

Title: Support for non-domestic electricity consumers on Shetland IA No: DECC0169 Lead department or agency: Department of Energy and Climate Change (DECC) Other departments or agencies: Ofgem	Impact Assessment (IA)				
	Date: 20 March 2015				
	Stage: Final				
	Source of intervention: Domestic				
	Type of measure: Other				
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Summary: Intervention and Options	RPC: GREEN
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Cost of Preferred Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
-£1.49m	-1.49m (-102.2m inc. cost pass through)	£0.07m	Yes	IN

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

The isolated nature of Shetland’s electricity infrastructure means that, in the absence of intervention, the price of electricity for electricity consumers on Shetland would be around 73% higher than that on the mainland. The ageing Lerwick Power Station on Shetland needs to be replaced and a fully integrated power solution for Shetland (including but not limited to smart grid solutions incorporating renewables, demand side management and innovative solutions) is expected to further increase Shetland’s electricity costs. Domestic and non-domestic electricity consumers on Shetland currently benefit from a cross-subsidy arrangement, which is recovered from electricity consumers (domestic and non-domestic) of the relevant Distribution Network Operator across northern Scotland.

In connection with a separate review, Government has already confirmed that the cross-subsidy will continue for domestic consumers. However, the cross-subsidy would fall away for non-domestic consumers without Government intervention, resulting in higher electricity costs than they currently pay, as well as a possible competitive disadvantage compared to businesses located on mainland GB and reduced household welfare compared with residents in mainland GB.

What are the policy objectives and the intended effects?

The objective is to limit any competitive disadvantage for smaller non-domestic electricity consumers on Shetland who would be unlikely to find a cost effective alternative (e.g. in the form of their own generation assets) to the higher costs of electricity supplies in Shetland. The policy should not distort competition, should be non-discriminatory and proportionate, and should be at the least cost for all consumers.

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

Option 0: “Do Nothing” - The cross-subsidy for non-domestic consumers will be discontinued but it will continue for domestic consumers.

Option 1: “The preferred option”- Cross-subsidy continues for all domestic and existing non-domestic electricity consumers on Shetland. It also continues for future non-domestic consumers with a maximum demand connection of up to 2MVA. Costs would be recovered from all Scottish Hydro Electric Power Distribution (SHEPD) electricity consumers until an integrated power solution has been implemented c2018 when, due to the material increase in costs, it will be recovered from all GB electricity consumers. This is the preferred option as it would limit any competitive disadvantage for smaller non-domestic electricity consumers on Shetland.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 03/2023					
Does implementation go beyond minimum EU requirements?			N/A		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro Yes	< 20 Yes	Small Yes	Medium Yes	Large Yes
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)			Traded: N/A		Non-traded: N/A

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: _____ Date: _____

Summary: Analysis & Evidence Preferred Option

Description: Shetland cross-subsidy continues for all current non-domestic electricity consumers and for future non-domestic consumers with a maximum demand connection of up to 2MVA (Mega Volt Amps).

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
			Low: -1.49m	High: -1.49m	Best Estimate: -1.49m
2012/13	2014/15	29			

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant prices)	Total Cost (Present Value)
Low	0	£52.2	£914.0
High	0	£54.2	£947.2
Best Estimate	0	£53.3	£932.2

Description and scale of key monetised costs by 'main affected groups'

Compared with the "Do Nothing" scenario (which removes the current cross subsidy arrangement for non-domestic consumers on Shetland) the costs of Shetland cross-subsidy payments will be between £37.6m and £38.0m (NPV, best estimate of £37.9m) higher over the period 2015/16 to 2017/18. These costs will be recovered from all SHEPD electricity consumers through higher prices (although prices for SHEPD's eligible Shetland consumers will be lower than in "Do Nothing").

All GB electricity consumers will pay for the Shetland cross-subsidy under the preferred option at a cost of between £874.9 and £907.8m (NPV, best estimate of £892.8m) over the period 2018/19 to 2042/43. The total cost of administrating the cross subsidy across GB, by National Grid, is estimated at £1.5m (NPV). These costs are recovered from suppliers and likely to be passed onto GB electricity consumers.

Other key non-monetised costs by 'main affected groups'

Potential barrier to business locating in SHEPD's area compared with rest of GB over the period 2015/16 to 2017/18. New and existing non-domestic electricity consumers locating in Scotland may choose to locate/re-locate outside the SHEPD area to avoid the cost of subsidy recovery over this period which will be higher than under "Do Nothing".

Potential increase in fuel poverty in the rest of northern Scotland over the period 2014/15 to 2017/18.

Spreading SHEPD costs over non-SHEPD consumers could reduce incentives on SHEPD to operate efficiently which could increase costs.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	£52.1	£912.5
High	0	£54.1	£945.8
Best Estimate	0	£53.2	£930.7

Description and scale of key monetised benefits by 'main affected groups'

Eligible non-domestic electricity consumers on Shetland will benefit from a cross-subsidy of between £476.7 and £495.2m (NPV, best estimate of £487.1m) over the period 2015/16 to 2042/43. This 25 year period is the estimated life of a new Light Fuel Oil power facility.

SHEPD electricity consumers will benefit from lower costs of the domestic subsidy payment over the period 2018/19 to 2042/43 compared with "Do Nothing" as costs would be spread over all GB electricity consumers rather than just SHEPD users equal to a value of between £435.8 and £450.6m (NPV, best estimate of £443.6m).

Other key non-monetised benefits by 'main affected groups'

Less of a competitive disadvantage for Shetland non-domestic electricity consumers, which could limit business closures or relocations and result in higher household income, welfare and fuel poverty considerations compared with "Do Nothing".

Over the period 2018/19 to 2043/44, when the cross-subsidy is funded over all GB electricity consumers rather than SHEPD only, some of the price differential between the SHEPD area and the rest of GB will be reduced compared with "Do Nothing" which could otherwise have created adverse incentives on businesses to locate outside of the SHEPD area.

Incentive remains for larger businesses to find their own cost-effective electricity supply solutions.

Key assumptions/sensitivities/risks**Discount rate (%)**

3.5%

Net benefit is dependent on any additional costs or benefits beyond the direct transfers from the cross-subsidy. In this instance, the net monetised benefits equal the cost of administering the scheme across GB.

BUSINESS ASSESSMENT (Preferred Option)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: £0.07m	Benefits: £0m	Net:-£0.07m	Yes	IN

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Introduction

1. Shetland is isolated from the mainland and has no electricity link to the GB transmission system, and no natural gas network. Consequently, local, oil-fuelled generation is required to securely meet part of the energy demand on the island, together with a gas terminal, and renewable generation – which leads to high average costs.¹ As a result, the unsubsidised price of electricity for consumers on Shetland would be around 73% higher than the price of electricity for comparable consumers on the mainland.²
2. The Common Tariff Obligation (CTO) ensures that electricity suppliers in northern Scotland are not able to charge comparable domestic consumers different prices solely on the basis of their location within the area. This is designed to protect electricity consumers in remote rural areas from the relatively high costs of supplying electricity in these areas. This measure has been reviewed and continues to be applied to provide assurance against consumers in remote rural areas being disadvantaged by higher electricity prices.
3. A licence condition was in place that allowed the cost differential between Shetland and the rest of northern Scotland to be recovered from all consumers in the relevant Distribution Network Operator's (DNO) area, including Shetland consumers. That licence condition was carried across to subsequent price control periods, which spanned the introduction of the CTO, with the result that both domestic and non-domestic electricity consumers on Shetland continue to be subsidised. This means that all electricity consumers on Shetland currently benefit from a subsidy which, in 2012/13, totalled £26.6m.
4. These additional costs of supplying electricity in Shetland are currently spread across all 760,000³ consumers in the Scottish Hydro Energy Power Distribution (SHEPD) area covering northern Scotland, including those in Shetland, at an current estimated annual cost of:
 - £19 for each household consumer in the SHEPD area (based on 5.2MWh average annual power consumption);
 - £164 for each small non-domestic consumer in the SHEPD area (based on 48MWh average annual power consumption);
 - £558 for each medium non-domestic consumer in the SHEPD area (based on 163MWh average annual power consumption); and
 - £5,051 for each large non-domestic consumer in the SHEP-D area (based on 1,477MWh average annual power consumption).⁴

