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: 24 July 2014** **Stage:** ConsultationConsultation **Source of intervention:** DomesticDomestic **Type of measure:** OtherOther **Contact for enquiries:** Ian.lomas@decc.gsi.gov.uk Aisling .gilchrist@decc.gsi.gov.uk
Summary: Intervention and Options	**RPC:** RPC Opinion StatusRPC Opinion Status

Cost of Preferred (or more likely) 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**
-£1.5m	-£50.5m	£2.2m	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 75% 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.

To

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" (discontinue the cross-subsidy for non-domestic consumers, but continue for domestic consumers).

Option 1: 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 2MW. 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.

Option 2: Cross-subsidy continues for all domestic and existing non-domestic electricity consumers on Shetland. It also continues for future non-domestic consumers with no size limit. Costs would be recovered from all SHEPD electricity consumers until an integrated power solution has been implemented c2018when, due to the material increase in costs, it will be recovered from all GB electricity consumers.

Our preferred option is 1 as it reduces the risk that future large consumers will increase the cross subsidy. These large load customers should be able to arrange for their own supply. Spreading the additional cost over GB once the increased costs are incurred will also avoid exacerbating fuel poverty in the SHEPD area, which is already higher than in the rest of GB. The net society-wide costs incurred are the costs of administering the cross-subsidy, as the subsidy itself represents a transfer.

Will the policy be reviewed? It willwill be reviewed. **If applicable, set review date:** 0303 / 20232023					
Does implementation go beyond minimum EU requirements?			**N/AN/A**		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro YesYes**	**< 20 YesYes**	**Small YesYes**	**Medium YesYes**	**Large YesYes**
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: 23rd July 2014

Summary: Analysis & Evidence Policy Option 1

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 2MW.

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2012/13	2014/15	29	**Low:** -1.5m	**High:** -1.5m	**Best Estimate:** -1.5m

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-domestics on Shetland) the costs of Shetland cross-subsidy payments will be between £37.6 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").

GB electricity consumers outside of the SHEPD area will pay for the Shetland cross-subsidy under Option 1 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 (Option 1)

Direct impact on business (Equivalent Annual) £m:			**In scope of OITO?**	**Measure qualifies as**
Costs: £35.7m	**Benefits: £33.5m**	**Net:-2.2m**	YesYes	ININ

Summary: Analysis & Evidence

Policy Option 2

Description: Shetland cross-subsidy continues for both current and future non-domestic electricity consumers with no size limit

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2012/13	2014/15	29	**Low:** -1.5m	**High:** -1.5m	**Best Estimate:** -1.5m

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		£55.3	£963.5
Best Estimate	0		£53.3	£932.2

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

The costs of Shetland cross-subsidy payments by SHEPD electricity consumers will be between £37.6 and 38.2m (NPV, best estimate of £37.9m) higher than the "Do Nothing" scenario over the period 2015/16 to 2017/18. These costs are expected to fall to all SHEPD electricity consumers through higher prices (although prices for SHEPD's eligible Shetland consumers will be lower than in "Do Nothing").

GB electricity consumers outside of the SHEPD area will pay for the Shetland cross-subsidy under Option 2 at a cost of between £874.9 and 923.9m (NPV, best estimate of £892.8m) over the period 2018/19 to 2042/43.

Once the cross-subsidy is recovered over GB, suppliers will have to pay administrative costs. The total cost of administration, through National Grid, is estimated at £1.5m (NPV). These costs are likely to be passed onto GB electricity consumers through higher prices.

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 non-domestic electricity consumers locating in Scotland may choose to 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 2015/16 to 2017/18.

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

Eligibility for larger businesses reduces their incentives to find alternative cost-effective supply arrangements at a cost to all other electricity consumers (SHEPD consumers over the period 2015/16 to 2017/18, GB consumers over the period 2018/19 to 2042/43).

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		£55.2	£962.0
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 511.9m (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 450.1m (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 lower 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.

