Title: Consultation stage Impact Assessment on amendments to the Government Guidance Notes on the Waste Batteries and Accumulators Regulations 2009 (definition of a "portable" battery) **IA No:** DEFRA1784 **Lead department or agency:** Defra **Other departments or agencies:** BIS and Environment Agency	**Impact Assessment (IA)** **Date:** 28/08/2014 **Stage:** Consultation **Source of intervention:** EU **Type of measure:** Other **Contact for enquiries:** Ian Atkinson 020 7238 4345 or Sarah Steeds 020 7238 4346

Summary: Intervention and Options

RPC Opinion: not required

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**
-£7.48 m	-£7.79m	£0.69m	No	NA

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

The problem under consideration is the inconsistent application of the definition of what constitutes a "portable battery" by different operators within the market, which is placing the UK at risk of infraction by the European Commission for not complying with all the provisions in the Batteries Directive. Without a clarification of the definition, there will continue to be inconsistencies in definitions used by producers and reprocessors which result in lower levels of recycling overall.

What are the policy objectives and the intended effects?

The objective is to clarify what constitutes a "portable battery", by amending the definition contained in the Government Guidance Notes to introduce a single weight threshold so that any battery weighing below a defined weight will be considered to be hand-carriable. This will exclude a proportion of lead acid batteries from the scope of the Regulations, thereby requiring producers to recycle other chemistry batteries in order to achieve targets. This change would bring the UKs position in line with the intention of the Directive.

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

The analysis has focussed on a threshold of either 3kg of 4kg for what constitutes a portable battery. These weights were chosen in light of the thresholds set in most other member states plus the Health and Safety Executive guidance on manual handling. The analysis shows that a 4kg threshold, option 1, is likely to impose the least cost to producers and have the highest net present value compared to option 2. Option 0 (Do Nothing) does not address the issue and does not resolve the potential infraction risk. Option 1 is therefore the preferred option. It does not require changes to regulation but will change the way regulations are interpreted and enforced.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 01/2016

Does implementation go beyond minimum EU requirements?			No			
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** Yes	**< 20** Yes	**Small** Yes	**Medium** Yes	**Large** Yes	
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -0.033		**Non-traded:**	

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 SELECT SIGNATORY: ..... Date: .....

Summary: Analysis & Evidence

Policy Option 1

Description: Introduce a single weight threshold of 4kg for portable batteries

FULL ECONOMIC ASSESSMENT

Price Base Year 2014	PV Base Year 2015	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -7.69	**High:** -6.54	**Best Estimate:** -7.48

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	n/a		0.8	**7.0**
High	n/a		0.9	**7.8**
Best Estimate	n/a		0.9	**7.8**

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

Introducing a single weight threshold of 4kg will mean that some lead acid batteries previously counted as portable will no longer be within scope of the definition. This means that more portable non-lead batteries will need to be recycled to meet recycling targets. This will increase collection and processing costs to businesses, by an estimated £7.8m over ten years.

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

There could be a small transitional cost for businesses and regulators to familiarise themselves with the change in definition. This cost has not been monetised but is likely to be small. Most producers already use a 4kg definition, although reprocessors tend to use a higher definition.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	n/a		0.0	**0.1**
High	n/a		0.1	**0.9**
Best Estimate	n/a		0.0	**0.3**

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

Increased recycling of non-lead portable batteries yields environmental benefits in carbon terms because less virgin raw material is required as a result of recycled metals being available from batteries. This carbon saving is estimated at £0.3m over ten years.

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

Increased recycling of non-lead portable batteries is likely to reduce environmental impacts from metal leaching into soil at landfill or into the atmosphere from incineration, although the risk of leaching from modern landfill sites is generally low. These impacts have not been monetised.
Moving to a single 4kg threshold reduces infraction risks by bringing the UK position in line with the intention of the European Batteries Directive.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

The overall tonnages of batteries placed on the market and the composition of battery type are assumed to remain constant. The increase in collection and processing costs as a result of more recycling of non-lead batteries are based on Environment Agency and industry estimates.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: 0.7	**Benefits:** 0	**Net:** 0.7 cost	No	NA

Summary: Analysis & Evidence

Policy Option 2

Description: Introduce a single weight threshold of 3kg for portable batteries

FULL ECONOMIC ASSESSMENT

Price Base Year 2014	PV Base Year 2015	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -13.91	**High:** -8.33	**Best Estimate:** -13.64

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	n/a	1	1.1	9.6
High	n/a		1.6	14.0
Best Estimate	n/a		1.6	14.0

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

Introducing a single weight threshold of 3kg will mean that some lead acid batteries previously counted as portable will no longer be within scope of the definiton. This means that more portable non-lead batteries will need to be recycled to meet recycling targets (and more than under option 1). This will increase collection and processing costs to businesses, by an estimated £14.0m over ten years.

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

There could be a small transitional cost for businesses and regulators to familiarise themselves with the change in definition. This cost has not been monetised but is likely to be small. The cost is likely to be slightly higher than under Option 1 as most producers currently use a 4kg definition, and reprocessors tend to use a higher definition.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	n/a		0.0	0.1
High	n/a		0.2	1.3
Best Estimate	n/a		0.0	0.4

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

Increased recycling of non-lead portable batteries yields environmental benefits in carbon terms because less virgin raw material is required as a result of recycled metals being available from batteries. This carbon saving is estimated at £0.4m over ten years.

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

Increased recycling of non-lead portable batteries is likely to reduce environmental impacts from metal leaching into soil at landfill or into the atmosphere from incineration, although the risk of leaching from modern landfill sites is generally low. These impacts have not been monetised.