Problem under consideration

5. Although domestic customers are protected by the CTO, should we choose not to intervene the cross-subsidy for businesses on Shetland will fall away in April 2015 leading to significantly higher electricity prices for those users relative to comparable businesses on mainland GB. These higher prices could put businesses located on Shetland at a competitive disadvantage and could lead to other adverse impacts on Shetland households through higher prices for goods and services on the

¹ Due to the prevalence of relatively high fixed costs and resulting economies of scale in the market.

² The average price of electricity for households in Northern Scotland was £162/MWh in 2013 (Source: DECC Quarterly Energy Prices, March 2014, Table 2.2.3. Available online at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296011/QEP_March_2014.pdf). The average value of the Shetland cross-subsidy in 2012/13 is estimated to be £118/MWh (see Annex A). $118/162 = 73\%$.

³ 755,214 customers in 2013/14, 679,452 of which were households. Source: SHEPD.

⁴ Bill impacts are calculated by taking the price impact ((total subsidy/total SHEPD electricity sales)*(1+VAT)) and multiplying it by annual user consumption for 2013/14. Total electricity sales and consumption are based on figures provided by SHEPD. Non-domestic users are based on connection sizes typical of Shetland and Northern Scotland region and are smaller than those typically used by DECC to estimate GB non-domestic electricity bills. See Annex A for estimation of total cross-subsidy in 2013/14.

island and lower real household income resulting from real wage cuts or job losses should local businesses close or relocate.

6. On Shetland, the ageing Lerwick Power Station (LPS) supplies around 50% of Shetland demand, but this needs to be replaced as all but one of its units are older than 25 years and half are 35 years or older. By the end of 2016, most of the nine diesel units will exceed their original design life and by 2018 the risks to security of supply in the region become material.⁵ An integrated power solution is needed by around 2018 due to operational constraints on Lerwick Power Station and the need to maintain reliability and security of supply. This integrated power solution is being put out to competitive tender and may include a replacement Lerwick Power Station, but could also involve smart grid solutions incorporating renewables, demand side management and innovation solutions. The capacity of a replacement power station, its costs and ownership will depend on the outcome of this tender process. We have used SHEPD's initial submission to estimate costs.
7. Increasing energy efficiency is an essential step towards a low carbon economy and we expect the enduring solution for Shetland to recognise this. This would contribute to a lower overall energy consumption on the island, which could in turn assist with reducing the operating costs and the burn of fossil fuel under any enduring solution. As a result, energy efficiency measures have the potential to lower the cost of the cross-subsidy. Nonetheless, our analysis assumes a cost increase from 2018 onwards reflecting the need to maintain reliability and security of supply.
8. Without intervention, the new solution would further exacerbate the cost of electricity for non-domestic electricity users on Shetland who would have to pay for a large part of LPS's replacement and operating costs.
9. In light of the expected change in future costs Ofgem sought clarification as to whether the terms of the cross-subsidy should continue as they are. While Ofgem, as the independent regulator, oversees the setting of distribution and transmission charges based on cost reflective charging, the Government retains responsibility to legislate in the interest of the wider social objectives. Currently, the cross-subsidy applies to both domestic and non-domestic electricity consumers on Shetland. DECC considered the cross-subsidisation of domestic consumers across northern Scotland as part of the 2013 review of the Common Tariff Obligation and concluded that consumer arrangements should continue until at least the next review takes place.⁶ However, the question of whether arrangements for non-domestic consumers should continue in their current form, or be changed in some way, needs to be resolved.

Rationale for Government intervention

10. The rationale for intervention is based on competition concerns for businesses in Shetland compared with mainland GB and resulting equity concerns for the residents of Shetland. On a societal NPV basis for GB, the cross-subsidy is a net transfer, with net societal costs due only to the costs of administering the cross-subsidy. We are not aware of any evidence with regards to elasticity of demand, and so we consider two extreme scenarios: The first is where all businesses on Shetland face competition from mainland GB. In such a situation, Shetland businesses would be unable to pass on any increase in energy costs onto the price of their goods or services without losing significant market share and profits. In such a case, these businesses would be forced to cut costs elsewhere to maintain profits, potentially through lower real wages, or relocate to mainland GB where energy costs are lower (resulting in job losses in Shetland). As a result, real incomes, and so welfare, for residents in Shetland would be reduced, posing an equity concern.
11. In the other extreme, where no businesses on Shetland compete with businesses on mainland GB, Shetland businesses will be able to pass on the increase in energy costs on the prices of their goods or services without losing any market share. The resulting increase in the cost of goods and

⁵ As outlined in SHEPD's Integrated Plan. This hasn't been published but was submitted to Ofgem but is referenced in their letter at <https://www.ofgem.gov.uk/ofgem-publications/87381/ofgemdeterminationofshepds submissionundercrrc18a.pdf>

⁶

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229469/hydro_benefit_replacement_scheme_response.pdf

services on the island will reduce the purchasing power of Shetland households, and so their welfare relative to residents on mainland GB, posing an equity concern.

12. As the independent energy regulator, Ofgem is responsible for overseeing the setting of distribution and transmission charges for GB. It does so following the principle that charges should reflect the cost each user places on the networks. This approach ensures the efficient build and operation of networks and keeps down overall costs to the consumer in line with Ofgem's primary objective. When a need arises to act in a way that is counter to this principle in the interest of wider social objectives, it is for Government to take forward. The question of whether non-domestic consumers on Shetland should receive a cross-subsidy is just such a wider social matter, and therefore falls to Government to resolve, rather than Ofgem.
13. In addition to the continuation of the cross subsidy for non-domestic customers in Shetland, this policy also affects the customers which will bear the costs of the cross subsidy. From 2018/19 the costs of this subsidy are likely to increase significantly because of the likely increase in the costs of providing reliable electricity to Shetland. For equity reasons this will be spread across customers in GB. Thus SHEPD customers will only face a share of the costs of the cross subsidy in proportion to their share of total GB electricity use. This will be considered as part of the consultation on increasing the level of support provided through the Hydro Benefit Replacement Scheme that was announced in the Budget Statement on 18 March 2015.
14. DECC considered a number of ways to deliver this policy objective. One option considered was to amend the CTO Order to include non-domestic consumers on Shetland only. However this was both complex to draft and unnecessary to deliver the policy intent which could be achieved through the less burdensome approach of a Secretary of State letter of direction.⁷ DECC also considered whether SHEPD could introduce some form of voluntary arrangement under Ofgem's guidance to deliver the cross-subsidy. However, this did not provide a strong enough legal basis to deliver the necessary long-term certainty to non-domestic consumers on Shetland as voluntary arrangements could be changed with relative ease and potentially without Government clearance. Such voluntary arrangements, which effectively call for different treatment for different groups of non-domestic consumers, would also not be appropriate for Ofgem and SHEPD to take forward beyond the current price control without some form of Government regulation. DECC consulted on this policy approach and as there were no views expressed to the contrary concluded that the most proportionate approach which ensures the intended outcome is achieved would be to issue a Direction to make a change to SHEPD's licence conditions.
15. DECC also considered whether or not to have a threshold for non-domestic customers in Shetland who received the subsidy. As part of the consultation stage Impact Assessment⁸, we tested the option of having no threshold for the size of the non-domestic businesses which could benefit from the cross subsidy. However this was dismissed because of the potential that it might distort the incentives to locate large businesses on Shetland knowing that their electricity will be cross-subsidised. Such users might have otherwise been able to find alternative cost-effective supply arrangements, but the incentives are instead dampened which could ultimately increase costs to society through the increased cost of the cross-subsidy.