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 (Option 1)

Direct impact on business (Equivalent Annual) £m:			**In scope of OITO?**	**Measure qualifies as**
Costs: £35.7m	**Benefits: £33.5m**	**Net:-2.2m**	YesYes	ININ

Contents

Introduction

1. Shetland is isolated from the UK 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 75% 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 760,000[3] consumers in the Scottish Hydro Energy Power Distribution (SHEPD) area covering northern Scotland, including those in Shetland, at a 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. 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 island and lower real household income resulting from

[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.

real wage cuts or job losses should local businesses close or relocate. 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] Government understands that an integrated power solution is needed by around 2018. 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.

6. Without intervention, the new solution would further exacerbate the cost of electricity for non-domestic electricity users on Shetland who will have to pay for a large part of LPS's replacement and operating costs.

7. 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 last year's 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, need to be resolved.

Rationale for Government intervention

8. 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 costs due to the costs of administrating 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.

9. 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 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.

10. 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.

[5] As outlined in SHEPD's Integrated Plan

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

11. 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. Therefore DECC 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.

Policy objective

12. The objective is to limit any competitive disadvantage for small and medium 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 at the least cost for all consumers.

Options under consideration

13. 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:** 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 2MW. Costs would be recovered from all SHEPD electricity consumers until a new integrated power solution has been implemented, when it will be recovered from all GB electricity consumers.

- **Option 2:** Cross-subsidy continues for all domestic and existing non-domestic electricity consumers on Shetland. It also continues for future non-domestic consumers with no size limit. Costs would be recovered from all SHEPD electricity consumers until a new integrated power solution has been implemented, when it will be recovered from all GB electricity consumers. This reflects the current arrangements

14. We considered a number of alternative options, but identified significant downsides with each of these.

15. For example, it would be possible to have a lower threshold size of 1MW for existing and/or future non-domestic consumers eligible to receive the cross-subsidy. This would produce a marginal reduction in the overall cost of the cross-subsidy, but would mean that (i) those existing 'large' non-domestic consumers on Shetland would face a dramatic cost increase, which could undermine their viability; (ii) existing/future medium-sized non-domestic consumers on Shetland would encounter a significant barrier to growth if they needed to increase their demand connection above 1MW; and (iii) if the 1MW limit was applied to future non-domestic consumers only, a significant cost disparity would be created between existing and future 'larger' non-domestic consumers.

[7] The CTO covers all domestic consumers in the North of Scotland and it would be difficult to amend this legislation to capture one small group of non-domestic consumers in the SHEPD area (ie those on Shetland only, excluding new connections over 2MW). This point can be more sensibly covered off in a letter setting out a policy intent with the detail subsequently put into licences by Ofgem.

16. In addition, we considered the options of either: (i) continuing to recover costs from SHEPD consumers even after the integrated power solution for Shetland has been implemented in c2018; or (ii) recovering costs from all GB consumers from April 2015. The significant cost impact for SHEPD consumers in c2018 under (i) is described in the cost benefit analysis below. For (ii), the increase in costs from now to April 2018 does not justify a change in the current recovery arrangements.

Cost Benefit analysis

Summary and comparison of options

17. 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 other options relative to this scenario.

18. Table 1 summarises the main identified costs and benefits of each option against the counterfactual scenario. The main cost of options 1 and 2 will be borne by those having to pay to subsidise Shetland's electricity consumption. The main benefit will be the value of the subsidy to those who receive it and the reduced cost to SHEPD electricity consumers of paying the subsidy from 2018/19 when it will be recouped from all GB electricity users. The total value of these costs and benefits will be equal under our best estimate, but each option will differ in terms of distributional impacts. These distributional impacts are outlined in the next section. 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