Moving to a single 3kg threshold reduces infraction risks by bringing the UK position in line with the intention of the European Batteries Directive.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

The overall tonnages of batteries placed on the market and the composition of battery type are assumed to remain constant. The change in batteries obligated within the portable batteries regime and the increase in collection and processing costs as a result of more recycling of non-lead batteries are based on Environment Agency and industry estimates.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: 1.2	**Benefits:** 0.0	**Net:** 1.2 cost	No	NA

Evidence Base (for summary sheets)

Executive Summary

The Batteries Directive (2006/66/EC) establishes targets to increase the collection and recycling of waste portable batteries (45% by 2016). The Waste Batteries and Accumulators Regulations[1] were introduced in 2009 to implement the EU Batteries Directive.

The problem under consideration is the inconsistent application of the definition of what constitutes a "portable battery" by different operators within the market, which is placing the UK at risk of infraction by the European Commission for not complying with all the provisions on the Batteries Directive.

The definition of "portable" batteries relies upon the concept of the battery being capable of being carried by hand ("hand-carriable"). In the Government guidance[2], only batteries in excess of 10kg in weight are defined as not able to be carried by hand and as such should be classed as industrial. Those below 4kg in weight are defined as able to be carried by hand and as such should be classed as portable (provided the other relevant criteria are met).

For batteries between the weights of 4kg and 10kg, there is no presumption of whether it is portable and the decision will have to be made based on all available information on a case by case basis. This has led to producers classifying lead acid batteries in this weight range as "industrial" when placed on the market whereas the waste industry (i.e. those responsible for recycling) are classifying the same batteries as "portable" when they becomes waste and are sent for recycling.

The absence of a clear definition means that the legislation is not having the intended effect on the batteries market; the increase in the collection and recycling of all types of batteries (as described in Article 7 of the Batteries Directive). As it is possible to generate sufficient evidence to meet the targets by the collection of lead acid batteries alone (which have a positive economic value), there is a lack of incentive to collect and recycle non-lead acid batteries (which are costly to recover).

This IA looks at the costs and benefits of introducing a single weight threshold for what constitutes a portable battery into the guidance. There are different options based on the relative threshold level.

Option 0 - Do nothing: Retain current guidance
Option 1 - Introduce a single weight threshold of 4kg for portable batteries
Option 2 - Introduce a single weight threshold of 3kg for portable batteries

These options are based on the thresholds set in most other member states plus the Health and Safety Executive guidance on manual handling. For these reasons, thresholds between 4kg and 6kg were not considered.

Option 0 – do nothing – is not the preferred option, as there is a need to amend the definition in order to meet the key requirements of the Directive. Not amending the definition will mean that collection and recycling of non-lead acid batteries will continue to be neglected, leaving the UK at risk of infraction.

[1] The Waste Batteries and Accumulators Regulations 2009, SI 2009 No. 890

[2] https://www.gov.uk/government/publications/the-waste-batteries-and-accumulators-regulations-2009-guidance-notes)

Option 1 is the preferred option as it will bring the UK position in line with the intention of the Batteries Directive while introducing lower costs to businesses than option 2. Options 1 and 2 both have a net cost (see table).This is because with the change of definition producers will need to fund the collection and recycling of non-lead acid batteries. Lead acid batteries have a positive economic value, whereas recycling of non-lead acid batteries is not currently cost effective. This means that the collection and recycling costs associated with achievement of the targets will increase compared to the current position under option 1 or 2.

Summary of costs and benefits over the 10 year appraisal period (2014 prices, PV base year 2015)

	Option 1	**Option 2**
Costs	£7.05m to £7.79m	£9.59m to £14.04m
Benefits	£0.06m to £0.89m	£0.12m to £1.25m
NPV	-£7.69m to -£6.54m	-£13.91 to -£8.33m

1. Problem under consideration

There is an inconsistent application of the definition of what constitutes a “portable battery” by different operators within the market, which is placing the UK at risk of infraction by the European Commission.

The definition of “portable” batteries, set out in Government Guidance Notes, relies upon the concept of the battery being capable of being carried by hand (“hand-carriable”). In the guidance, only batteries in excess of 10kg in weight are defined as not able to be carried by hand and as such should be classed as industrial. Those below 4kg in weight are defined as able to be carried by hand and as such should be classed as portable (provided the other relevant criteria are met).

For batteries between the weights of 4kg and 10kg, the guidance says that there is no presumption of whether it is portable and judgement will have to be made based on all available information on a case by case basis. This has led to producers classifying lead acid batteries in this weight range as “industrial” when placed on the market (possibly to avoid the financial obligation attracted by portable batteries) whereas the waste industry (i.e. those responsible for recycling) are classifying the same batteries as “portable” when they become waste and are sent for recycling.

This leads to inconsistencies in the data reported for the amounts of waste lead-acid portable batteries collected for recycling compared with the reported amount placed on the market. Currently recycling rates of over 400% are being reported (implying we recycle 4 times more portable lead-acid batteries than we use in the first place). This has led to UK reporting data which have been queried by several industry sources and by the Commission.

The inconsistent application of the definition reporting of portable lead-acid collections is also undermining achievement of the Directive’s overarching environmental objective “to achieve a high level of recycling for all waste batteries and accumulators”. The Regulations defines portable batteries by chemistry type (lead acid, nickel cadmium or other) and the tonnage of non-lead acid batteries (i.e. nickel cadmium and ‘other’ batteries) collected has actually decreased since the implementation of the Directive. This is putting a strain on those businesses which have invested in infrastructure to deal with the anticipated increase in collections of these other chemistries and some stakeholders (e.g. batteries recyclers) have been pushing for Government action to address this issue.

