Business and Regulatory Impact Assessment

Title of Proposal

The Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (Scotland) (Amendment) Regulations 2020

Purpose and intended effect

Background

The Stockholm convention currently lists 28 Persistent Organic Pollutant (POPs) substances or groups of substances, one of which is polychlorinated biphenyls (PCBs). The UK is a signatory to the Stockholm convention. The Stockholm Convention requires the environmentally sound waste management of PCBs by 2028. This requirement is not addressed in either the existing or the proposed regulations, but will be dealt with at a later date.

The physical and chemical properties of PCBs are such that once released into the environment, they:

- remain intact for exceptionally long periods of time;
- become widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
- accumulate in the fatty tissue of living organisms including humans, and are found at higher concentrations at higher levels in the food chain; and
- are toxic to both humans and wildlife.

As a result of releases to the environment over the past several decades due to human activities, PCBs are now widely distributed over large regions (including those where PCBs have never been used).

PCBs have been demonstrated to cause a variety of adverse health effects. They have been shown to cause cancer, effects on the immune system, reproductive system, nervous system, endocrine system and other health effects in animals. Studies in humans support evidence for potential carcinogenic and non-carcinogenic effects of PCBs. The different health effects of PCBs may be interrelated, and alterations in one system may have significant implications for the other systems of the body.

For these reasons there is increasing concern over the damage that PCBs might cause to human health and the environment, and it is necessary to take further action to reduce their prevalence and the associated risks.

The management and disposal of PCBs in Scotland is currently carried out in line with the Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (Scotland) Regulations 2000 (the “existing regulations”). These prohibit the holding of PCBs and equipment containing PCBs with some limited exceptions. Currently under the existing regulations, there is an exception allowing transformers with fluids which contain 0.05% by weight or less of PCBs to be held until the end of their useful life. Following a recast of the European Union

legislation on Persistent Organic Pollutants (POPs, Regulation (EU) 2019/1021), Article 3(1) read with Annex I of the Regulation requires member states to **identify** and **remove** equipment containing more than 0.005% PCBs and volumes greater than 0.05 dm^3 by 31 December 2025.

In this document, 'the proposed regulations' refers to the proposed Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (Scotland) (Amendment) Regulations 2020,.

Objective
Update the existing regulations to introduce a deadline of 31 December 2025 for holders of transformers/equipment containing more than permitted levels (0.005%/0.05dm3) of PCBs, to remove such equipment from use.

The proposed regulations aims to ensure the protection of human health and the environment from potential long term and serious consequences associated with uncontrolled dispersive releases of PCBs from ageing electrical equipment, and that Scotland continues to comply with EU law.

Rationale for Government intervention

To not intervene would be a breach of EU law and the Scottish Government is committed to protecting and where possible enhancing our environment.

The proposed regulations support several of the National Outcomes that make up Scotland's new National Performance Framework, and contribute to National Indicators linked to the Framework:

- We value, enjoy, protect and enhance our environment.
- We have a globally competitive, entrepreneurial, inclusive and sustainable economy.
- We have thriving and innovative businesses, with quality jobs and fair work for everyone.
- We are healthy and active.

PCBs can also have a damaging effect on human health as they are classified as human carcinogens and produce a wide spectrum of adverse effects in animals and humans, including infertility, malformations in the fetus, child development and the immune system.

Consultation

Within Government

We have discussed the proposals with a range of Scottish Government colleagues.

Public Consultation

We propose to run an eight to nine week formal consultation after summer recess 2020.

We have discussed the proposals with the Scottish Environment Protection Agency (SEPA), which is required to maintain an inventory of certain contaminated equipment under the existing regulations.

Business

We understand that the proposals may impact upon businesses in a variety of ways, for example there will be costs and impacts from having to decontaminate or replace equipment, alongside potential opportunities for waste management and disposal or decontamination experts, as well as potential orders for manufacturers of replacement equipment.

From discussions with SEPA, the Environment Agency and the Department for Environment Food and Rural Affairs, we understand that, in the United Kingdom, over 99% of equipment which contains PCBs is in the electrical distribution network. There are two energy distribution companies in Scotland and the Scottish Government has engaged directly in discussion with these businesses that enforcement of this regulation would impact on, Scottish Power and SSE.