NPV (real 2012/13 £m)	**Best estimate** ***(low growth, high growth)***	
Description	**Option 1**	**Option 2**
Costs		
Increase in subsidy cost paid by SHEPD electricity consumers over the period 2015/16 to 2017/18	37.9 *(37.6,38.0)*	37.9 *(37.6, 38.2)*
Subsidy cost paid by all GB electricity consumers outside the SHEPD area from 2018/19 onwards	892..8 *(874.9, 907.8)*	892.8 *(874.9, 923.9)*
Administrative costs of the GB scheme from 2018/19 onwards to National Grid which will likely be passed onto GB electricity consumers via the suppliers	1.5	1.5
Increased costs to serve SHEPD area from reduced competitive incentives on the company	Unquantified	Unquantified
Reduced incentives on large users to make their own cost-effective supply arrangements at a cost to all electricity consumers over which the cross subsidy is being recovered	Unquantified but likely to be negligible	Unquantified but higher than Option 1
Increase in GB fuel poverty	Unquantified but likely to be minimal	Unquantified but likely to be minimal
Total quantified costs	**932.2** ***(914.0, 947.2)***	**932.2** ***(914.0, 963.5)***
Benefits		
Subsidy to eligible Shetland non-domestic electricity consumers	487.1 *(476.7, 495.2)*	487.1 *(476.7, 511.9)*
Reduced cost to SHEPD consumers from spreading the cross-subsidy cost over GB electricity consumers from 2018/19 onwards	443.6 *(435.8, 450.6)*	443.6 *(435.8, 450.1)*
Improved economic growth and welfare in Shetland as it becomes a more viable location for business vs rest of GB	Unquantified	Unquantified but possibly higher than Option 1
Improved economic growth in SHEPD area outside Shetland as it becomes a more viable location for businesses vs rest of GB from 2018/19	Unquantified	Unquantified
Reduced fuel poverty in Shetland and SHEPD area	Unquantified	Unquantified but possibly lower than Option 1
Total quantified benefits	**930.7** ***(912.5, 945.8)***	**930.7** ***(912.5, 962.0)***
TOTAL QUANTIFIED NET BENEFIT	**-1.5** ***(-1.5, -1.5)***	**-1.5** ***(-1.5, -1.5)***

The 'high growth' scenario assumes electricity demand growth consistent with a new large user of average demand (1,477MWh per year but above a 2MW maximum demand connection) joining the island every 5 years. However, it is power that one or more larger demand users could connect, and this would mean a very significant cost increase under the 'high growth' scenario under option 2.

The counterfactual (the "Do Nothing" option)

19. 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/MWh or around 105% in 2015.[8] By 2018/19, following implementation of a new integrated power solution the non-domestic electricity prices on Shetland could be as much as £264/MWh or around 210% higher than average non-domestic electricity prices in GB.[9] Both raise issues of business competitiveness and household welfare on the island, as set out under "Rationale for Government Intervention".

20. In the quantified costs and benefits below, the central estimates 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 their impact on electricity demand on Shetland may be outweighed by improvements in energy efficiency over the period.

21. As sensitivity, we also consider 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).[10] 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 2MW maximum demand connection) joining the island every 5 years. 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 Option 1. As such, the quantified costs and benefits between the two policy options will only differ under the "High growth" scenario. Annex A sets out how the quantified costs and benefits were calculated.

Costs

The direct cost of the Shetland cross-subsidy

22. Clearly, under both Option 1 and Option 2, the Shetland cross-subsidy will be higher than in the counterfactual because the latter assumes no cross-subsidy for non-domestic consumers on Shetland. Table 2 sets out the additional value of the cross-subsidy against the counterfactual under both options and sensitivities.

23. 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.

[8] 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). 118/113 = 105%..

[9] 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 average value of the Shetland cross-subsidy in 2018/19 if all existing Shetland electricity users are cross subsidised is estimated to be [……]31

[10] Available online at: https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2013.

Table 2: Estimated increase in Shetland cross-subsidy against counterfactual (NPV, real 2012/13 £m)[11]

	Option 1			Option 2		
Sensitivity	**Low growth**	**Central**	**High growth**	**Low growth**	**Central**	**High growth**
2015/16 to 2017/18	£37.6	£37.9	£38.0	£37.6	£37.9	£38.2
2018/19 to 2042/43	£439.1	£449.2	£457.2	£439.1	£449.2	£473.7
Total	£476.7	£487.1	£495.2	£476.7	£487.1	£511.9

24. Table 2 shows that the cost of the Shetland cross-subsidy, recovered from SHEPD electricity consumers over the period 2015/16 to 2017/18, will be higher than the counterfactual by between **£37.6m and £38.0m under Option 1 and between £37.6m and £38.2m under Option 2** (NPV, £37.9m is the best estimate under both options).

25. 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 fall to 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").