Policy objective

16. The objective is to limit any competitive disadvantage for small and medium non-domestic electricity consumers on Shetland who would otherwise face higher costs of electricity supplies in Shetland. The policy should not distort competition, should be non-discriminatory and proportionate, and at the least cost for all consumers.

⁷ The CTO already covers all domestic consumers in the North of Scotland. Amending this legislation to capture one small group of non-domestic consumers in the SHEPD area is unnecessary as the same policy objective can be achieved in a Secretary of State Direction setting out a policy intent with the detail subsequently put into licences by Ofgem.

⁸

Options under consideration

17. We consider the following options in the “cost-benefit analysis” section below.

- **Option 0:** Do nothing (i.e. cross-subsidy ends for non-domestic consumers from April 2015, but continues for domestic consumers). Any new generation on the island will not be subsidised by GB consumers.
- **Option 1:** The preferred option (i.e. cross-subsidy continues for all domestic and existing non-domestic electricity consumers on Shetland). It also continues for future non-domestic consumers with a maximum demand connection of up to 2MVA. Costs would be recovered from all SHEPD electricity consumers until a new integrated power solution has been implemented in around 2018, when it will be recovered from all GB electricity consumers.

Cost Benefit analysis

Summary and comparison of options

18. This section first describes the counterfactual, or “Do Nothing”, scenario which would take away the current cross-subsidy from Shetland non-domestic consumers and then examines the costs and benefits of the preferred option relative to this scenario.
19. As explained in more detail in paragraph 40 the direct costs and benefits of this policy fall on suppliers. However, it is expected that these will ultimately be passed on to electricity customers. Therefore it is important in assessing the costs and benefits to society that we consider this pass through. The following paragraphs show the costs and benefits to society of the policy if we assume that all costs are passed on by suppliers to their domestic and non-domestic customers in proportion to their electricity use.
20. Table 1 summarises the main identified costs and benefits of the policy against the counterfactual do nothing scenario. The total value of these costs and benefits will be equal but there are distributional impacts which vary by region. The total costs and benefits are assessed in this section while the regional distributional impacts on domestic and non-domestic customers are outlined in the next section.
21. Table 1 shows that to 2017/18 this policy represents a simple transfer from customers in SHEPD to non-domestic customers on Shetland. From 2018/19 these transfers become more complex. This is because there are two effects at work. The first is the effect of the cross-subsidy for non domestic customers and the second is the effect of the entire cross subsidy (for both domestic and non-domestic customers in Shetland) being borne by GB customers rather than just SHEPD customers. In this period, customers in Shetland are better off largely because of the benefits of the cross subsidy to non-domestic customers. Customers in SHEPD are better off because of the benefit to them of GB taking on the burden of paying for the entire cross subsidy.
22. While the first two rows of table 1 represent transfers between different customers, in addition there will also be administrative costs associated with recovering the cost of the cross-subsidy over all GB electricity consumers from 2018/19. Our appraisal period is based on the time between now and the end of a new power station’s life (25 years), should one be built in 2018/19.

Table 1: Summary of costs and benefits by region and over time (present value, 2012/13 prices 2014/15 base year)

Time Period	Impact (£m)	Shetland		SHEPD (excluding Shetland)		GB (excluding SHEPD)		GB
		Costs	Benefits	Costs	Benefits	Costs	Benefits	NPV
2015/16 - 2017/18	Cross Subsidy	-£1 ^a	£38 ^b	-£37 ^c	N/A	N/A	N/A	£0
2018/19 - 2041/42	Cross Subsidy + apportioning to GB customers	N/A	£462 ^d	N/A	£431 ^e	-£893 ^f	N/A	£0
	Administrative cost	-£0.00 ^g	N/A	-£0.04 ^h	N/A	-£1.45 ⁱ	N/A	-£1.49
2015/16 - 2041/42	Total	-£1.10	£500	-£37	£431	-£894	£0	-£1.49

The data which underpins this table is shown in more detail in annex B. The notes in the table explain these figures and relate them to the figures in the table.

- a. This represents the costs to Shetland customers as a result of the cross subsidy being recovered across SHEPD (-£0.56m for domestic customers and -£0.54m for non-domestic customers).
- b. This represents the net benefits of the cross subsidy to customers on Shetland taking into account the benefits of the cross subsidy to non-domestic customers (£37.86m)
- c. This represents the increased costs to SHEPD customers (excluding Shetland) as a result of the cross subsidy over these years. It is equal and opposite to the benefits to SHEPD customers in a.
- d. This benefit represents the cross subsidy to non-domestic customers on Shetland (£449.2m) as well as the benefits to Shetland customers as a result of the entire cross subsidy being recovered over GB rather than SHEPD from 2018/19 (£6.55m for domestic customers and £6.28m for non-domestic customers).
- e. This represents the net benefits to SHEPD customers (excluding Shetland) as a result of the entire cross subsidy (including to domestic customers) being recovered over GB rather than SHEPD from 2018/19
- f. This represents the costs to GB customers (excluding SHEPD) as a result of the cross subsidy falling to GB from 2018/19.
- g. This represents Shetland's share of National Grid's administrative costs from 2018/19.
- h. This represents SHEPD's (excluding Shetland) share of National Grid's administrative costs from 2018/19.
- i. This represents GB's (excluding SHEPD) share of National Grid's administrative costs from 2018/19.

The counterfactual (the “Do Nothing” option)

23. If we did nothing, the current cross-subsidy to non-domestic electricity consumers in Shetland will fall away from the start of Ofgem’s new licence period in April 2015, leaving only domestic electricity consumers in Shetland receiving a cross-subsidy. As a result, electricity prices for businesses in Shetland would be expected to increase by around £118.2/MWh or around 105% in 2015.⁹ By 2018/19, following implementation of a new integrated power solution the non-domestic electricity prices on Shetland could be [...] ¹⁰ higher than average non-domestic electricity prices in GB.¹¹ Both raise issues of business competitiveness and household welfare on the island, as set out under “Rationale for Government Intervention”.
24. The quantified costs and benefits are based on the assumption that total electricity demand in Shetland remains flat over the appraisal period for simplicity. Over the period, we may see some population and business growth consistent with national expectations, but energy efficiency over the period is likely to act in the opposite direction. In the consultation stage impact assessment¹² we tested the sensitivity of the results to this assumption. The analysis suggests that results are relatively insensitive to credible high and low growth scenarios. Annex D sets out the overall results in the high and low growth.