We will use the information and feedback from our consultation process to update the BRIA where necessary, including where any additional stakeholders are identified

Next steps

The Scottish Government will proceed to lay the proposed Regulations in the Scottish Parliament using powers under section 2(2) of the European Communities Act, therefore we propose a laying date of 17th December 2020 and target coming in to force date of 14th February 2021.

Benefits and costs of the options

A full assessment on the economic impact is attached in Appendix 1. This provides analysis for the following two options: one, do nothing and two, implement the regulations.

Option 1: Do nothing

An assessment like this usually requires consideration of a 'do nothing' option.

This was not considered a satisfactory option on the basis that the Scottish Government must comply with EU law and there is equivalent legislation already in England and Wales which is being updated on an equivalent basis, a decision not to update the existing regulations would mean Scotland being left with lower environmental standards than the rest of the UK and EU in an important area.

Option 2: Regulate to reflect recent updates to EU law

The proposed regulations would make minor technical amendments to the existing regulations to implement EU regulation and in turn reduce the risks associated with

PCBs.

The changes bring forward the point at which equipment containing PCBs would have been removed from use and disposed of. Under the existing regulations this date would have been "the end of the useful life" of the equipment in question. Under the proposed regulations any equipment containing PCBs above the new threshold of 0.005% PCB content by weight and PCB volumes >0.05dm^3 (0.05 litres) must be removed from use by 31st December 2025.

The Scottish Government's preferred option is option two which Appendix 1 below provides further detail and analysis on.

Sectors and groups affected

A number of industry groups may have equipment containing PCBs and could be affected by the proposed regulations. Operators of large industrial equipment, particularly the energy networks, have a direct interest in the environmental and health risk of equipment for which they are responsible, as well as local government and a number of non-governmental organisations (NGOs).

Scottish Firms Impact Test

Views were sought on the impact of the proposed regulations. This informed our understanding of how the proposals may impact upon businesses, for example there will be costs and impacts from having to decontaminate or replace equipment (which may be passed on to customers), alongside potential opportunities for waste management and disposal or decontamination experts, as well as potential orders for manufacturers of replacement equipment.

Competition Assessment

There has been no indication from any organisations contacted that there will be an impact on the competitiveness of firms in Scotland, as the Regulations largely reflect what is currently in place, and the same requirements will apply throughout the EU.

Consumer Assessment

From our discussions with the two major Scottish energy suppliers, they indicated that they may potentially pass on costs of testing and replacing equipment to customers. They did, however, give no indication that there will be an impact on the quality or availability of the energy service they supply to consumers.

Test run of business forms

There are no new business forms proposed.

Digital Impact Test

Companies who hold PCB contaminated equipment are required to inform SEPA in writing of that equipment, the form can be in an electronic format acceptable to

SEPA. The form that SEPA uses to gather and collate information on PCB contaminated equipment is likely to be revised to encourage electronic submission of data however this is primarily to take account of changing working practices and not a consequence of the amendments to legislation.

Legal Aid Impact Test

These Regulations do not have any impacts on rights to access justice for individuals, through availability of legal aid or possible expenditure from the legal aid fund.

Enforcement, sanctions and monitoring

Under the existing regulations it is currently a criminal offence for anyone to hold PCB contaminated equipment subject to some exceptions. Transformers with fluids containing 0.05% by weight or less of PCBs can be held until the end of their useful life. It is an offence for the holder to fail to decontaminate or dispose of that equipment at the end of it useful life.

The offences listed in the existing regulations will be amended to reflect the changes in maximum PCB levels. While previously it was an offence to fail to decontaminate or dispose of transformers with certain level PCBs after their useful life, there will now be two separate offences for: (1) failure to decontaminate or dispose of transformers with PCB levels less than 0.005% or 0.05dm^3 as soon as possible after the end of their useful life; and, (2) failure to decontaminate or dispose of transformers with PCB levels of 0.005-0.05% and a total volume of greater than 0.05dm^3 as soon as possible after 31 December 2025.

It is assumed that most operators will further decontaminate equipment to below the threshold where that is technically possible, although some may opt for disposal and replacement with new equipment .