26. 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.[12] Hence, around 97% of the total Shetland cross-subsidy under options 1 and 2 represents an additional cost of the options to GB electricity consumers (excluding the SHEP-D area), equivalent to between **£874.9m and £907.8m under Option 1 and between £874.9m and 923.9m under Option 2** (NPV, £892.8m is the best estimate under both options, see Table 3).

Table 3: Estimated total Shetland cross-subsidy cost between 2018/19 and 2042/43 split by region (NPV, real 2012/13 £m)

	Option 1			Option 2		
Sensitivity	**Low growth**	**Central**	**High growth**	**Low growth**	**Central**	**High growth**
SHEPD	£24.0	£24.4	£24.8	£24.0	£24.4	£25.3
Non-SHEPD GB	£874.9	£892.8	£907.8	£874.9	£892.8	£923.9
Total	£898.8	£917.3	£932.6	£898.8	£917.3	£949.2

Costs of administering the scheme

27. There should be relatively few administrative costs of introducing either 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[13]. If a similar approach was taken, 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.

[11] Figures are estimated as: value of cross-subsidy x additional subsidised electricity demand.

[12] 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%.

[13] 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

Other costs

28. Both options 1 and 2 reflect 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).[14] This could be impacting fuel poverty in an area where the level of fuel poverty is already above the national average[15]. Moreover, this increased differential over the period between SHEPD electricity prices and the rest of GB could be discouraging new businesses from locating in the SHEPD area which could be affecting 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 user[16], we expect these costs to be small.

29. In addition, from 2018/19, both options 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 £0.2/MWh or 0.1% for domestic consumers[17]), 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.

30. Under both options, 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.

31. Under Option 2, large users might be incentivised to locate to Shetland knowing that their power 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. Under Option 1, this effect is mitigated by the threshold of eligibility for new non-domestic electricity consumers.

Benefits

Direct benefit of Shetland cross-subsidy

32. 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. This extends to future non-domestic connections with a maximum demand connection of up to 2MW under Option 1 and, additionally, to any new connections above that threshold under Option 2. The total value of these savings equals the increase in the total cross-subsidy against the counterfactual as set out in Table 2. Specifically, **between £476.7m and £495.2m under Option 1 and between £476.7m and £511.9m under Option 2** (NPV, the best estimate under both options is £487.1m).

Improved industry competitiveness and household welfare on Shetland

33. These non-domestic electricity consumers 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

[14] 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%.

[15] 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

[16] 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.

[17] Price impact is estimated as: (Total subsidy cost/total GB electricity sales) x (1 + 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%.

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.

34. 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 consumers from 2018/19

35. 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 Options 1 and 2, 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 (see Table 4). This equates to a saving to SHEPD electricity consumers of **between £435.8m and £450.6m under Option 1 and between £435.8m and £450.1m under Option 2** (NPV, the best estimate under both options is £443.6m).

Table 4: Estimating the total saving in Shetland cross-subsidy costs to SHEPD electricity consumers from 2018/19 (NPV, real 2012/13 £m)

	Option 1			Option 2		
	Low growth	**Central**	**High growth**	**Low growth**	**Central**	**High growth**
Total domestic cross-subsidy (a)	£459.7	£468.1	£475.4	£459.7	£468.1	£475.4
Cost to SHEPD consumers of total cross-subsidy (b)[18]	£24.0	£24.4	£24.8	£24.0	£24.4	£25.3
Net cross subsidy saving to SHEPD consumers (a-b)	£435.8	£443.6	£450.6	£435.8	£443.6	£450.1

Other benefits

36. 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.

Net cost to business

37. This section assesses the direct costs and benefits to businesses, which is calculated to assess net impact 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. These figures are EANCB.

38. For the purpose of OITO accounting, we must also account for the removal of the existing cross-subsidy, which is now due to end in March 2015. Were this cross-subsidy to have continued, it would have benefited businesses 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.[20] This is equivalent to a cost to Shetland businesses of **£21.4m per year**. The figure of £21.4 is the present value of the above costs to Shetland businesses but expressed in EANCB terms i.e. 2010 base year and 2009 prices.

