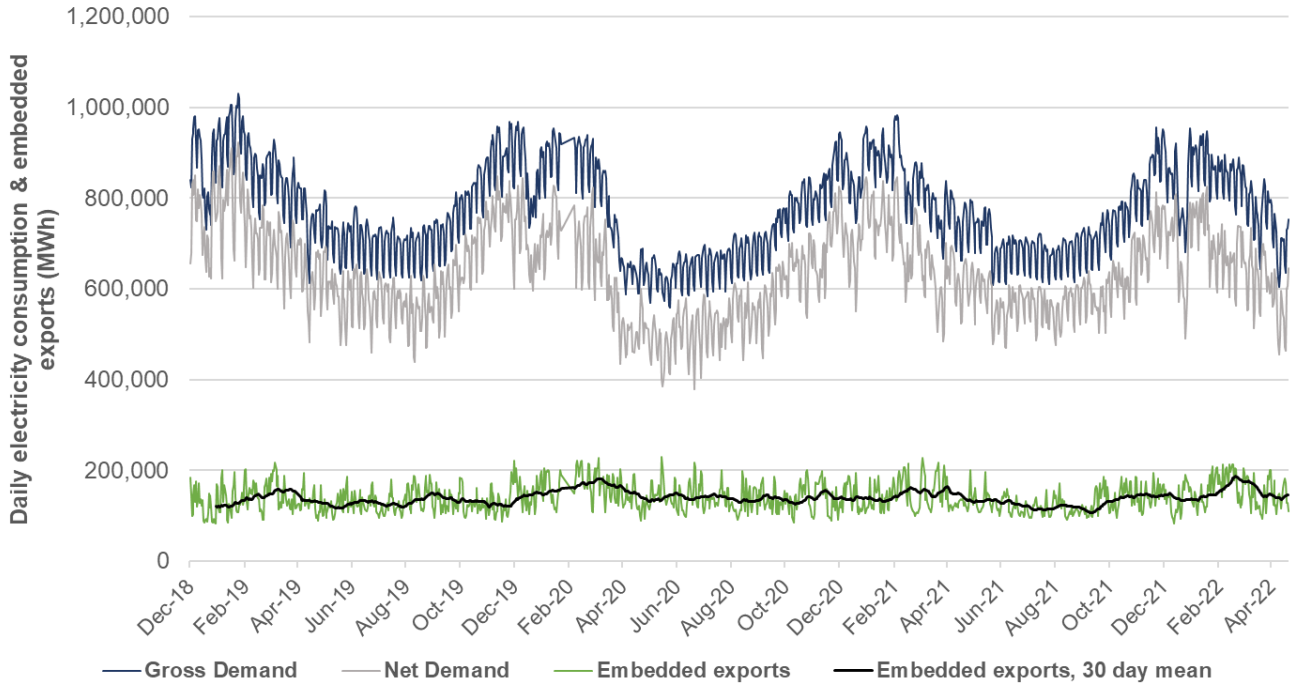
period covered by this review (between **2019/20 – 2021/22**) – this has led to an embedded benefit of approximately **£49 million** in total over the last three years. The value of the embedded benefit has continued to rise, in part due to the increased presence of embedded generators on Great Britain's distribution network.

Table 2: Net demand and embedded export volumes for primary supplier BMUs and calculated embedded benefit, 2019/20 – 2021/22

Charging year	Net Demand (TWh)	Tariff based on Net Demand (p/kWh)[16]	Demand x Tariff (£m)	Embedded export (TWh)	Embedded Benefit (Export x Tariff, £m)
2019/20	228	0.026270	59.8	49	12.9
2020/21	221	0.030446	67.2	52	15.7
2021/22	230	0.040427	93.1	50	20.3
TOTAL	**678**		**220.0**	**151**	**48.9**