Costs

25. The cross-subsidy to Shetland will be higher than in the counterfactual because the latter assumes no cross-subsidy for non-domestic consumers on Shetland. Table 1 sets out the additional value of the cross-subsidy against the counterfactual.
26. The figures are split into two time periods reflecting the period before the implementation of a new integrated power solution (including a new power station) when costs will be recovered across all SHEPD electricity consumers; and post implementation, assumed to be around 2018, when costs will be recovered across all GB electricity consumers.

⁹ The average price of electricity for small businesses was £115/MWh in 2013, or £113/MWh in 2012 prices (Source: DECC Quarterly Energy Prices, March 2014, Table 2.2.3. Available online at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296011/QEP_March_2014.pdf). The average value of the Shetland cross-subsidy in 2015/16 is estimated to be £118/MWh (see Annex A). $118.2/113 = 105\%$.

¹⁰ Redacted

¹¹ The average price of electricity for commercial users in the UK in 2018/19 is estimated to be £125/MWh (real 2012 prices) (Source: Green book supplementary guidance for valuing energy use, 2013. Available online at:

<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>.) The total value of the Shetland cross-subsidy in 2018/19 if all existing Shetland electricity users are cross subsidised is estimated to be [redacted] based on SHEPD’s Integrated Plan³¹

¹²

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/336358/shetland_final_impact_assessment_consultation_stage.pdf Page 12

27. Table 1 shows that the cost of the Shetland cross-subsidy, recovered from SHEPD (excluding Shetland) electricity consumers over the period 2015/16 to 2017/18, will be higher than the counterfactual by around **£37m**.
28. While the total cost of the Shetland cross-subsidy, over the period from 2018/19 to 2042/43, will also be higher compared with the counterfactual, this cost will be recovered from all GB electricity consumers. However, because the domestic cross-subsidy will also be included and spread across GB from 2018/19, SHEPD electricity consumers will see a net *reduction* in Shetland cross-subsidy costs over this period compared with counterfactual (see “Benefits”).
29. SHEPD area electricity consumption represents just under 3% of total GB electricity consumption, which we assume continues to be the case throughout the appraisal period.¹³ Hence, around 97% of the total Shetland cross-subsidy under the preferred option represents an additional cost to GB electricity consumers (excluding the SHEP-D area), of around **£893m**.

Costs of administering the scheme

30. There should be relatively few administrative costs of introducing the policy option at the beginning as the cross-subsidy is technically already in place. The cost of administration will increase once we spread costs over GB, with our current best estimate equalling around £100,000 per year (**£1.5m in NPV terms**) based on costs for National Grid to administer the existing Hydro Benefit Replacement Scheme (HBRS)¹⁴. If a similar approach was taken to administer this cross-subsidy, this cost would be recovered through Transmission Network Use of System charges which suppliers can pass through to their consumers. It is therefore assumed that GB electricity consumers would ultimately pay for National Grid to manage the cross-subsidy post-2018.

Other costs

31. The preferred option reflect a continuation of the current arrangements and compared with the counterfactual they increase electricity prices in the SHEPD area of Northern Scotland over the period 2015/16 to 2017/18 (by around £2/MWh or around 1% for domestic consumers).¹⁵ This could be impacting fuel poverty in an area where the level of fuel poverty is already above the national average¹⁶. Moreover, this increased differential over the period between SHEPD electricity prices and the rest of GB could discourage new businesses from locating in the SHEPD area which could affect economic prosperity in the area relative to the counterfactual. However, given the scale of the price impact, the short period of time over which this impact and price differential will prevail and the relatively small share of total operating costs that energy represents for an average business user¹⁷, we expect these costs to be small.
32. From 2018/19, the preferred policy option will remove these differentials as the costs of the cross-subsidy will be spread across all GB electricity consumers. While this implies an increase in electricity prices against the counterfactual for non-SHEPD GB electricity consumers (by around

¹³ SHEPD total electricity sales in 2013/14 was estimated to be around 8TWh (Source: SHEPD) while total GB electricity sales in 2013 was 305TWh (Source: DECC Energy Trends. Available online at: <https://www.gov.uk/government/publications/electricity-section-5-energy-trends>). 8/305 = 2.6%.

¹⁴ Information on National Grid’s administration of the Hydro Benefit Replacement Scheme is set out in its latest charging statement for the scheme: <http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=7440>

¹⁵ Price impact is estimated as: (Total increase in subsidy cost/total SHEPD electricity sales) x (1 + VAT). The average price of electricity for domestic users in the UK over the period 2015/16 to 2017/18 is estimated to be £177/MWh (real 2012 prices) (Source: Green book supplementary guidance for valuing energy use, 2013. Available online at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>.) 2/177 = 1%.

¹⁶ We estimate that fuel poverty in northern Scotland is around 32%, compared to 25% in Scotland as a whole, 15% in England and 29% in Wales. Fuel poverty for Shetland is 37%. Fuel poverty data for local authorities in northern Scotland is taken from the *Scottish House Condition Survey – Local Authority Report*, and other data is taken from DECC’s *Annual Report on Fuel Poverty Statistics 2013*. See: <http://www.scotland.gov.uk/Publications/2011/11/SHCSLA0810> and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199833/Fuel_Poverty_Report_2013_FINALv2.pdf

¹⁷ Energy costs represent less than 3% of total business costs on average for the UK manufacturing sector. By contrast, employment costs represent around 18%. Source: ONS.

£0.2/MWh or 0.1% for domestic consumers¹⁸), the relatively small scale of this impact is expected to lead to minimal adverse effects in GB with regards to fuel poverty and business competitiveness.

33. Under the preferred option, some of the costs to serve the SHEPD area will be spread across consumers outside that area, with no direct benefit to them. As a result, competitive incentives to deliver energy at lowest cost to the area might be dampened, which could ultimately lead to increased costs to society.

Benefits

Benefits of Shetland cross-subsidy

34. Existing non-domestic electricity consumers on Shetland will benefit directly from lower electricity costs equal to the value of the Shetland cross-subsidy compared with counterfactual. All customers on Shetland will also benefit from 2018/19 as a result of the entire cross subsidy being borne by GB customers rather than SHEPD customers. The total value of these benefits to Shetland customers is equal to **£500m** as shown in Table 1.

Improved industry competitiveness and household welfare on Shetland

35. Non-domestic electricity consumers on Shetland will face less of a competitive disadvantage relative to those on mainland GB as a result of different electricity costs (relative to the counterfactual) as they will be paying a more comparable price for electricity. This will therefore limit any adverse effect from non-domestic electricity consumers in Shetland increasing the price of their goods or services, or relocating to the mainland, reducing household welfare in Shetland relative to mainland GB.
36. The non-domestic cross-subsidy will also increase the viability of Shetland as a place for new smaller businesses looking to locate on Shetland which could lead to further growth, innovation and general welfare in the area relative to the counterfactual.

Reduced cost of the cross-subsidy to SHEPD (excluding Shetland) consumers from 2018/19

37. Under the counterfactual, where only domestic electricity consumption on Shetland is cross subsidised, the total cost of the cross-subsidy would be recovered over all SHEPD electricity consumers. Under the preferred option, from 2018/19, an amount equal to the sum of the domestic and new non-domestic cross-subsidy would be recovered over all GB electricity consumers. As per under "Costs", less than 3% of these costs would therefore fall to SHEPD electricity consumers. As such, SHEPD electricity consumers should face lower costs of the cross-subsidy from 2018/19 equal to over 97% of the domestic cross-subsidy which they will no longer have to pay; less 3% of the new cost of the non-domestic cross-subsidy). This equates to a saving to SHEPD electricity consumers of **around £431m**

Other benefits

38. These lower cross-subsidy costs to SHEPD consumers from 2018/19 equates to around £4/MWh or 2% of domestic electricity prices.¹⁹ This saving could be sufficient to reduce fuel poverty in the SHEPD area relative to the counterfactual with associated benefits.