[18] From Table 3

[19] Price impact is estimated as: [(Total subsidy cost under Option 1/total GB electricity sales) - (Total subsidy cost under "Do Nothing"/total SHEPD electricity sales)] x (1 + 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%.

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

39. 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.[21] As such, SHEPD businesses save around **£12.1m per year** in cross-subsidy recovery costs over the appraisal period from removing the old cross-subsidy.

40. 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 **£21.4m 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.[22] 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 67% of electricity consumption in GB is expected to be by non-domestic users.[23] This equates to a cost to businesses from recovering the cross-subsidy of around **£14.2m per year** over the entire appraisal period.

41. In addition, the admin costs of enabling cost-recovery over GB are also expected to be recovered over GB electricity consumers, equivalent to a further cost to GB businesses of around **£0.1m per year**.

42. In summary, the net cost to businesses of ending the old cross-subsidy and introducing the new one is estimated to be around £2.2m per year and, therefore, the measure is classed as an "IN" for OITO purposes. This is summarised in Table 5.

Table 5: One-in-two-out summary – net impact on businesses

Description	Impact (£m p.a., +ve numbers are benefits)
Cost to Shetland businesses from removal of existing cross-subsidy scheme	-£21.4m
Saving to SHEPD businesses from reduced cost of cross-subsidy	+£12.1m
Saving to Shetland businesses from introduction of new cross-subsidy	+£21.4m
Cost to SHEPD businesses of new cross-subsidy	-£1.2m
Cost to non-SHEPD GB businesses of new cross-subsidy	-£13.0m
Cost to all GB businesses of admin costs	-£0.1m
Total direct costs	**-£35.7m**
Total direct benefits	**+£33.5m**
Total net benefit	**-£2.2m (IN)**

43. The business NPV figure of -£50.5m given in the summary table is the total net present value of the net costs to all businesses from 2015 to 2042 from the removal of the existing subsidy and the introduction of the new cross subsidy arrangements. This consists of: costs from the loss of subsidy to Shetland businesses, cost savings to SHEPD businesses, benefits of the new cross subsidy to Shetland businesses, the costs of the new cross subsidy to SHEPD businesses, the costs of the new subsidy to non-SHPED GB businesses, and administration costs to GB businesses. All of these costs are direct costs to businesses apart from the administration costs which we assume are direct costs to the administrator, National Grid, which will then likely be passed on to business customers as indirect costs.

[21] Based on data provided by SHEPD for 2013/14.
[22] This is necessarily, the same value as the cost to these businesses of removing the old cross-subsidy.
[23] Source: DECC's Updated Energy and Emissions Projections. Available online at: https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2013.

Distributional impacts

44. 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, SHEPD and GB). To illustrate these distributional effects, these transfers have been translated into electricity bill impacts.

45. Table 6 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 6: Average annual domestic electricity bill impacts by region, central, both options (£, +ve numbers reflect bill increase against counterfactual)

	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%)

46. Table 7 shows the average impact on non-domestic electricity bills in the different regions, including between eligible and ineligible non-domestic users in Shetland (relevant to Option 1). 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 7: Average annual non-domestic electricity bill impacts by region and eligibility, central, both options (%, +ve numbers reflect bill increase against counterfactual)

	Shetland		SHEPD	GB
	Eligible	Ineligible		
2015/16 to 2017/18	-50%	+1%	+1%	N/A
2018/19 to 2042/43	-66%	-1%	-3%	0.1 to 0.2%[24]

Specific impact tests

Competition impacts

47. Option 1 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.

48. 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.

49. 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.

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

Small and Microbusiness Assessment

50. Implementing either Option 1 or 2 will be beneficial for the 1,939 small non-domestic electricity consumers on Shetland[25] as they will continue to get the cross-subsidy (or will gain the cross-subsidy if they are new to Shetland), which is worth £5,673 to each small business 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.

51. Under option 1 and 2, Shetland small businesses will see a bill increase of £80 per annum for 2015/16-2017/18 compared to the counterfactual. However, there will be a net benefit to small businesses given that the subsidy of £5,673 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%[26] compared to the counterfactual. We are unable to calculate bill impacts for small GB businesses, but the subsidy is recovered in a proportional manner.