Under the existing regulations, SEPA has the duty to register applications of equipment contaminated with PCBs, compile and maintain inventories of such equipment, report annually to Scottish Ministers on such information, and enforce the registration of contaminated equipment. For the purpose of enforcing the existing regulations, SEPA is provided with various powers under the Environmental Regulation (Enforcement Measures) (Scotland) Order 2015. For offences established under regulation 13 of the existing regulations, SEPA can impose fixed monetary penalties, variable monetary penalties and enforcement undertakings.

Introducing the proposed regulations will make no change to these existing enforcement powers/options. SEPA will be able to use the same range of enforcement powers/options in relation to the offences in regulation 13 which are being amended as outlined above.

Implementation and delivery plan

It is intended that proposed regulations will come into force on 14 February 2021. SEPA are currently carrying out a review of the existing PCB register in Scotland

before embarking on targeted activity to inform relevant stakeholders of the new 2025 deadline.

Post-implementation review

No post-implementation review of the legislation is required.

Summary and recommendation

The proposed regulations ensure the Scottish Government continues to comply with EU law.

It is assumed that relevant industry will follow significant developments, such as the recast of the EU POPs regulation, and should already be aware that these changes were likely. While there may be impacts and costs from making the proposed regulations, these are outweighed by the envisaged benefits and wider opportunities.

This Business and Regulatory Impact Assessment concludes that the proposed regulations will have an impact on businesses across Scotland, however this is acceptable when considered against the potential harm that PCBs can cause to human health and the environment.

This assessment is recommended for Cabinet Secretary clearance and submission in support of the proposed regulations.

Declaration and publication

I have read the Business and Regulatory Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs. I am satisfied that business impact has been assessed with the support of businesses in Scotland.

Signed:

Date:

Roseanna Cunningham
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APPENDIX A

Analysis of Economic Impact

1.1 Option One – Do Nothing

Under this option, Scottish Government would not implement the retained law on POPs. Instead, equipment containing PCBs would continue to be used after 2025 and would only be replaced at the end of their useful life. Taking this option would put Scotland in a position of contravening EU law, and would introduce a significant regulatory difference between Scotland and other parts of the UK (where the implementation of this retained law is progressing). The Scottish Government also seeks to remain compliant with EU law, and this option would contravene that commitment.

This option has therefore been ruled out, but it will be used as a baseline in this analysis – against which the other options will be compared.

1.2 Option Two – Implement the PCB Regulations

Under this option, Scottish Government would implement the legislation required to comply with the changes to EU Law regarding PCBs. This would require all holders of equipment containing PCBs above 0.005% / 0.05dm^3 to remove all the equipment at their own expense by 31 December 2025. This option not only allows Scotland to maintain international commitments and standards, but is in line with the Polluter Pays Principle. It is, therefore, our preferred option.

2.1 Cost of Policy Options – Background

SEPA has the duty to register applications of equipment contaminated with PCBs, compile and maintain inventories of such equipment, report annually to Scottish Ministers on such information, and enforce the registration of contaminated equipment. From discussions with SEPA, the Environment Agency and the Department for Environment Food and Rural Affairs, we understand that, in the United Kingdom, over 99% of equipment which contains PCBs is in the electrical distribution network. In order to ensure that the amount of equipment in Scotland is not underestimated, we have gathered figures from the electrical distribution network operators in Scotland for the total number of units which they have which were installed before 1987 (the year in which the manufacturer of equipment containing PCBs was banned in the EU). For the small number of contaminated units which are used outside of the electricity distribution network, we have used a population share of the Environment Agency figures for England and Wales. These units are split into Easily Accessible (predominately ground-mounted units) and Not Easily Accessible (predominately pole-mounted units). The estimated total numbers of each in Scotland are shown in Table One.

Table One – Numbers of PCB Pre-1987 Units in Scotland

Easily Accessible Units - Electricity Distribution Network	15,100
Not Accessible Units - Electricity Distribution Network	38,019
Easily Accessible Units - Other	31
Not Accessible Units - Other	45
Total	53,195

The main costs associated with the policy options, are those of testing and replacing units containing PCBs. A wide range of costs were provided to us by the Department for Environment, Food and Rural Affairs (DEFRA) which were in turn received from the Energy Network Association (ENA), the trade body representing the sector in the UK and Ireland. A weighted average has been used, for simplicity and commercial sensitivity. The costs are presented in Table Two and have been checked with industry stakeholders in Scotland.