The Commission has indicated to officials that it expects the UK to clarify the situation and set a threshold in line with other member states. If the current situation were to continue there would

be a risk of the UK undergoing infraction proceedings for not complying fully with the environmental aims of the Directive.

2. Rationale for intervention

Currently the absence of a clear definition of portable batteries, combined with the incentives of producers and treatment operators, mean that the legislation is not having the intended effect on the batteries market; the increase in the collection and recycling of all types of batteries (as described in Article 7). As it is possible to generate sufficient evidence to meet the targets by the collection of lead acid batteries (which have a positive economic value), there is a lack of incentive to collect and recycle non-lead acid batteries (which are costly to recover). Note that 'evidence' in this context is the proof producers are required to provide to the environment agencies to show that they have funded the recycling of the required amount of portable batteries.

There are negative externalities associated with the disposal of batteries which results from factors, such as environmental costs, that are not fully taken into account by those generating battery waste. This results in more batteries being disposed of than is socially optimal. Negative externalities associated with sending portable batteries to landfill/incineration potentially include emissions of hazardous substances into the wider environment, e.g. waterways, air and soils, although there is relatively little research specifically quantifying emissions from batteries. The best evidence comes from experiments on an incinerator in Denmark. Those results suggest that incinerating batteries as part of black bag waste can lead to mercury escaping through the chimney (if mercury is present in the batteries). Other more common metals in portable batteries, like zinc and manganese, were not found to escape significantly through that particular gas cleaning system although their presence in incinerated mixed waste could lead to higher maintenance costs through corrosion of the incinerator heating chamber.[3] Costs also arise from the need to treat, stabilise and (usually) landfill the often hazardous incinerator residues. The collection and recycling of non-lead acid batteries also increases the volume of recovered material (such as nickel, silver and cobalt), potentially reducing demand for primary resources and the negative externalities associated with their extraction (e.g. carbon emissions).

A previous study for Defra (see footnote 10) found that the environment would benefit from increased batteries recycling, but the industry would incur substantial costs. No comparison was made in that study as to which impacts were the greater.

3. Proposed Solution

The objective is to clarify what constitutes a "portable battery", by amending the definition contained in the Government Guidance Notes to introduce a single weight threshold so that any battery weighing below a defined weight will be considered to be hand-carriable. This

[3] Pedersen et al 2009. A Full-scale Study on the Partitioning of Trace Elements in MSW Incineration – Effects of Firing Different Waste Types. Energy & Fuels 23: 3475-3489.

clarification should result in more consistent tonnage figures being reported for batteries being placed on the market and those collected for recycling.

The proposed change will ensure that the data being submitted to the Commission is more consistent and credible and will show that the UK is taking the necessary steps to recycle all battery types. This should reduce the risk of infraction.

It will also lead to an overall environmental benefit, as more batteries will be recycled. With the clarification, more lead acid batteries will be classed as "industrial" when coming off the market which must be recycled and cannot be sent for disposal. This will require the collection and recycling of more non-lead acid batteries in order to meet targets, to compensate for the lead acid batteries which are no longer eligible.

We have considered other non-regulatory options, however these would not deliver the change required. Whilst changing guidance in the manner proposed will not require a change to existing regulation, it will change the way the regulations are interpreted by business and enforced by the Agencies.

Impact

The intended impact of the change to guidance will be to exclude a proportion of the lead acid batteries from being able to have 'evidence' issued against them once recycled.

The change in guidance will mean that a proportion of lead acid batteries will be re-classified as industrial or automotive and as such it would be illegal to landfill or incinerate them. As these batteries have a positive economic value it is assumed that they are all recycled, so it is not anticipated that there will be a drop in the actual number of lead acid batteries recycled, just those that are counted towards the achievement of the portable batteries targets. This will mean that producers will need to take steps to ensure that an increased proportion of nickel cadmium and/or "other" batteries are collected and recycled in order to achieve their recycling targets for portable batteries.

Options

The analysis has focussed on a threshold of either 3kg of 4kg for what constitutes a portable battery. These weights were chosen in light of the thresholds set in other Member States (such as France and the Netherlands which both use a 4kg threshold) plus the HSE guidance on manual handling.

Legislative context of the proposed changes: The environment and Directive

The Batteries Directive (2006/66/EC) establishes targets to increase the collection and recycling of waste portable batteries (25% by 2012 and 45% by 2016). The Waste Batteries and Accumulators Regulations[4] were introduced in 2009 to implement the EU Batteries Directive.

[4] The Waste Batteries and Accumulators Regulations 2009, SI 2009 No. 890

Since 2010, batteries producers (companies who place batteries on the UK market which includes both manufacturers and importers of batteries) are required to finance the collection, treatment and recycling of a proportion of the batteries they place on the UK market. Industrial and automotive batteries are subject to different requirements. Batteries are classified according to their chemistry type – lead-acid, nickel cadmium and other. Historically collection routes for lead acid batteries, which are predominantly automotive or industrial but also contain a small proportion of portable batteries, are well established due to the value of the lead. Collections of other portable batteries have been low (around 2%).