52. One major problem with exempting small businesses 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.

53. DECC is aware that the cross-subsidy may have a moderate cost impact on small and micro non-domestic consumers in GB from 2018/19 onwards. As part of the consultation being published alongside this Impact Assessment, we will ask for views on the costs to small and micro non-domestic consumers, and whether it would be possible to mitigate these costs in some way. This will be reflected as part of any final Impact Assessment and policy decision.

Equalities

54. 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

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

Greenhouse gas impacts

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

Post implementation review

57. 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.

[25] Small businesses for this IA are based on an average demand of 5.5kW, sourced from Ofgem's estimates.
[26] Consistent with table 7

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 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.**[27]

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 2012/13

	No. electricity consumers on Shetland (a)	Average annual electricity demand (MWh) (b)	Total annual electricity demand on Shetland (MWh) (a x b)
Domestic	11,691	10.2	119,085
Small I&C	1,939	48.2	93,018
Medium I&C	41	163.2	6,690
Large I&C	4	1,477.0	5,908
Total	**13,675**		**224,700**

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**.[28] Note that this figure is not directly comparable 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.

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**.[29]

2018/19 onwards

An estimated further 990kW of non-domestic demand is expected to have connected by 2014/15[30], equivalent to 8,672**MWh**[31] 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.

[27] Source: Ofgem – SHEPD's regulatory return
[28] £26,570,000 / 224,700MWh
[29] 119,085MWh x £118.2/MWh
[30] 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
[31] 990kW x 24 hours per day x 365 days per year / 1000kWh per MWh

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 2018 (assuming all existing consumption on the island was subsidised) to be around [……][32] 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 2018/19[33], is therefore estimated to be [……..][31] 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 [……..][31]

Option 1 & 2

Under Option 1, 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 2MW or below. Under Option 2, new connections above this threshold will also receive a cross-subsidy. Under the central growth scenario, no new connections above this threshold are assumed to enter the island. As such, the total cross-subsidy under Option 2 will be equal to that of Option 1 under the central (and low growth) scenario(s).

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 Options 1 and 2 for the period 2015/16 to 2017/18 is estimated to be **£27,590,176**.[34] 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 [……..][31].

[32] Commercially sensitive figures redacted

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

[34] £14,081,334 + [£118.2/MWh x (93,018MWh + 6,690MWh + 5,908MWh + 8,672MWh)]

Annex B: Explanatory notes for the figures in the summary sheets.

Page 1: Summary and Interventions sheet

The -£1.5m Total NPV figure is the total of all discounted costs and benefits to both consumers and businesses (for 2015 to 2042) compared to the "do nothing" counterfactual scenario. Annex D sets out in detail the annual figures which lead to this amount.

The business NPV figure of -£50.5m is the total net present value of the net costs to all businesses from 2015 to 2042 from the removal of the existing subsidy and the introduction of the new cross subsidy arrangements. This consists of: costs from the loss of subsidy to Shetland businesses, cost savings to SHEPD businesses, benefits of the new cross subsidy to Shetland businesses, the costs of the new cross subsidy to SHEPD businesses, the costs of the new subsidy to non-SHPED GB businesses, and admin costs to GB businesses. The figures underlying this analysis are provided in Annex C

The -£50.5m business NPV figure does not directly reconcile with the -£1.5m total NPV figure as the business NPV figure is calculated to assess net impact of the regulation (for One In, Two Out purposes) which requires that the costs to business of the removal of the existing cross subsidy are accounted for. In contrast these costs are not included in the -£1.5m Total NPV figure which is assessed against the main counterfactual scenario of the IA where the existing subsidy falling away is already accounted for in the "do nothing" scenario.

The EANCB equivalent annual figure of £2.2m is calculated in 2009 prices with a 2010 base year.

Page 2 and 4: Analysis and Evidence for Policy Options 1 and 2

The annual average figures take the subsidy benefits, subsidy costs, and the administrative costs, and average these over the period 2015 to 2042. These are calculated for both options under the high, low, and central scenarios.