Table Two - Weighted Average Cost per Unit (2019 prices)

Asset Type	Average testing cost (per unit)	Average replacement, removal and disposal cost (per unit)
Easily Accessible	£375	£26,667
Not Easily Accessible	£375	£3,875

Evidence from DEFRA and the ENA suggests that many easily accessible units would only require an oil change (at an average cost of around £3,700). However, as the ENA are unable to provide an estimate of the proportion of easily accessible units for which this is the case, we have taken the conservative approach of assuming that there will be a full asset replacement for the small number of easily accessible units containing PCBs.

In the baseline (Option One) we expect all units to be tested (to determine their disposal method) and removed at the end of their useful life (i.e. we assume that, in the absence of any government intervention, owners of equipment will choose to replace equipment when it comes to the end of its useful life). In Option Two, we assume that any testing and replacement of units containing PCBs will be undertaken by 2025. In undiscounted terms, the costs of removing and replacing units is the same in both scenarios. The testing, removal and replacement costs under Option Two are simply brought forward in time. However, in discounted terms Option Two will more expensive - reflecting social time preferences.

Throughout this Business and Regulatory Impact Assessment, we have expressed figures in 2019 real prices, and discounted from a present value base year of 2020. We have used a discount rate of 3.5% to reflect social time preferences in line with

the HMT Green Book Supplementary Guidance[1]. The appraisal period is from 2020 – 2046, to reflect the fact that, without any intervention, the final pieces of equipment containing PCBs would be replaced in 2046 (assuming a 60 year asset lifetime)[2].

2.2 - Testing and Replacement Assumptions

Under Option One we have assumed:

- Approximately 14% of units will be tested and replaced from 2020-2025. (Based on information from DEFRA and the ENA to suggest that approximately 9% of units are expected to be replaced by 2023 under the current Ofgem price control. This has been prorated to 14% by 2025.)
- The remaining units (86%) will be tested and replaced between 2026-2046 – at a constant rate each year.

Under Option Two we have assumed:

- Testing pre-2025 – all units containing PCBs will be identified through the testing of 100% of easily accessible units and 20% of not easily accessible units by 2025. This is based on a conservative approach of testing all easily accessible units (as these can be tested without destroying the unit) and that the electricity distribution network companies will develop a cohort testing approach for not easily accessible units.

- Testing post-2025 –the remaining 80% of not easily accessible units will be tested between 2023-46. (This is due to the fact that even the 'clean-cohort' may still need to be tested for PCBs in order to determine the appropriate disposal technique).

- Replacement pre-2025 – 15% of easily accessible units and 20% of not easily accessible units will be replaced by 2025 (as they are all destroyed when tested). The 15% of easily accessible units is one percentage point higher than the baseline and this is based on information provided by DEFRA and the ENA to suggest that less than 1% of units previously replaced based on natural attrition were containing PCBs.

- Replacement post-2025 – the remaining 85% of easily accessible units and 80% of not easily accessible units are replaced between 2026-2046, at a constant annual rate.

The above information is summarised in table three below. We recognise that there is considerable uncertainty around the testing and replacement rates that will occur. The ENA are currently working on the development of a 'sniffer-tool' which, if developed successfully, could significantly reduce the number of not easily

[1] HMT Green Book 2018 - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

[2] 2046 is 60 years on from 1986 – the most recent year in which equipment containing PCBs could have legally been installed.

accessible units that needed to be replaced. To account for the large degree of uncertainty, we have modelled additional sensitivity scenarios, which are set out in Annex A.

Table Three – Testing and Replacement Assumptions

Scenario	Unit type	Units tested by 2025	Units replaced by 2025	Units tested by 2026-2046	Units replaced by 2026-2046
Option One (Do Nothing)	Easily accessible	14%	14%	86%	86%
	Not Easily accessible	14%	14%	86%	86%
Option Two (Central Estimate)	Easily accessible	100%	15%	0%	85%
	Not Easily accessible	20%	20%	80%	80%

2.3 Testing and Replacement Costs

Table four presents a summary of the total number of units tested and replaced up to 2025 under both options, as well as discounted costs of these options. Under the baseline 7,450 units would be tested and replaced by the end of 2025, compared to 22,740 tested and 9,880 replaced in the central estimate for Option Two. Over the whole appraisal time period (2020-2046) the same number of units are tested and replaced under each scenario, but the present value of the costs is higher under Option Two because these costs are incurred in earlier years.