Batteries that are not collected and recycled will end up in the residual waste stream, most likely going into landfill or incineration. Disposal of batteries to landfill means the chemicals they contain may leak into the ground, potentially polluting the environment and harming human health. Recycling diverts batteries from landfill, helping recover thousands of tonnes of metals, including valuable metals such as nickel, cobalt and silver, and saving on CO_2 emissions by reducing the need to mine new materials. In order to protect the environment, the directive and regulations apply to all batteries and accumulators placed on the market in the EU and UK respectively, 'regardless of their shape, volume, weight, material, composition or use'[5] and to all chemistries of batteries, with some exceptions[6].

Batteries are classified as portable, industrial or automotive[7]. Portable batteries have associated collection targets, whereas there are no targets for industrial and automotive batteries but they are prohibited from being disposed of to landfill or by incineration[8]. Therefore, it is assumed that all industrial and automotive batteries are recycled. Within each category, batteries are also categorised as lead-acid, nickel cadmium or 'other'. Batteries which will be reclassified as industrial or auto will be assumed to be 100% recycled.

It is likely that most lead-acid batteries weighing between 4kg and 10kg were being collected before the regulations were implemented, due to their inherent value, and that the increase in available evidence was due to more companies becoming approved to treat or export portable batteries.

The increase in the amount of recycling evidence generated from the recycling of lead acid batteries, has meant that the amount of non-lead acid batteries being recycled (in order to meet targets) has actually decreased since the first collection year of 2010. This is contrary to the policy intention of the Directive, which was to increase the recycling of all battery chemistries.

In 2010, around 6500 tonnes of portable lead acid batteries were reported as placed on the UK market and 1800 tonnes were reported as collected for recycling, a collection rate of around 30%. However, in 2013, the tonnage of portable lead acid batteries collected (almost 10,400 tonnes) vastly exceeded the amount placed on the market (around 2,200 tonnes); a collection rate of around 470%. This is because of the different interpretations of the definition at different stages of the supply chain which this change is seeking to resolve.

There are 504 producers registered with Batteries Compliance Schemes for the 2014 compliance year. The 10 largest producers account for around 54% of the total UK obligation.

[5] Article 1, EU directive 2006/66/EC

[6] Article 2, EU directive 2006/66/EC

[7] Article 3, EU directive 2006/66/EC

[8] Article 14, EU directive 2006/66/EC

4. Description of options considered

Option 0 - Do nothing: Retain current guidance
Option 1 - Introduce a single weight threshold of 4kg for portable batteries
Option 2 - Introduce a single weight threshold of 3kg for portable batteries

Option 1 is the preferred option because a 4kg threshold is likely to minimise additional costs to producers while also presenting the lowest risk to the UK failing to meet future collection targets. This was also the most popular option in the initial consultation carried out in 2013[9] (see section 10), because it minimises both costs to producers from expanding the collection network and administrative costs from adjusting to a new threshold. Views are sought in the consultation on the costs to producers and environmental benefits of each option.

Analysis to inform this impact assessment also considered threshold weights between 4kg and 10kg, and below 3kg, but discounted these on grounds of infraction risk for the higher weights as it would not address the underlying issue and would not drive the recycling of non-lead acid batteries; and cost to batteries producers for the lower weights due to increased costs associated with the collection and processing of small, portable batteries.

5. Monetised and non-monetised costs and benefits of each option

In general terms, a lower threshold will increase costs to producers as more non-lead acid batteries would be collected and treated in order to meet targets.

The costs of each option depend upon:

- The number of obligated portable, automotive and industrial batteries placed on the market
- The cost of collection for recycling and processing within the portable batteries regime
- The cost of collection for recycling and processing within the automotive and industrial batteries regimes

The benefits of each option depend upon:

- The number of additional portable batteries recycled
- The offset carbon from using recycled materials as opposed to raw materials
- The monetary value attached to the offset carbon

Two scenarios are generated for the costs and benefits based on alternative estimates of numbers of batteries affected and collection and processing costs. These scenarios are based on alternative EA and industry estimates.

[9] An initial consultation was carried out in August 2013 around changes to guidance on the definition of a portable battery. There were errors in the supporting data, which may have affected some responses, but where possible responses from that consultation are used to guide this Impact Assessment.

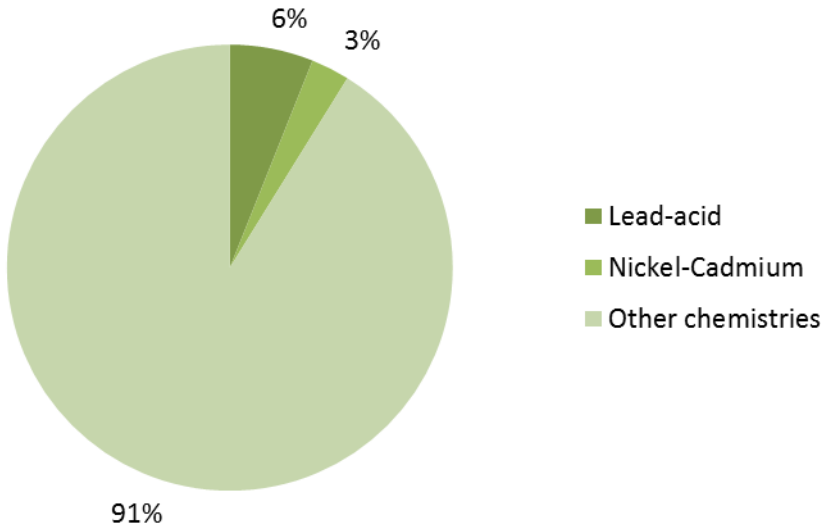
Number of Batteries

In both options 1 and 2, some lead-acid batteries will switch from being classified as “portable” to “automotive” or “industrial”, but overall we expect the same quantity of lead acid batteries to be collected and recycled, due to their positive economic value, and therefore there is no change in costs for these batteries.