Annex C: Detailed breakdown of -£50.5m Business NPV calculation

	Removal of cross-subsidy		Introduction of new cross-subsidy						
	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	Admin cost to GB business	Net benefit to business		Total Annual NPV
2015	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0		£0
2016	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0		£0
2017	-£13,514,147	£7,603,911	£13,514,147	-£7,603,911	£0	£0	£0		£0
2018	-£30,217,983	£17,002,542	£30,217,983	-£490,147	-£20,190,030	-£68,437	-£3,746,071		-£3,264,485
2019	-£30,217,983	£17,002,542	£30,217,983	-£492,360	-£20,125,515	-£68,230	-£3,683,564		-£3,101,462
2020	-£30,217,983	£17,002,542	£30,217,983	-£491,618	-£20,132,599	-£68,251	-£3,689,926		-£3,001,757
2021	-£30,217,983	£17,002,542	£30,217,983	-£486,755	-£20,103,638	-£68,140	-£3,655,990		-£2,873,575
2022	-£30,217,983	£17,002,542	£30,217,983	-£482,587	-£20,033,861	-£67,895	-£3,581,800		-£2,720,060
2023	-£30,217,983	£17,002,542	£30,217,983	-£476,575	-£19,946,035	-£67,584	-£3,487,652		-£2,558,999
2024	-£30,217,983	£17,002,542	£30,217,983	-£470,678	-£19,924,325	-£67,493	-£3,459,953		-£2,452,826
2025	-£30,217,983	£17,002,542	£30,217,983	-£464,721	-£19,865,494	-£67,279	-£3,394,951		-£2,325,357
2026	-£30,217,983	£17,002,542	£30,217,983	-£456,357	-£19,846,413	-£67,188	-£3,367,415		-£2,228,499
2027	-£30,217,983	£17,002,542	£30,217,983	-£447,224	-£19,713,530	-£66,718	-£3,224,929		-£2,062,033
2028	-£30,217,983	£17,002,542	£30,217,983	-£437,016	-£19,717,609	-£66,697	-£3,218,780		-£1,988,504
2029	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,943,319
2030	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,877,603
2031	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,814,109
2032	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,752,763
2033	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,693,490
2034	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,636,223
2035	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,580,892
2036	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,527,431
2037	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,475,779
2038	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,425,874
2039	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,377,656
2040	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,331,068
2041	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,286,056
2042	-£30,217,983	£17,002,542	£30,217,983	-£427,729	-£19,763,731	-£66,819	-£3,255,738		-£1,242,566
Average (£m)	**-£28.4**	**£16.0**	**£28.4**	**-£1.2**	**-£17.7**	**-£0.1**	**-£3.0**	**Total (m)**	**-£50.54**

Annex D: Detailed annual breakdown of NPV for Options 1 and 2 compared to the Do Nothing scenario with central growth.