¹⁸ Price impact is estimated as: $(\text{Total subsidy cost} / \text{total GB electricity sales}) \times (1 + \text{VAT})$. The average price of electricity for domestic users in the UK over the period 2018/19 to 2042/43 is estimated to be £203/MWh (real 2012 prices) (Source: Green book supplementary guidance for valuing energy use, 2013. Available online at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>.) $0.2/203 = 0.1\%$.

¹⁹ Price impact is estimated as: $[(\text{Total subsidy cost under the preferred option} / \text{total GB electricity sales}) - (\text{Total subsidy cost under "Do Nothing"} / \text{total SHEPD electricity sales})] \times (1 + \text{VAT})$. The average price of electricity for domestic users in the UK over the period 2018/19 to 2042/43 is estimated to be £203/MWh (real 2012 prices) (Source: Green book supplementary guidance for valuing energy use, 2013. Available online at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>.) $4/203 = 2\%$.

Net cost to business

Equivalent Annual Net Cost to Business

39. The assessment in this section is intended to estimate the Equivalent Annual Net Cost to Business, which is calculated to assess the direct impacts on business of the regulation for One-In, Two-Out (OITO) purposes. Direct costs or benefits are defined in Better Regulation Executive guidance as costs or benefits that can be identified as resulting directly from the implementation or removal/simplification of a regulation.
40. Direct costs and benefits are the value of the subsidy to energy suppliers. Under the old scheme, SHEPD suppliers paid the cross-subsidy to Shetland non-domestic customers. This is due to be removed in 2015/16. With the introduction of a new cross-subsidy, from 2015/16 to 2017/18, there is a direct benefit to suppliers of non-domestic customers in Shetland from not having to pay the full cost of electricity. There is an equivalent direct cost to suppliers of customers in the SHEPD region who will pay for the costs of Shetland non-domestic subsidy as a result of this policy. Beyond 2017/18, there is a direct benefit to suppliers of customers in the SHEPD region who will pass the costs of both the Shetland domestic and non-domestic subsidy on to National Grid who in turn will pass them on to suppliers of customers throughout GB (direct cost). Since the direct costs to suppliers result in an equivalent direct benefit to other suppliers, this policy does not in fact impose any additional direct costs to business apart from the small additional cost that suppliers will face as a result of National Grid's administrative costs from 2018/19.
41. We assume that this admin cost will represent a cost to business of around **£0.1m per year in 2012 prices**. When expressed in terms of EANCB (i.e. in 2009 prices and a 2010 base year) this is equal to **£0.07m per year**²⁰. Therefore, the measure is classed as an "IN" for OITO purposes.

Total Net Cost to Business customers

42. Although the direct costs fall on suppliers, it is expected that these will ultimately be passed on as costs to electricity customers. Pass-through costs are treated as indirect costs so are not included in the EANCB calculation. However, therefore it is important in assessing the costs to business that we consider this pass through. The following paragraphs show the costs to business if we assume that all costs are passed on by suppliers to their domestic and non-domestic customers in proportion to their electricity use. The detailed figures which underpin the costs and benefits in this section are shown in Annex C.
43. If the cross-subsidy were to have continued, it would have benefited non-domestic customers on Shetland by around £13m per year between 2015/16 to 2017/18 and by around £30.2m per year between 2018/19 to 2042/43 as a result of the assumption of a fully integrated power solution in 2018/19.²¹ The average annual cost to business is **£28.4m per year** over the period.
44. Under the old scheme, the cost of the cross-subsidy would be recovered over all SHEPD electricity consumers over the whole appraisal period. Around 56% of SHEPD electricity demand is by non-domestic consumers.²² As such, SHEPD businesses save an average of around **£16.0m per year** in cross-subsidy recovery costs over the appraisal period from removing the old cross-subsidy.
45. The proposed new cross-subsidy generates a direct benefit to those businesses in Shetland who would otherwise pay higher electricity costs in the counterfactual. This would be equivalent to a saving in electricity costs to Shetland businesses of **£28.4m per year**. This is equivalent to around £13m per year between 2015/16 to 2017/18 and by around £30.2m per year between 2018/19 to 2042/43.²³ The costs of this cross-subsidy will be recovered over SHEPD consumers between 2015/16 to 2017/18 and over GB electricity consumers from 2018/19 onwards. As previously stated, around 56% of SHEPD electricity consumption is by non-domestic consumers. In addition, around

²⁰ The EANCB figures were derived by inputting the streams of costs and benefits to business into the IA calculator. (<https://www.gov.uk/government/publications/impact-assessment-calculator--3>)

²¹ Equivalent to: the value of the cross-subsidy x total Shetland non-domestic consumption in the central scenario.

²² Based on data provided by SHEPD for 2013/14.

²³ This is necessarily, the same value as the cost to these businesses of removing the old cross-subsidy.

67% of electricity consumption in GB is expected to be by non-domestic users.²⁴ This equates to a cost to businesses from recovering the cross-subsidy of around **£18.9m per year** over the entire appraisal period.

46. There are also impacts on business as a result of shifting the cost of the subsidy for domestic customers to all GB compared to it remaining with SHEPD customers in the counterfactual. This represents an annual benefit to SHEPD businesses of around **£15.4m per year** but represents an average annual cost to GB businesses of around **£18.5m per year**.
47. Taking these costs together and discounting them to provide an NPV gives a total net cost to business of around **£102.2m**. The individual elements are split out below.

Table 2: Net Present Value of impacts on business customers (2012/13 prices and 2014/15 base year)

Description	Impact (£m)
Cost to Shetland businesses from removal of existing cross-subsidy scheme	-£487.1
Saving to SHEPD businesses from reduced cost of cross-subsidy	£274.1
Saving to Shetland businesses from introduction of new cross-subsidy	£487.1
Cost to SHEPD businesses of new cross-subsidy	-£28.0
Cost to non-SHEPD GB businesses of new cross-subsidy	-£295.6
Benefits to SHEPD businesses as a result of cost being apportioned to GB from 2018/19	£256.3
Costs to GB businesses as a result of costs being apportioned to GB from 2018/19	-£308.0
Cost to all GB businesses of admin costs	-£1.0
Total costs	-£1,119.6
Total benefits	£1,017.5
Total net benefit	-£102.2

Distributional impacts

48. As described in the costs and benefits section, while the net costs are relatively small (equal to admin costs of administering the scheme over GB), there are underlying distributional impacts from the transfer of costs and benefits across different sets of electricity users (domestic and non-domestic, Shetland, SHEPD and GB). To illustrate these distributional effects, these transfers have been translated into electricity bill impacts.
49. Table 7 illustrates the estimated average annual impact on household electricity bills in the different regions over the different time periods. It is worth noting that the average bill impact in Shetland is double that of SHEPD in absolute terms (but not % terms) because average annual domestic electricity demand in Shetland is around double that of an average SHEPD consumer reflecting the higher proportion of electrically heated households among other factors. The increased hours of darkness and lower than GB-average temperatures in Northern Scotland will also result in SHEPD average annual household electricity demand that is higher than the GB average.