In addition to lead-acid batteries switching regime, the total weight of batteries recycled by the portable regime needs to be maintained, and that will draw in more batteries of other chemistries, raising the average cost per tonne of collection and processing.

The tonnage recycled in each year is assumed to be the same as the UK obligation for that year. The current guidance states that the recycling target for the current year is based on the average tonnage placed on the market in the current year and the previous two years.

Portable batteries placed on the market, as identified by producers – split by chemistry



Most batteries categorised as “other chemistries” will be alkaline or lithium batteries and will generally weigh less than 1kg, as will nickel cadmium batteries. A greater proportion of lead-acid batteries tend to weigh above 4 kg. Overall, a large majority of batteries placed on the market will remain classified as portable under either option 1 or 2.

Cost per tonne

Under all options the collection target for portable batteries rises from 30% in 2013 by 5% per year, reaching 45% by 2016 where it is assumed to remain. As a result, in every option costs rise (by different amounts) to 2016 as industry must finance the expansion of the collection network.

Estimates of producer cost per tonne of portable batteries in each option take into account responses to the initial consultation and are adjusted for changes to costs in the 2014 operational plans of compliance schemes.

The cost per tonne of collection and processing portable batteries is applied to the total weight of batteries in the portable regime. No changes in costs are assumed for collecting and processing batteries in the automotive and industrial regimes, because no change in recycling levels is expected in these regimes as a result of the change in the portable regime definition. This also implies that the revenue from collecting lead acid batteries is equal to the costs of collecting them, so there is no "benefit" transferred from the portable batteries regime to the industrial or automotive regimes.

It is assumed that those lead-acid batteries no longer classified as portable, will continue to be collected and properly disposed of. Indeed, classing these lead acid batteries as automotive or industrial means that 100% of them need to be collected for reprocessing. There is therefore no environmental damage as a result of lead-acid batteries being 'displaced' by non-lead acid batteries, and the number of lead-acid batteries going to landfill or incineration is expected to be unchanged as the threshold is lowered.

Benefits of recycling

There is evidence that recycling batteries delivers benefits to the environment compared to disposal in landfill or by incineration[10]. Batteries disposed of in landfill sites can have negative environmental and potentially health consequences, particularly by increasing the heavy metal content of the landfill leachate and thus impacting human toxicity via soil. [11] [12] [13]

However most landfill sites now have measures in place to prevent soil, water and atmospheric contamination (e.g. bottom liners, leachate collection and treatment and gas collection and utilization for electricity generation).

Evidence from Denmark suggests that incinerating mercury-containing batteries as part of black bag waste results in up to 40% of the mercury entering the environment through air emissions. Mercury is extremely hazardous both to the environment and humans.[14] The same study showed more than 99.9% of other metals (by weight) do not escape beyond the gas cleaning process, so those substances represent relatively low environmental or health risk when high efficiency gas cleaning is employed.

There is insufficient information at this stage to measure and monetise the environmental impacts of each option through avoidance of sending batteries to the various types of landfill sites or incinerators now in operation. Only the environmental benefits in terms of carbon emissions savings from recycling batteries are monetised.

[10] Battery Waste Management Life Cycle Assessment - Final Report for Publication, 2006 http://www.epbaeurope.net/090607_2006_Oct.pdf

[11] Manfredi et al (2010) Contribution of individual waste fractions to the environmental impacts from landfilling of municipal solid waste. http://www.sciencedirect.com/science/article/pii/S0956053X09003717

[12] Karnchanawong and Limpiteeprakan (2009) Evaluation of heavy metal leaching from spent household batteries disposed in municipal solid waste. http://www.ncbi.nlm.nih.gov/pubmed/18562190

[13] Xará et al (2009) Laboratory study on the leaching potential of spent alkaline batteries. http://www.ncbi.nlm.nih.gov/pubmed/19342214

[14] Astrup et al 2011. Incinerator Performance: Effects of Changes in Waste Input and Furnace Operation on Air Emissions and Residues. Waste Management & Research 29(10) Supplement pp57-68.

For each option the benefit of diverting a tonne of batteries from landfill to recycling is taken as 487kg CO2e, from the Defra / DECC's 2011 Guidelines to GHG Conversion Factors for Company Reporting[15].

Projections of costs and benefits

Costs and benefits are considered over a 10 year timeframe, i.e. 2015-2024, as the proposed change to the guidance does not have a specific end date.

In each option producer cost per tonne remains the same from 2016-2024. Views are sought in the consultation on whether costs would be expected to fall after 2016/2017 after investments in infrastructure have been made and the 45% recycling target should have been reached.

The costs associated with each option have been based on data and behavioural assumptions provided the Environment Agency, for the high scenario cost, and by various industry sources, for the low cost scenario.

In each option it is assumed that the tonnage of portable batteries placed on the market remains the same from 2015-2024 (albeit at a slightly lower level in option 2). Views are sought in the consultation on whether this is reasonable, or whether there are other trends in portable battery consumption which need to be taken into account.

It has been assumed that the familiarisation costs associated with the proposed change are negligible. For most producers, they will already be using the 4kg threshold as a guide and so will not have to make any changes, though there would be some with a 3kg threshold. For reprocessors, there is likely to be a small cost associated with the need to notify staff of the change and with the re-classification of certain batteries though this has not been quantified.