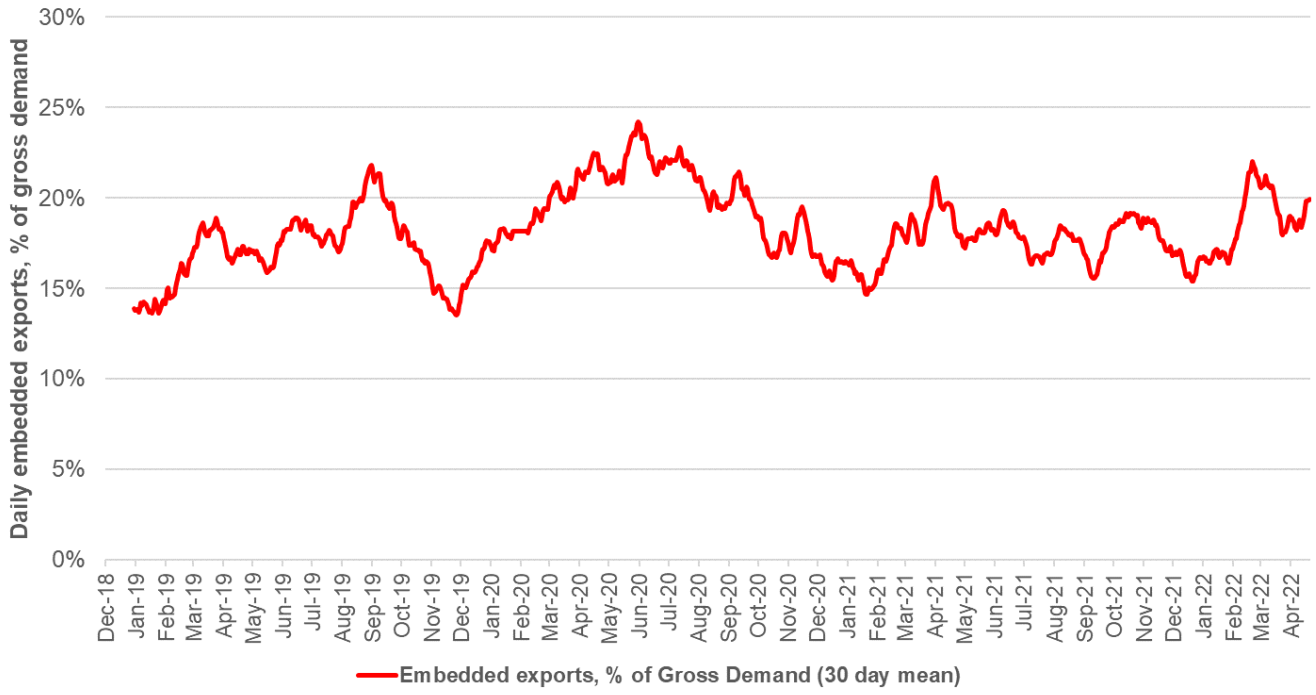
Figures 2 and 3 show that embedded exports have risen steadily over the last three years. If this trend were to continue in the medium term, then the redistributive impact on different suppliers of the embedded benefit will only increase in the future.

Figure 2: Total daily gross demand, net demand and embedded exports for all primary supplier BMUs, 2019/20 – 2021/22



[16] The AAHEDC tariffs are published by National Grid ESO each year by 15 July and take effect from 1 April retrospectively. These can be viewed on National Grid ESO's website: https://www.nationalgrideso.com/industry-information/charging/assistance-areas-high-electricity-distribution-costs-aahedc.

Figure 3: Daily embedded exports, % of gross demand for all primary supplier BMUs, 2019/20 – 2021/22



Potential impacts from the removal of the embedded benefit

Table 3 below shows the gross demand volumes of primary supplier BMUs and estimates the tariff reduction in the counterfactual scenario that the embedded benefit was removed entirely via the AAHEDC tariff being levied on gross demand instead of net demand. Our analysis finds that the AAHEDC scheme tariff in 2021/22 would be almost 18% lower with the removal of the embedded benefit – and over **18% lower on average** for the entire period between 2019/20 – 2021/22 (see table 3 below). Note that a larger number of suppliers would pay these lower tariffs, such that the total assistance amount raised for the North of Scotland would remain at the same level.