	Subsidy benefit to Shetland			Subsidy cost					Admin cost				
	Domestic	non-dom (existing and future below 2MW)	non-dom (future above 2MW)	Shetland domestic	Shetland non-dom (existing and future below 2MW)	Shetland future above 2MW	Non-Shetland SHEPD	non-SHEPD GB	Shetland domestic	Shetland non-dom (existing and future below 2MW)	Shetland future above 2MW	Non-Shetland SHEPD	non-SHEPD GB
2014	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2015	£0	£13,057,147	£0	-£192,690	-£184,929	£0	-£12,679,528	£0	£0	£0	£0	£0	£0
2016	£0	£12,615,601	£0	-£186,174	-£178,675	£0	-£12,250,752	£0	£0	£0	£0	£0	£0
2017	£0	£12,188,986	£0	-£179,878	-£172,633	£0	-£11,836,475	£0	£0	£0	£0	£0	£0
2018	£0	£26,333,226	£0	£382,045	£366,656	£0	£25,139,605	-£52,221,533	-£37	-£36	£0	-£2,440	-£84,632
2019	£0	£25,442,731	£0	£369,026	£354,162	£0	£24,282,907	-£50,448,824	-£36	-£35	£0	-£2,368	-£81,759
2020	£0	£24,582,348	£0	£356,579	£342,216	£0	£23,463,873	-£48,745,017	-£35	-£33	£0	-£2,284	-£78,998
2021	£0	£23,751,061	£0	£344,725	£330,840	£0	£22,683,881	-£47,110,508	-£33	-£32	£0	-£2,185	-£76,349
2022	£0	£22,947,885	£0	£333,238	£319,815	£0	£21,927,948	-£45,528,886	-£32	-£31	£0	-£2,093	-£73,786
2023	£0	£22,171,870	£0	£322,205	£309,227	£0	£21,201,967	-£44,005,268	-£30	-£29	£0	-£1,997	-£71,316
2024	£0	£21,422,096	£0	£311,533	£298,985	£0	£20,499,725	-£42,532,339	-£29	-£28	£0	-£1,906	-£68,929
2025	£0	£20,697,678	£0	£301,217	£289,084	£0	£19,820,878	-£41,108,856	-£28	-£27	£0	-£1,818	-£66,622
2026	£0	£19,997,756	£0	£291,327	£279,592	£0	£19,170,114	-£39,738,790	-£26	-£25	£0	-£1,725	-£64,402
2027	£0	£19,321,504	£0	£281,788	£270,438	£0	£18,542,428	-£38,416,158	-£25	-£24	£0	-£1,633	-£62,259
2028	£0	£18,668,119	£0	£272,597	£261,617	£0	£17,937,614	-£37,139,946	-£23	-£22	£0	-£1,542	-£60,190
2029	£0	£18,036,830	£0	£263,675	£253,055	£0	£17,350,563	-£35,904,124	-£22	-£21	£0	-£1,458	-£58,187
2030	£0	£17,426,889	£0	£254,759	£244,497	£0	£16,763,829	-£34,689,975	-£21	-£21	£0	-£1,409	-£56,220
2031	£0	£16,837,574	£0	£246,144	£236,229	£0	£16,196,937	-£33,516,884	-£21	-£20	£0	-£1,361	-£54,319
2032	£0	£16,268,188	£0	£237,820	£228,241	£0	£15,649,214	-£32,383,463	-£20	-£19	£0	-£1,315	-£52,482
2033	£0	£15,718,056	£0	£229,778	£220,523	£0	£15,120,014	-£31,288,370	-£19	-£19	£0	-£1,271	-£50,707
2034	£0	£15,186,527	£0	£222,008	£213,065	£0	£14,608,709	-£30,230,309	-£19	-£18	£0	-£1,228	-£48,992
2035	£0	£14,672,973	£0	£214,500	£205,860	£0	£14,114,694	-£29,208,028	-£18	-£17	£0	-£1,186	-£47,336
2036	£0	£14,176,786	£0	£207,246	£198,899	£0	£13,637,386	-£28,220,317	-£17	-£17	£0	-£1,146	-£45,735
2037	£0	£13,697,377	£0	£200,238	£192,173	£0	£13,176,218	-£27,266,007	-£17	-£16	£0	-£1,107	-£44,188
2038	£0	£13,234,181	£0	£193,467	£185,674	£0	£12,730,646	-£26,343,968	-£16	-£16	£0	-£1,070	-£42,694
2039	£0	£12,786,648	£0	£186,924	£179,395	£0	£12,300,141	-£25,453,109	-£16	-£15	£0	-£1,034	-£41,250
2040	£0	£12,354,250	£0	£180,603	£173,329	£0	£11,884,194	-£24,592,376	-£15	-£15	£0	-£999	-£39,855
2041	£0	£11,936,473	£0	£174,496	£167,467	£0	£11,482,313	-£23,760,749	-£15	-£14	£0	-£965	-£38,508
2042	£0	£11,532,824	£0	£168,595	£161,804	£0	£11,094,022	-£22,957,246	-£14	-£14	£0	-£932	-£37,205
NPV (£m)													
14-17	**£0**	**£38**	**£0**	**-£1**	**-£1**	**£0**	**-£37**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**
18-42	**£0**	**£449**	**£0**	**£7**	**£6**	**£0**	**£431**	**-£893**	**-£0**	**-£0**	**£0**	**-£0**	**-£1**
Total	**£0**	**£487**	**£0**	**£6**	**£6**	**£0**	**£394**	**-£893**	**-£0**	**-£0**	**£0**	**-£0**	**-£1**