It is possible there could be a small transitional cost for monitoring and enforcement associated with a change to threshold level. This would be as a result of changing the old limit with the new threshold and the impact on the agencies. It is expected any change in monitoring costs will be minimal as this is simply a change from one threshold (10kg) to another (3 or 4 kg). Such a cost is likely to be very small and has not been monetised.

Option 0 - Do nothing: Retain current guidance (4-10kg threshold).

The ‘do nothing’ option introduces no new costs or benefits compared to the current baseline. It would however cause a high risk of infraction proceedings with potentially high costs. These costs have not been quantified but include the potential for substantial fines and reputational damage for the UK. Baseline information on the size of the market for batteries is described below.

In 2013 there were 1,664 registered batteries producers, of which 1,145 were small producers. There were 5 Batteries Compliance Schemes with a total of 519 members[16].

The total obligation for 2013 is 11,333 tonnes of batteries recycling. This means:

[15] p.40 http://archive.defra.gov.uk/environment/business/reporting/pdf/110707-guidelines-ghg-conversion-factors.pdf

[16] Numbers are taken from NPWD. They differ slightly from publicly available summaries of NPWD because of the precise methodology for aggregating data up from individual company returns. The method used in this IA is likely to be less accurate than that on the NPWD website, but allows for more detailed analysis that is consistent throughout this impact assessment.

- Average obligation (schemes) = 2,267 tonnes

- Average obligation (scheme members) = 21.8 tonnes

The current guidance states that for batteries weighing between 4kg and 10kg there is no presumption about hand-carriability and judgements are made at the discretion of producers and compliance schemes based on all available information.

If the current guidance remains in place:

- There is not expected to be any change in the total weight of portable batteries placed on the market, i.e. it remains at 2013 levels (36,877 tonnes)[17].

- The composition of battery type collected is expected to remain the same as now, i.e. 88% of the UK's obligation is met with lead-acid battery evidence, 2% with Nickel-Cadmium battery evidence and 10% with other battery chemistry evidence.

- The estimated cost per tonne for producers of meeting the UK's collection targets is expected to be around £1000 in 2015 and £1,100 thereafter if the guidance remains unchanged. The expected rise between 2015 and 2016 is a result of the higher target, which draws in batteries that are less easy to collect and process, and command a lower total value of materials for each tonne of batteries collected.

- The 'do nothing' option introduces no new costs or benefits compared to the current baseline

Option 1 - Introduce a single weight threshold of 4kg for portable batteries

Option 1 involves amending the definition of "portable" batteries contained in the Government Guidance Notes to introduce a single weight threshold of 4kg so that any battery weighing 4kg or below will be considered to be hand-carriable.

With a 4kg threshold:

[17] https://npwd.environment-agency.gov.uk/Public/Batteries/PublishedReports.aspx

- there is not expected to be any reduction in the total weight of batteries placed on the market which are classified as portable, i.e. it remains at 2013 levels (36,877 tonnes)[18].

- Some lead acid batteries that reprocessors (as opposed to producers) previously classified as portable would now be classified as either industrial or automotive batteries. This is estimated at around 3,500 to 6,900 tonnes per year under the two scenarios presented below. However, there is no change in recycling levels for these batteries, as all are assumed to be recycled in either case because of their economic value.

- The costs of collecting and processing batteries in the portable batteries regime are expected to rise by around £50 per tonne - in 2015 collection and processing is expected to cost in the region of £1,050-£1,100 per tonne and in 2016 and beyond around £1,150 per tonne. This is because more non-lead batteries will need to be collected (replacing the tonnage of lead batteries no longer included in the regime).

- No changes in costs are assumed for collecting and processing batteries in the automotive and industrial regimes, because no change in recycling levels is expected in these regimes as a result of the change in the portable regime definition.

Option 1 Costs:

We estimate that with a 4kg threshold there would be in the region of £7.05m - £7.79m additional costs to batteries producers over the 10 years (in present value terms).

The number of obligated portable batteries placed on the market is assumed to be unchanged from the baseline. This is because producers of batteries already class those up to 4kg as portable.

Under this option, recycled lead batteries above 4kg, which processors currently count as portable, will be transferred to the industrial and automotive regimes. There is no change in costs for these batteries, as they are all assumed to be recycled in either case because of their positive economic value. However, with fewer lead batteries counted in the portable regime, more non-lead batteries will need to be recycled to achieve the portable recycling obligations. This results in higher costs of collection and processing for these batteries. The costs given in table 1 below are net of the recyclate value of additional recycled batteries.

The “present value” (or PV) figure attempts to weight costs accrued in the future less heavily than those accrued today, using HM Treasury’s discount rate of 3.5% per year. Once each year’s cost has been discounted to a present value, they are added up to arrive at the total.

Two scenarios for the costs are presented below. Scenario A uses industry estimates whereas scenario B uses Environment Agency (EA) estimates. Scenario B represents a higher cost case because the additional collection and processing costs of portable batteries are higher under this scenario.

[18] https://npwd.environment-agency.gov.uk/Public/Batteries/PublishedReports.aspx

Table 1 shows the additional costs of the portable batteries regime with a 4kg threshold could be £0.74m-£1.48m in 2015, and £0.83m per year thereafter and in the region of £7.05m - £7.79m over the 10 years (in present value terms).

In terms of non-monetised costs, there could be a small transitional cost for businesses and regulators to familiarise themselves with the change in definition. This cost has not been monetised but is likely to be small. Most producers already use a 4kg definition, although reprocessors tend to use a higher definition.