Table 7: Average annual domestic electricity bill impacts by region, central, both options (£, +ve numbers reflect bill increase against counterfactual)

²⁴ Source: DECC's Updated Energy and Emissions Projections. Available online at: <https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2013>.

	Shetland	SHEPD	GB
2015/16 to 2017/18	+£18 (+1%)	+£9 (+1%)	N/A
2018/19 to 2042/43	-£40 (-2%)	-£20 (-2%)	+£1 (+0.1%)

50. Table 8 shows the average impact on non-domestic electricity bills in the different regions, under the preferred option. Figures are presented in % terms only as the absolute impacts will vary significantly according to user demand, which is much more variable than in the domestic sector.

Table 8: Average annual non-domestic electricity bill impacts by region and eligibility, central, both options (%), +ve numbers reflect bill increase against counterfactual)

	Shetland	SHEPD	GB
2015/16 to 2017/18	-50%	+1%	N/A
2018/19 to 2042/43	-66%	-3%	0.1 to 0.2% ²⁵

Specific impact tests

Competition impacts

51. The preferred option may directly limit participation of large non-domestic consumers in the energy market on Shetland. However, these large non-domestic consumers should be better able to operate without the cross-subsidy assistance. Implementing either option should help reduce barriers to entry for new non-domestic consumers in Shetland and could deliver longer-term competition benefits.
52. However, choosing to recover the costs over SHEPD and not GB over the period 2015/16 to 2017/18 may result in adverse competition impacts on non-domestic consumers in north Scotland. Non-domestic electricity consumers in the SHEPD area but not on Shetland will be paying to cross-subsidise Shetland non-domestic electricity consumers and will not benefit from this arrangement. This would not be the case if they were located outside SHEPD's area.
53. Non-domestic consumers in the SHEPD area will be at a competitive disadvantage to non-domestic consumers in the rest of GB, whereas when the cross-subsidy cost is recovered over GB, they would be able to compete fairly against GB non-domestic consumers also paying the cross-subsidy.

Small and Microbusiness Assessment

54. There are two types of small and microbusiness that might be affected by this policy. The first is small and microbusiness suppliers which supply customers in SHEPD to 2017/18 and small and microbusiness suppliers which supply customers in GB from 2018/19. The second type are small and microbusiness customers in Shetland, the SHEPD region and GB who are likely to see changes to their electricity bills as a result of this policy when the costs are passed through.

Impact on small and microbusiness suppliers

55. DECC believes²⁶ there to be 10 small or micro businesses according to the Better Regulation definition, which defines them as having up to 49 full-time equivalent (FTE) employees.²⁷ The total market share of these 10 suppliers is estimated to be around 0.4% (amounting to around 112,000 customer accounts). We would expect these suppliers to face 0.4% of the cost of the cross

²⁵ Upper end of range reflects the impact on very large energy intensive users who pay below average electricity prices.

²⁶ We do not have complete data on the number of persons employed by the smaller independent suppliers so we have estimated this figure on the basis of the information we do have. The underlying assumption we have used is that the number of employees a supplier has is proportional to the size of their customer base.

²⁷ BIS (2013) 'Better Regulation Framework Manual: Practical Guidance for UK Government Officials', pp.26-7 [web], available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf

subsidy²⁸. We expect that these suppliers will pass the costs of the cross subsidy on to their customers. We assume that suppliers will not face any additional administration cost in passing these costs on to customers because we assume that the cost will be passed on to them by National Grid in the form of higher Transmission Network Use of System Charges. Therefore to a supplier this will simply manifest itself in a marginally higher charge than they would otherwise have received. Given that small and microbusiness suppliers will not face any additional admin cost as a result of this policy and are expected to pass on the cost of the cross-subsidy to customers, we do not expect any disproportionate burdens on small and micro businesses. To exempt small and micro businesses from the charge would provide them with a subsidy which would give them an unfair competitive advantage compared to suppliers with more than 50 employees.

Impact on small and microbusiness customers

56. Implementing the preferred option will be beneficial for the nearly 2000 small and microbusiness non-domestic electricity consumers on Shetland²⁹ as they will continue to get the cross-subsidy (or will gain the cross-subsidy if they are new to Shetland with a maximum demand connection of up to 2MVA). We estimate that this is worth around £5,673 to an average business in this category up to 2017/18, and worth £12,684 thereafter; this wouldn't be the case in the counterfactual. Without the cross-subsidy they may need to increase their prices to cover the cost of electricity they'll have to pay, possibly affecting their market share and profits, or, if they are unable to source alternative arrangements, they may need to close or relocate.
57. Under the preferred option, an average Shetland small businesses will see a bill increase of £80 per annum for 2015/16-2017/18 compared to the counterfactual as a result of their being part of SHEPD region. However, there will be a net benefit to small businesses given that the subsidy of £5,673 to the average small business is much greater than the £80 bill increase. Once costs are spread over GB from 2018/19, small businesses in the SHEPD region will benefit from a bill decrease of around 3%³⁰ compared to the counterfactual. There would be a marginal bill increase for small GB businesses from 2018/19 onwards, of around 0.1%.
58. One major problem with exempting small and micro businesses from these costs would be the fact that domestic customers will still pay to recover the cost of the subsidy, and by exempting small businesses, domestic bills will increase. This is problematic on Shetland and in the SHEPD region which has relatively high levels of fuel poverty, as previously mentioned in the Cost Benefit Analysis section.
59. Given the potential cost impact of the cross-subsidy on small GB businesses from 2018/19 onwards, our consultation asked for views on whether, and if so how, these costs should be mitigated. Where respondents addressed this question, they tended to agree that such costs were marginal, i.e. a 0.1% - 0.2% bill increase for small and micro GB businesses, and therefore rendered mitigation or exemption unnecessary. No practical proposals for mitigation approaches were put forward.

Equalities

60. We do not consider that the impact of our proposals is likely to differ on account of any of the protected characteristics (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation).

Human rights

61. To the extent that human rights may be engaged, we consider the approach to be compatible with the Human Rights Act 1998.

²⁸ This assumes that the market share of small and microbusiness suppliers remains the same over time and that their customers consume an amount of energy that is proportional to the GB average.

²⁹ Small businesses for this IA are based on an average demand of 5.5kW, sourced from Ofgem's estimates.

³⁰ Consistent with table 7

Greenhouse gas impacts

62. Compared to having no limit on the size of non-domestic consumer able to receive the cross-subsidy, the 2MVA should encourage more efficient energy usage.

Post implementation review

63. We will re-evaluate the current cross-subsidy arrangements in 2023 to coincide with Ofgem's next electricity distribution price control review. We would expect a key consideration for re-evaluation to be a substantial change in relevant circumstances with a potential to impact on the electricity supply arrangements on Shetland. We would not expect to re-evaluate the arrangements ahead of that price control review unless circumstances related to the energy supply arrangement on Shetland change materially.

Annex A: Estimating the annual Shetland cross-subsidy under each scenario

The following section sets out how we arrive at total Shetland cross-subsidy figures under the counterfactual and under the preferred policy option scenarios. The focus is on the central estimates. The methodology is the same for the high and low growth scenarios but demand growth over time is allowed to vary.

Estimates for the total cost of the Shetland cross-subsidy are extrapolated from data on the cross-subsidy and Shetland electricity consumers from 2012/13.