Table Four – Testing and Replacement Costs Summary

	Option One (Baseline)	Option Two (Central Estimate)
Units Tested before end 2025	7,450	22,740
Units Tested after 2025	45,750	30,450
Units Replaced before end 2025	7,450	9,880
Units Replaced after 2025	45,750	43,310
Total Cost of Testing (Discounted) (£ms)	12.7	14.6
Total Cost of Replacement (Discounted) (£ms)	350.2	354.4

2.4 Air Quality Costs

There are expected to be emissions costs associated with disposing PCB oils through high temperature incineration. These costs are very small, and are brought forward costs (as they would be incurred when the units containing PCBs come to the end of their useful life).

We have not been able to obtain data concerning which air pollutants and in what volumes are emitted by burning PCBs. We have therefore followed the approach of the UK Government's Department for Environment, Food and Rural Affairs, and used the emissions associated with burning chemicals in hazardous waste incineration as a very rough proxy. These include nitrogen oxides (NO_x expressed as NO_2), sulfur dioxide (SO_x), and particulate matter < 2.5µm ($PM_{2.5}$).

We expect there to be a central air quality emission cost of £1,772 in discounted terms between 2020 to 2025, resulting from incinerating and disposing of the PCB oils found in relevant units. For comparative purposes, we also monetised the emission costs that we estimated would be incurred in the counterfactual, which was £1,474. This demonstrates that under our central scenario, the air quality damage costs are expected to be £88 larger than in the counterfactual. A more detailed breakdown of the specific costs associated with each air pollutant in table five.

Table Five – Avoided Air Quality Damage Costs

Air Pollutant	Baseline Damage Costs	Central Damage Costs
Nitrogen Oxides (NOx expressed as NO2)	£1,200	£1,442
Sulfur Dioxide (SOx)	£5	£6
PM2.5 (Particulate Matter < 2.5µm)	£270	£324
Total	£1,474	£1,772

2.5 Non Monetised Costs

Familiarisation Costs – there is likely to be a cost to holders of equipment containing PCBs to familiarise themselves with the new regulations. However, as there are very few organisations in Scotland that will be affected by these regulations, and they have predominately been previously engaged in the policy process for the proposed changes, it is felt that any familiarisation costs are likely to be negligible in Scotland.

Generalised Compliance Costs - the costs associated with businesses holding meetings concerning general compliance with the regulations have not been quantified. For example, there is an ENA working group which has been established to identify clean cohorts of equipment, and the cost of this has not been included in the above figures.

3.1 Benefits of Policy Options

There are a range of benefits associated with the removal of equipment containing PCBs. Due to the complex nature of these benefits, it has not been possible to provide quantified estimates of these benefits – but an outline of the main benefit types are highlighted below. In the two options presented in this paper, the benefits

that arise from the removal of equipment containing PCBs would occur earlier (and therefore be available for longer) under Option Two compared to Option One.

3.1.1 Human Health Benefits

PCBs are globally recognised to cause substantial harm to human health and the environment. The human health benefits expected from removing equipment containing PCBs include:

- reduced risk of human exposure to carcinogenic substances
- reduced risk of reproductive system damages (reduced level of contraception and live births, reduced birth weights and reduced sperm counts)[3].

The effects of long term exposure to PCBs that have been reported also include: neurological effects (reduced neurological development); endocrine disrupting effects (disruption to the hormone system including decreased thyroid hormone levels); immune system effects (decreased size of the thymus); reduced immune system response; and reduced resistance to viral and other infectious agents).

Many of the ill-effects caused by exposure to PCBs have no safe level, or no safe minimum dose where effects are not observed.

3.1.2 Environmental Benefits

Environmental benefits expected from reducing PCBs emitted into the atmosphere, include avoided damage to biodiversity, particularly through reduced levels of PCB accumulation in mammals.

3.1.3 Efficiency Benefits

There may be some efficiency savings available to the owners of equipment containing PCBs, as the need to remove this equipment will subsequently result in the installation of newer equipment as a replacement. This newer equipment is likely to operate more efficiently than older equipment. However, it has not been possible to quantify these savings, and they are likely to be quite small.