Table 1: Costs of Option 1

	Year	2015	2016 onwards (average)	Total over 10 years to 2024
Scenario A	Tonnes placed on the market defined as portable	36,877	36,877	368,772
	Increased cost within portable batteries regime (2014 prices)	£0.74m	£0.83m	£8.21m
	Increased cost within other batteries regimes (2014 prices)	£0m	£0m	£0m
	Discounted cost (at 3.5% pa, base year 2015)	£0.74m	£0.70m	£7.05m
Scenario B	Tonnes placed on the market defined as portable	36,877	36,877	368,772
	Increased cost within portable batteries regime (2014 prices)	£1.48m	£0.83m	£8.94m
	Increased cost within other batteries regimes (2014 prices)	£0m	£0m	£0m
	Discounted cost (at 3.5% pa, base year 2015)	£1.48m	£0.70m	£7.79m

Option 1 Benefits:

Monetised benefits of option 1 are expected to be £0.06m-£0.89m (PV) over the 10 year appraisal period. This does not include a number of relevant non-monetised environmental benefits, so is thought to be an underestimate.

Economic benefits of a 4kg threshold arise from taking batteries out of landfill or incineration, and avoiding the need to extract as much virgin metal ore because more recycled metals are available. Extracting less metal ore helps to avoid carbon emissions, and (once carbon emissions from recycling batteries are taken into account), it is these carbon savings that we have valued. Other benefits remain non-monetised, such as reduced risk of metals leaching into the environment from landfill or into the atmosphere from incineration. The benefits from reduced infraction risk are also non-monetised.

Between 2015 and 2024, we estimate around 39,000 to 68,000 tonnes more non-lead acid batteries will be collected compared to the baseline. Assuming these batteries would otherwise

have ended up in landfill, this equates to emissions saving of around 19,000 to 33,000 tonnes CO2e[19] over the 10 years, which can be valued at £0.06m-£0.89m (PV) depending on the scenario and using the low and high values of "traded" carbon published by the Department for Energy and Climate Change[20].

Table 2: Benefits of option 1

	Year	2015	2016 onwards (average)	Total over 10 years to 2024
Scenario A	Additional batteries recycled (tonnes)	3,519	3,959	39,149
	Additional CO_2 emissions avoided (tonnes)	1,714	1,928	19,066
	Value of Co2 emissions avoided (2014 prices, £m) - low carbon values	£0.00	£0.02	£0.07
	Value of Co2 emissions avoided (2014 prices, £m) - central carbon values	£0.01	£0.02	£0.22
	Value of Co2 emissions avoided (2014 prices, £m) - high carbon values	£0.03	£0.07	£0.62
	Discounted value (at 3.5% pa, base year 2015, £m) - low carbon values	£0.00	£0.01	£0.06
	Discounted value (at 3.5% pa, base year 2015, £m) - central carbon values	£0.01	£0.02	£0.18
	Discounted value (at 3.5% pa, base year 2015, £m) - high carbon values	£0.03	£0.05	£0.51
Scenario B	Additional batteries recycled (tonnes)	6,126	6,891	68,149
	Additional CO_2 emissions avoided (tonnes)	2,983	3,356	33,189
	Value of Co2 emissions avoided (2014 prices, £m) - low carbon values	£0.00	£0.03	£0.13
	Value of Co2 emissions avoided (2014 prices, £m) - central carbon values	£0.01	£0.04	£0.39
	Value of Co2 emissions avoided (2014 prices, £m) - high carbon values	£0.05	£0.11	£1.08
	Discounted value (at 3.5% pa, base year 2015, £m) - low carbon values	£0.00	£0.02	£0.10
	Discounted value (at 3.5% pa, base year 2015, £m) - central carbon values	£0.01	£0.03	£0.31
	Discounted value (at 3.5% pa, base year 2015, £m) - high carbon values	£0.05	£0.09	£0.89

Option 2 - Introduce a single weight threshold of 3kg for portable batteries

[19] Based on emissions of 487kg CO_2e avoided per tonne of batteries which is diverted from landfill into recycling. Source: 2011 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting, available here: http://archive.defra.gov.uk/environment/business/reporting/pdf/110707-guidelines-ghg-conversion-factors.pdf

[20] Using the traded values is appropriate because the majority of carbon impact result from avoiding extraction of virgin materials and this activity tends to happen outside the EU. DECC guidance states that where the activity occurs outside the EU, the traded values should be used instead of the untraded ones. Values available here:"Updated short-term traded carbon values used for UK public policy appraisal" https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/240095/short-term_traded_carbon_values_used_for_UK_policy_appraisal_2013_FINAL_URN.pdf and guidance stating the traded values are most appropriate is available here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254083/2013_main_appraisal_guidance.pdf

Option 2 involves amending the definition of “portable” batteries contained in the Government Guidance Notes to introduce a single weight threshold of 3kg so that any battery weighing 3kg or below will be considered to be hand-carriable.

With a 3kg threshold:

- There is expected to be a fall in the total weight of batteries placed on the market classified as portable of 3%-5% compared to the 2013 level, because with a lower threshold a greater proportion of batteries would be classified as industrial/automotive and so out of scope.

- Between 2015 and 2024, we assume around 35,000 - 35,800 tonnes of batteries will be placed on the market each year.

- Some lead acid batteries that reprocessors (as opposed to producers) previously classified as portable would now be classified as either industrial or automotive batteries. This could be in the region of 8,100 to 9,800 tonnes per year. However, there is no change in recycling levels for these batteries, as all are assumed to be recycled in either case because of their economic value.