The total Shetland cross-subsidy in 2012/13 (when all power consumption on the island was subsidised) was **£26,570,000**.³¹

Table A1 below sets out the numbers of different types of electricity consumers on Shetland and their average electricity consumption in 2012/13. Based on this data, total electricity demand on Shetland in 2012/13 can be estimated.

Table A1: Electricity consumers and average annual consumption on Shetland in 2012/13³²

	No. electricity consumers on Shetland (a)	Assumed average demand (kW) (b)	Total average demand on Shetland (kW) c = (a x b)	Total annual electricity demand on Shetland (MWh) d = c x 365 x 24
Domestic	11,691	1.2	13,594.1	119,084.5
Small I&C	1,939	5.5	10,618.4	93,017.6
Medium I&C	41	18.6	763.7	6,689.7
Large I&C	4	168.6	674.4	5,908.2
Total	13,675		25,650.7	22,4700

Source: SHEP-D and Ofgem estimates. Size bands are based on connection size. Domestic annual electricity demand from DECC's subnational electricity statistics, available online at: <https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics-2005-to-2011>.

The average value of Shetland cross-subsidy in 2012/13 based on figures from Ofgem and SHEPD is therefore **£118.2/MWh**.³³ Note that this figure is not directly comparable to DECC's levelised costs of electricity because the subsidy includes non-generation elements of Shetland's electricity infrastructure including for example components of network costs and balancing costs.

In the absence of any other evidence, we assume the average value of the cross-subsidy reflects the average unsubsidised electricity price differential between Shetland and the mainland.

“Do Nothing”

2015/16 to 2017/18

Under the counterfactual option, the cross-subsidy for Shetland's non-domestic electricity consumers will be discontinued, while the domestic cross-subsidy will continue.

As such, and given we assume the per unit value of the cross-subsidy remains constant over this period, the annual Shetland cross-subsidy under the “Do Nothing” scenario for the period 2015/16 to 2017/18 is estimated to be **£14,081,334**.³⁴

2018/19 onwards

³¹ Source: Ofgem – SHEPD's regulatory return

³² Rounded to the nearest whole number

³³ £26,570,000 / 224,700MWh

³⁴ 119,085MWh x £118.2/MWh

An estimated further 990kW of non-domestic demand is expected to have connected by 2014/15³⁵, equivalent to 8,672 MWh³⁶ of additional generation needed in 2014/15 relative to 2012/13. There is currently no information on any further connections in the area for subsequent years.

Shetland also needs to replace the power station currently located on the island. Ofgem currently estimates the total cost of the cross-subsidy (covering operating costs and capex cost recovery) to be recouped through energy bills in 2018³⁷ (assuming all existing consumption on the island was subsidised) to be around [...] ³⁸ which we assume stays flat in real terms for 25 years. This includes the subsidy for domestic consumers.

The average value of Shetland cross-subsidy from 2018/19³⁹, is therefore estimated to be [...] ⁴⁰ Note that this increase in cost will be as a result of implementing the Shetland Integrated Plan. This will be a fully integrated power solution for Shetland (including but not limited to smart grid solutions incorporating renewables, demand side management and innovative solutions). Note that the Shetland Integrated Plan has not yet been signed off by Ofgem so at the moment these are best estimates. As before, we assume this figure remains flat in real terms for a period of 25 years.

As such, the annual Shetland cross-subsidy under the “Do Nothing” scenario for the period 2018/19 to 2043/44 is estimated to be [...] ⁴¹

The preferred option

Under the preferred option, the cross-subsidy for Shetland’s existing non-domestic electricity consumers will also continue, as well as for future non-domestic consumers with a maximum demand connection of 2MVA or below. Assuming non-domestic demand remains flat over the period and given we assume the per-unit value of the cross-subsidy remains constant over this period at £118.2/MWh, the annual Shetland cross-subsidy under the preferred option for the period 2015/16 to 2017/18 is estimated to be **£27,590,176**.⁴² As implied by the previous section, if we assume demand remains unchanged, then the total Shetland cross-subsidy under these options over the period 2018/19 to 2042/43 is [...] ⁴³.

³⁵ 990kW is anticipated demand on the basis of connections applications received, which may or may not have already been accepted by SHEPD, and where connections may or may not have been made

³⁶ 990kW x 24 hours per day x 365 days per year / 1000kWh per MWh

³⁷ The power station should start operating in 2018. When exactly the costs will start to be recovered is still to be decided.

³⁸ Redacted figures based on Ofgem and SHEPD estimates as well as DECC estimates of the increase in electricity demand.

³⁹ based on Ofgem and SHEPD estimates as well as DECC estimates of the increase in electricity demand.

⁴⁰ Source: Ofgem – SHEPD’s regulatory return - Redacted

⁴¹ Source: Ofgem – SHEPD’s regulatory return - Redacted

⁴² £14,081,334 + [£118.2/MWh x (93,018MWh + 6,690MWh + 5,908MWh + 8,672MWh)]

⁴³ Redacted

Annex B: Detailed annual breakdown of NPV for preferred option compared to the Do Nothing scenario with central growth.

	Subsidy Benefit	Subsidy cost				Admin cost			
	Non Domestic Shetland	Shetland domestic	Shetland Non Domestic	Non-Shetland SHEPD	non-SHEPD GB	Shetland domestic	Shetland non-dom (existing and future below 2MW)	Non-Shetland SHEPD	non-SHEPD GB
2014	£0	£0	£0	£0	£0	£0	£0	£0	£0
2015	£13,057,147	-£192,690	-£184,929	-£12,679,528	£0	£0	£0	£0	£0
2016	£12,615,601	-£186,174	-£178,675	-£12,250,752	£0	£0	£0	£0	£0
2017	£12,188,986	-£179,878	-£172,633	-£11,836,475	£0	£0	£0	£0	£0
2018	£26,333,226	£382,045	£366,656	£25,139,605	-£52,221,533	-£37	-£36	-£2,440	-£84,632
2019	£25,442,731	£369,026	£354,162	£24,282,907	-£50,448,824	-£36	-£35	-£2,368	-£81,759
2020	£24,582,348	£356,579	£342,216	£23,463,873	-£48,745,017	-£35	-£33	-£2,284	-£78,998
2021	£23,751,061	£344,725	£330,840	£22,683,881	-£47,110,508	-£33	-£32	-£2,185	-£76,349
2022	£22,947,885	£333,238	£319,815	£21,927,948	-£45,528,886	-£32	-£31	-£2,093	-£73,786
2023	£22,171,870	£322,205	£309,227	£21,201,967	-£44,005,268	-£30	-£29	-£1,997	-£71,316
2024	£21,422,096	£311,533	£298,985	£20,499,725	-£42,532,339	-£29	-£28	-£1,906	-£68,929
2025	£20,697,678	£301,217	£289,084	£19,820,878	-£41,108,856	-£28	-£27	-£1,818	-£66,622
2026	£19,997,756	£291,327	£279,592	£19,170,114	-£39,738,790	-£26	-£25	-£1,725	-£64,402
2027	£19,321,504	£281,788	£270,438	£18,542,428	-£38,416,158	-£25	-£24	-£1,633	-£62,259
2028	£18,668,119	£272,597	£261,617	£17,937,614	-£37,139,946	-£23	-£22	-£1,542	-£60,190
2029	£18,036,830	£263,675	£253,055	£17,350,563	-£35,904,124	-£22	-£21	-£1,458	-£58,187
2030	£17,426,889	£254,759	£244,497	£16,763,829	-£34,689,975	-£21	-£21	-£1,409	-£56,220
2031	£16,837,574	£246,144	£236,229	£16,196,937	-£33,516,884	-£21	-£20	-£1,361	-£54,319
2032	£16,268,188	£237,820	£228,241	£15,649,214	-£32,383,463	-£20	-£19	-£1,315	-£52,482
2033	£15,718,056	£229,778	£220,523	£15,120,014	-£31,288,370	-£19	-£19	-£1,271	-£50,707
2034	£15,186,527	£222,008	£213,065	£14,608,709	-£30,230,309	-£19	-£18	-£1,228	-£48,992
2035	£14,672,973	£214,500	£205,860	£14,114,694	-£29,208,028	-£18	-£17	-£1,186	-£47,336
2036	£14,176,786	£207,246	£198,899	£13,637,386	-£28,220,317	-£17	-£17	-£1,146	-£45,735
2037	£13,697,377	£200,238	£192,173	£13,176,218	-£27,266,007	-£17	-£16	-£1,107	-£44,188
2038	£13,234,181	£193,467	£185,674	£12,730,646	-£26,343,968	-£16	-£16	-£1,070	-£42,694
2039	£12,786,648	£186,924	£179,395	£12,300,141	-£25,453,109	-£16	-£15	-£1,034	-£41,250
2040	£12,354,250	£180,603	£173,329	£11,884,194	-£24,592,376	-£15	-£15	-£999	-£39,855
2041	£11,936,473	£174,496	£167,467	£11,482,313	-£23,760,749	-£15	-£14	-£965	-£38,508
2042	£11,532,824	£168,595	£161,804	£11,094,022	-£22,957,246	-£14	-£14	-£932	-£37,205
NPV (£m)									
14-17	£37.86	-£0.56	-£0.54	-£36.77	£0.00	£0.00	£0.00	£0.00	£0.00
18-42	£449.20	£6.55	£6.28	£430.78	-£892.81	-£0.00	-£0.00	-£0.04	-£1.45
Total	£487.06	£5.99	£5.75	£394.01	-£892.81	-£0.00	-£0.00	-£0.04	-£1.45