Occasionally transformer units fail, which can results in PCB leaks into the environment through oil spillages. When this occurs the operators have procedures in place to ensure that the affected area is treated to remove lasting impacts of the spillage. However, once PCBs are removed – this cost will no longer be incurred. We have not monetised the avoided costs of treating spillages between 2026-2046 from such failures. This will depend on the number of expected incidences and the cost of treatment on which we have not been able to gather information.

[3] In 2015, the International Agency for Research on Cancer (IARC) announced their evaluation on PCBs and they had classified both PCBs and dioxin-like PCBs as carcinogenic to humans (Group 1) (IARC, 2015).

4.1 – Summary of Costs and Benefits

To consider the overall costs and benefits of the requiring the removal of all equipment containing PCBs above 0.005% / 0.05dm^3 by the end of 2025 compared with the baseline scenario, the central estimates for the costs and benefits for Option Two (along with a High and Low sensitivity scenarios[4]) have been compared against the baseline in Table Six below.

This shows that in all scenarios, the intervention (Option Two) has a higher net present value than Option One – however this is due in part to the fact that it has not been possible to monetise many of the benefits associated with Option Two.

The central estimate shows that the net present value for Option Two is £6.1m lower than the net present value for the baseline. However, due to the environmental and health outcomes associated with Option Two, as well as the importance of maintaining international commitments and standards, Option Two is the Scottish Government's preferred option.

Table Six – Costs and Benefits Summary

	Discounted costs and benefits of each scenario from baseline (£m)		
Present Value (PV)	Central	Low	High
Testing (Easily accessible)	1.6	1.6	1.6
Testing (Not easily accessible)	0.3	2.2	0.3
Asset replacement (Easily accessible)	1.3	1.3	1.3
Asset replacement (Not easily accessible)	2.9	22.4	0.5
PCB sniffer tool development costs	n/a	n/a	0.01
Air quality emission costs	0.0	0.0	0.0
Total Costs	6.1	27.5	3.7
Total (Quantified) Benefits	0	0	0
Net benefit	-6.1	-27.5	-3.7

[4] Full detail of these scenarios is set out in Annex A

Annex A – Economic Cost Sensitivity Analysis

There is considerable uncertainty around the amount of units that will need to be tested and replaced before 2025 and towards the end of its useful life. We have therefore produced additional sensitivity scenarios. The low scenario represents the scenario with the lowest net benefit or highest cost, whereas the high scenario represents the option with the highest net benefit or lowest cost

In addition to the assumptions set out above for Option One and Option Two (Central estimate), we have made the following assumptions for the additional sensitivity scenarios:

Under Option Two (Low Net Benefit) we have assumed:

- Testing pre-2025 – for easily accessible units we use the same assumption as in the central case (test 100% of easily accessible units). However for not easily accessible units we assume that significantly more units (60%) will need to be tested to identify clean cohorts of equipment. This is a very pessimistic assumption that we have presented as a worst case scenario.

- Testing post-2025 –the remaining 40% of not easily accessible units will be tested between 2023-46. (This is due to the fact that even the 'clean-cohort' may still need to be tested for PCBs in order to determine the appropriate disposal technique).

- Replacement pre-2025 – 15% of easily accessible units and 60% of not easily accessible units will be replaced by 2025.

- Replacement post-2025 – the remaining 85% of easily accessible units and 40% of not easily accessible units are replaced between 2026-2046, at a constant annual rate.

Under Option Two (High Net Benefit) we have assumed:

- Testing pre-2025 – for easily accessible units we use the same assumption as in the central case (test 100% of easily accessible units and 20% of not easily accessible units.

- Testing post-2025 –the remaining 80% of not easily accessible units will be tested between 2023-46. (This is due to the fact that even the 'clean-cohort' may still need to be tested for PCBs in order to determine the appropriate disposal technique).

- Replacement pre-2025 – 15% of easily accessible units will be replaced by 2025, and that only 15% of not easily accessible units will need to be replaced. This is based on the assumption of the successful development of a sniffer tool to allow not easily accessible units to be tested without breaking them.

- Replacement post-2025 – the remaining 85% of easily accessible units and 85% of not easily accessible units are replaced between 2026-2046, at a constant annual rate.

The full set of testing and replacement assumptions is set out in Table Seven below.