Removal of the embedded benefit via changing the AAHEDC tariff such that it is charged on a gross demand basis, would in effect result in a transfer from one group of suppliers to another. This would help level the playing field between suppliers, as suppliers who do not contract with embedded generators would in effect no longer be charged a higher average tariff. A reduced average tariff spread across a greater number of players, in addition to introducing a greater degree of neutrality between transmission and distribution connected generation, would also likely result in consumer benefits, as they would no longer have to pay for the redistributive effects that arise from suppliers making these direct payments to generators. However, estimating the potential consumer benefit from the removal of the embedded benefit is made difficult by the inherent complexity that arises from a multitude of different arrangements between suppliers and generators.

Table 3: Gross demand volumes for primary supplier BMUs and the estimated tariff reduction from removal of the embedded benefit, 2019/20 – 2021/22

Charging year	Gross Demand (TWh)	Tariff if based on Gross Demand (p/kWh)[17]	Demand x Tariff (£m)	Tariff reduction based on Gross Demand (%)
2019/20	277	0.021601	59.8	-17.8%
2020/21	272	0.024679	67.2	-18.9%
2021/22	280	0.033185	93.1	-17.9%
TOTAL	**829**		**220.0**	**-18.2% (avg.)**

An alternative approach to reforming the AAHEDC tariff

Changing the charging regime for AAHEDC so that it is charged on a gross demand basis would have eliminated the entirety of the embedded benefit of **£49 million** shown in table 2 over the review period. An alternative option suggested by some stakeholders would be to set a minimum floor of 0 for the AAHEDC tariff – this would in effect eliminate any negative charges and flat-out payments that are made to suppliers with more embedded exports than gross demand (which are then often passed down to the contracted embedded generators).

Table 4: Sum of negative AAHEDC charges, 2019/20 – 2021/22

Charging year	Sum of negative AAHEDC charges (where exports exceed demand, TWh)	Tariff if based on Gross Demand (p/kWh)	Negative demand x Tariff (£m)
2019/20	20	0.026270	5.4
2020/21	25	0.030446	7.5
2021/22	25	0.040427	10.3
TOTAL	**70**		**23.1**

Our analysis shows that direct payments to suppliers due to a negative AAHEDC tariff – where embedded exports are greater than gross demand – have accounted for approximately 46% of all embedded exports (70 out of 151 TWh) over the last three years, amounting to over **£23 million** in direct payments to suppliers. This is almost half (**47%**) of the total embedded benefit of **£49 million** that arose over the period covered by this review (see table 4 above). Our analysis in effect shows that, in the counterfactual scenario where the AAHEDC tariff was

[17] Note that these tariffs in Table 3 have been calculated manually by taking the total assistance amount that needs to be recovered (the 'Demand x Tariff' column, which has the same values as in Table 2), and diving that by total gross demand. This effectively assumes that the AAHEDC tariff is charged on a gross demand basis. The Tariff reduction column shows how much lower this new tariff would be if such a reform to the AAHEDC were to be implemented.

floored at a minimum value of 0 over the last three years, this would have eliminated less than half of the total embedded benefit.

Although setting a floor of 0 for the tariff would eliminate almost half of the embedded benefit, it would not eliminate all its indirect effects. Suppliers would still be incentivised to contract with embedded generators to reduce their AAHEDC charge. This may affect incentives with regards to optimal placement of generation and may in some cases result in a net loss to the consumer. Estimating the size of this consumer loss is difficult due to the inherent complexity that arises from a multitude of different arrangements between suppliers and generators. Similarly, estimating the potential consumer benefits from the removal of the embedded benefit is also made difficult by this complexity.

This consultation is available from: www.gov.uk/government/consultations/hydro-benefit-replacement-scheme-and-common-tariff-obligation-statutory-review-2022

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