Annex C: Detailed breakdown of -£102.2m Business NPV calculation

	Removal of cross-subsidy		Introduction of new cross-subsidy to non domestic customers on Shetland			Shifting cost of Shetland domestic cross subsidy to all of GB from SHEPD from 2018		Admin cost	Total
	Lost subsidy to shetland business	cost savings to SHEPD businesses	Subsidy benefit to Shetland business	Subsidy cost to SHEPD business	Subsidy cost to non-SHEPD GB business	Subsidy benefit to SHEPD businesses	Subsidy cost to non SHEPD customers	Admin cost to GB business	Net benefit to business
2015	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0	£0	£0
2016	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0	£0	£0
2017	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0	£0	£0
2018	-£30,217,983	£17,002,542	£30,217,983	-£490,147	-£20,190,030	£17,205,419	-£21,037,403	-£68,437	-£7,578,055
2019	-£30,217,983	£17,002,542	£30,217,983	-£492,360	-£20,125,515	£17,203,113	-£20,970,181	-£68,230	-£7,450,632
2020	-£30,217,983	£17,002,542	£30,217,983	-£491,618	-£20,132,599	£17,203,886	-£20,977,562	-£68,251	-£7,463,601
2021	-£30,217,983	£17,002,542	£30,217,983	-£486,755	-£20,103,638	£17,208,954	-£20,947,386	-£68,140	-£7,394,422
2022	-£30,217,983	£17,002,542	£30,217,983	-£482,587	-£20,033,861	£17,213,297	-£20,874,680	-£67,895	-£7,243,184
2023	-£30,217,983	£17,002,542	£30,217,983	-£476,575	-£19,946,035	£17,219,560	-£20,783,168	-£67,584	-£7,051,260
2024	-£30,217,983	£17,002,542	£30,217,983	-£470,678	-£19,924,325	£17,225,705	-£20,760,547	-£67,493	-£6,994,795
2025	-£30,217,983	£17,002,542	£30,217,983	-£464,721	-£19,865,494	£17,231,912	-£20,699,247	-£67,279	-£6,862,286
2026	-£30,217,983	£17,002,542	£30,217,983	-£456,357	-£19,846,413	£17,240,628	-£20,679,365	-£67,188	-£6,806,152
2027	-£30,217,983	£17,002,542	£30,217,983	-£447,224	-£19,713,530	£17,250,144	-£20,540,905	-£66,718	-£6,515,690
2028	-£30,217,983	£17,002,542	£30,217,983	-£437,016	-£19,717,609	£17,260,780	-£20,545,155	-£66,697	-£6,503,156
2029	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2030	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2031	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2032	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2033	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2034	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2035	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2036	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2037	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2038	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2039	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2040	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2041	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
2042	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	£17,270,457	-£20,593,214	-£66,819	-£6,578,495
Average Annual (£m)	-£28.4	£16.0	£28.4	-£1.2	-£17.7	£15.4	-£18.5	-£0.1	-£6.1
NPV (£m)	-£487.1	£274.1	£487.1	-£28.0	-£295.6	£256.3	-£308.0	-£1.0	-£102.2

Annex D: Summary Results in a High and Low Growth Scenario

As sensitivity, we considered low growth and high growth scenarios. The low growth scenario is consistent with electricity demand growth for the UK from the “Low growth” scenario of DECC’s Updated Energy and Emissions Projections (UEP).⁴⁴ For the high growth scenario, we assume domestic and small and medium-sized business electricity demand on Shetland grow in line with the “High growth” scenario of the UEP. For Shetland’s large industry, we assume electricity demand growth consistent with a new large user of average demand (1,477MWh per year but above a 2MVA maximum demand connection) joining the island every 5 years based upon an assumption that SHEPD provided to Ofgem. This is a faster growth scenario than that implied by simply applying DECC’s UEP growth rate on these users. By implication, only in the “High growth” scenario do we see new connections on the island which would not be eligible for the cross-subsidy under the preferred option.

The results for these scenarios are presented below.

Low Growth

Time Period	Impact (£m)	Shetland		SHEPD (excluding Shetland)		GB (excluding SHEPD)		GB
		Costs	Benefits	Costs	Benefits	Costs	Benefits	NPV
2015/16 - 2017/18	Cross Subsidy	-£1	£38	-£37	N/A	N/A	N/A	£0
2018/19 - 2041/42	Cross Subsidy + apportioning to GB customers	N/A	£451	N/A	£423	-£875	N/A	£0
	Administrative cost	-£0.00	N/A	-£0.04	N/A	-£1.45	N/A	-£1.49
2015/16 - 2041/42	Total	-£1.08	£489	-£37	£423	-£876	£0	-£1.49

High Growth

Time Period	Impact (£m)	Shetland		SHEPD (excluding Shetland)		GB (excluding SHEPD)		GB
		Costs	Benefits	Costs	Benefits	Costs	Benefits	NPV
2015/16 - 2017/18	Cross Subsidy	-£1	£38	-£37	N/A	N/A	N/A	£0
2018/19 - 2041/42	Cross Subsidy + apportioning to GB customers	N/A	£471	N/A	£437	-£908	N/A	£0
	Administrative cost	-£0.00	N/A	-£0.04	N/A	-£1.45	N/A	-£1.49
2015/16 - 2041/42	Total	-£1.11	£509	-£37	£437	-£909	£0	-£1.49