Table 7 – Replacement and testing assumed under each scenario

Scenario	Unit type	Units tested by 2025	Units replaced by 2025	Units tested by 2026-2046	Units replaced by 2026-2046
Option 1 (Do Nothing) (Baseline)	Easily accessible	14%	14%	86%	86%
	Non Easily accessible	14%	14%	86%	86%
Option 2: Central	Easily accessible	100%	15%	0%	85%
	Non Easily accessible	20%	20%	80%	80%
Option 2 Low	Easily accessible	100%	15%	0%	85%
	Non Easily accessible	60%	60%	40%	40%
Option 2 High	Easily accessible	100%	15%	0%	85%
	Non Easily accessible	20%	15%	80%	85%

The tables below can be used to understand the different rates of units that are tested and replaced under each scenario and the associated costs. Tables 8, 9, 10 and 11 capture the number of units tested and replaced under each scenario.

The undiscounted costs are calculated by multiplying the number of units in tables 8-11 by the weighted average costs in table 2. It should be noted that total costs of testing, removal and replacement in undiscounted terms are the same regardless of the scenario, as we consider these to be brought forward costs rather than new costs.

The undiscounted costs are discounted at a rate of 3.5% in line with HMT Greenbook guidance, which are captured under tables 16-19.

Table 8 - Annual profile of testing and asset replacement (Option One/Baseline)

No. of Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	353	353	353	353	353	353	620	620	620		620	15,131

Units Tested (Not Easily Accessible)	888	888	888	888	888	888	1,559	1,559	1,559		1,559	38,064
Units Replaced (Easily Accessible)	353	353	353	353	353	353	620	620	620		620	15,131
Units Replaced (Not Easily Accessible)	888	888	888	888	888	888	1,559	1,559	1,559		1,559	38,064

Table 9 - Annual profile of testing and asset replacement (Option 2 Central)

No. of Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	2,522	2,522	2,522	2,522	2,522	2,522	0	0	0		0	15,131
Units Tested (Not Easily Accessible)	1,269	1,269	1,269	1,269	1,269	1,269	1,450	1,450	1,450		1,450	38,064
Units Replaced (Easily Accessible)	378	378	378	378	378	378	612	612	612		612	15,131
Units Replaced (Not Easily Accessible)	1,269	1,269	1,269	1,269	1,269	1,269	1,450	1,450	1,450		1,450	38,064

Table 10 - Annual profile of testing and asset replacement (Option 2 Low)

No. of Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	2,522	2,522	2,522	2,522	2,522	2,522	0	0	0		0	15,131
Units Tested (Not Easily Accessible)	3,806	3,806	3,806	3,806	3,806	3,806	725	725	725		725	38,064
Units Replaced (Easily Accessible)	378	378	378	378	378	378	612	612	612		612	15,131

Units Replaced (Not Easily Accessible)	3,806	3,806	3,806	3,806	3,806	3,806	725	725	725		725	38,064

Table 11 - Annual profile of testing and asset replacement (Option 2 High)

No. of Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	2,522	2,522	2,522	2,522	2,522	2,522	0	0	0		0	15,131
Units Tested (Not Easily Accessible)	1,269	1,269	1,269	1,269	1,269	1,269	1,450	1,450	1,450		1,450	38,064
Units Replaced (Easily Accessible)	378	378	378	378	378	378	612	612	612		612	15,131
Units Replaced (Not Easily Accessible)	952	952	952	952	952	952	1,541	1,541	1,541		1,541	38,064

Table 12 - Annual profile of undiscounted costs (Option One/Baseline, £m)

Total costs undiscounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.13	0.13	0.13	0.13	0.13	0.13	0.23	0.23	0.23		0.23	5.67
Units Tested (Not Easily Accessible)	0.33	0.33	0.33	0.33	0.33	0.33	0.58	0.58	0.58		0.58	14.27
Units Replaced (Easily Accessible)	9.41	9.41	9.41	9.41	9.41	9.41	16.52	16.52	16.52		16.52	403.50
Units Replaced (Not Easily Accessible)	3.44	3.44	3.44	3.44	3.44	3.44	6.04	6.04	6.04		6.04	147.51

Table 13 - Annual profile of undiscounted costs (Option 2 Central, £m)

Total costs undiscounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.00	0.00		0.00	5.67
Units Tested (Not Easily Accessible)	0.48	0.48	0.48	0.48	0.48	0.48	0.54	0.54	0.54		0.54	14.27
Units Replaced (Easily Accessible)	10.09	10.09	10.09	10.09	10.09	10.09	16.33	16.33	16.33		16.33	403.50
Units Replaced (Not Easily Accessible)	4.92	4.92	4.92	4.92	4.92	4.92	5.62	5.62	5.62		5.62	147.51

Table 14 - Annual profile of undiscounted costs (Option 2 Low, £m)

Total costs undiscounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.00	0.00		0.00	5.67
Units Tested (Not Easily Accessible)	1.43	1.43	1.43	1.43	1.43	1.43	0.27	0.27	0.27		0.27	14.27
Units Replaced (Easily Accessible)	10.09	10.09	10.09	10.09	10.09	10.09	16.33	16.33	16.33		16.33	403.50
Units Replaced (Not Easily Accessible)	14.75	14.75	14.75	14.75	14.75	14.75	2.81	2.81	2.81		2.81	147.51

Table 15 - Annual profile of undiscounted costs (Option 2 High, £m)

Total costs undiscounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.00	0.00		0.00	5.67
Units Tested (Not Easily Accessible)	0.48	0.48	0.48	0.48	0.48	0.48	0.54	0.54	0.54		0.54	14.27

Units Replaced (Easily Accessible)	10.09	10.09	10.09	10.09	10.09	10.09	16.33	16.33	16.33		16.33	403.50
Units Replaced (Not Easily Accessible)	3.69	3.69	3.69	3.69	3.69	3.69	5.97	5.97	5.97		5.97	147.51

Table 16 - Annual profile of discounted costs (Option One/Baseline, £m)

Total costs discounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.13	0.13	0.12	0.12	0.12	0.11	0.19	0.18	0.18		0.09	3.61
Units Tested (Not Easily Accessible)	0.33	0.32	0.31	0.30	0.29	0.28	0.48	0.46	0.44		0.24	9.07
Units Replaced (Easily Accessible)	9.41	9.10	8.79	8.49	8.20	7.93	13.44	12.99	12.55		6.76	256.42
Units Replaced (Not Easily Accessible)	3.44	3.33	3.21	3.10	3.00	2.90	4.91	4.75	4.59		2.47	93.74

Table 17 - Annual profile of discounted costs (Option 2 Central, £m)

Total costs discounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.91	0.88	0.85	0.82	0.80	0.00	0.00	0.00		0.00	5.22
Units Tested (Not Easily Accessible)	0.48	0.46	0.44	0.43	0.41	0.40	0.44	0.43	0.41		0.22	9.35
Units Replaced (Easily Accessible)	10.09	9.75	9.42	9.10	8.79	8.49	13.29	12.84	12.40		6.68	257.75
Units Replaced (Not Easily	4.92	4.75	4.59	4.43	4.28	4.14	4.57	4.42	4.27		2.30	96.66

Accessible)												

Table 18 - Annual profile of discounted costs (Option 2 Low, £m)

Total costs discounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.91	0.88	0.85	0.82	0.80	0.00	0.00	0.00		0.00	5.22
Units Tested (Not Easily Accessible)	1.43	1.38	1.33	1.29	1.24	1.20	0.22	0.21	0.21		0.11	11.24
Units Replaced (Easily Accessible)	10.09	9.75	9.42	9.10	8.79	8.49	13.29	12.84	12.40		6.68	257.75
Units Replaced (Not Easily Accessible)	14.75	14.25	13.77	13.30	12.85	12.42	2.29	2.21	2.13		1.15	116.13

Table 19 - Annual profile of discounted costs (Option 2 High, £m)

Total costs discounted	2020	2021	2022	2023	2024	2025	2026	2027	2028	..	2046	Total
Units Tested (Easily Accessible)	0.95	0.91	0.88	0.85	0.82	0.80	0.00	0.00	0.00		0.00	5.22
Units Tested (Not Easily Accessible)	0.48	0.46	0.44	0.43	0.41	0.40	0.44	0.43	0.41		0.22	9.35
Units Replaced (Easily Accessible)	10.09	9.75	9.42	9.10	8.79	8.49	13.29	12.84	12.40		6.68	257.75
Units Replaced (Not Easily Accessible)	3.69	3.56	3.44	3.33	3.21	3.11	4.86	4.69	4.53		2.44	94.23