- The costs of collecting and processing batteries in the portable batteries regime are expected to rise by £100-£200 per tonne. In 2015 collection and processing is expected to cost in the region of £1,100-£1,200 per tonne and in 2016 and beyond around £1,200-1,250 per tonne.

- No changes in costs are assumed for collecting and processing batteries in the automotive and industrial regimes, because no change in recycling levels is expected in these regimes as a result of the change in the portable regime definition.

Option 2 costs:

We estimate that with a 3kg threshold there would be in the region of £9.6m - £14.0m additional costs to batteries producers over the 10 years (in present value terms).

As under option 1, costs arise as a result of recycling a higher proportion of non-lead batteries in the portable battery regime, with higher costs per tonne. However, in option 2 there is also a reduction in the weight placed on market in the portable batteries regime because some lead acid batteries that producers currently class as portable (i.e. those between 3 and 4 kg) will be classed as either industrial or automotive under option 2. Therefore the tonnage of portable batteries obligated to be recycled is lower. This switch reduces the effect of higher cost-per-tonne in the portable regime to some extent, but the costs are nonetheless higher than option 1 overall. The costs given in table 3 below are net of the recyclate value of additional recycled batteries.

As with option 2, the “present value” or PV figure attempts to weight costs accrued in the future less heavily than those accrued today, using HM Treasury’s discount rate of 3.5% per year. Once each year’s cost has been discounted to a present value, they are added up to arrive at the total.

Table 3: Costs of option 2

	Year	2015	2016 onwards (average)	Total over 10 years to 2024
Scenario A	Tonnes placed on the market defined as portable	35,771	35,771	357,709
	Increased cost within portable batteries regime (2014 prices, £m)	1.31	1.08	11.07
	Increased cost within other batteries regimes (2014 prices, £m)	0.00	0.00	0.00
	Discounted cost (at 3.5% pa, base year 2015)	1.31	0.92	9.59
Scenario B	Tonnes placed on the market defined as portable	35,033	35,033	350,334
	Increased cost within portable batteries regime (2014 prices, £m)	2.66	1.49	16.07
	Increased cost within other batteries regimes (2014 prices, £m)	0.00	0.00	0.00
	Discounted cost (at 3.5% pa, base year 2015, £m)	2.66	1.26	14.04

Table 3 shows the additional costs of the portable batteries regime with a 3kg threshold could be £1.31m-£2.66m in 2015, and £1.08m-£1.49m per year thereafter.

There are a number of potential costs of option 2 that have not been monetised:

- As producers do not currently use a 3kg threshold to define “portable”, they may choose to revisit past compliance years’ data and provide updated data returns based on the new guidance. There would be no requirement to do this but producers may find it in their interests to do so as it may reduce their obligation (which is set on the basis of the current and previous two years data). This cost is therefore not monetised in the analysis.
- Treatment operators would have to revise their sampling operations and protocols in line with the 3kg definition. This administrative cost has not been valued for lack of evidence, but estimates will be requested in the consultation.

Option 2 benefits:

Monetised benefits of options 2 are expected to be £0.12m-£1.25m (PV) over the 10 year appraisal period. This does not include a number of relevant environmental benefits, so is thought to be an underestimate.

As with option 1, economic benefits of a 3kg threshold arise from taking batteries out of landfill or incineration, and avoiding carbon emissions from virgin material extraction. Other benefits remain non-monetised, such as reduced risk of metals leaching into the environment from landfill or into the atmosphere from incineration. The benefits from reduced infraction risk are also non-monetised.

Around 87,000-96,000 tonnes more batteries are collected in option 2 over the 10 year appraisal period, leading to emissions saving of around 42,000-47,000 tonnes CO_2e. Estimates of the value of these savings are given based on DECC's traded price of carbon.[21]

Table 4: benefits of option 2

	Year	2015	2016 onwards (average)	Total over 10 years to 2024
Scenario A	Additional batteries recycled (tonnes)	8,774	9,683	95,918
	Additional CO_2 emissions avoided (tonnes)	4,273	4,715	46,712
	Value of Co2 emissions avoided (2014 prices, £m) - low carbon values	£0.00	£0.04	£0.18
	Value of Co2 emissions avoided (2014 prices, £m) - central carbon values	£0.02	£0.06	£0.54
	Value of Co2 emissions avoided (2014 prices, £m) - high carbon values	£0.08	£0.16	£1.52
	Discounted value (at 3.5% pa, base year 2015, £m) - low carbon values	£0.00	£0.03	£0.14
	Discounted value (at 3.5% pa, base year 2015, £m) - central carbon values	£0.02	£0.05	£0.43
	Discounted value (at 3.5% pa, base year 2015, £m) - high carbon values	£0.08	£0.13	£1.25
Scenario B	Additional batteries recycled (tonnes)	8,074	8,793	87,209
	Additional CO_2 emissions avoided (tonnes)	3,932	4,282	42,471
	Value of Co2 emissions avoided (2014 prices, £m) - low carbon values	£0.00	£0.04	£0.16
	Value of Co2 emissions avoided (2014 prices, £m) - central carbon values	£0.01	£0.05	£0.49
	Value of Co2 emissions avoided (2014 prices, £m) - high carbon values	£0.07	£0.15	£1.38
	Discounted value (at 3.5% pa, base year 2015, £m) - low carbon values	£0.00	£0.03	£0.12
	Discounted value (at 3.5% pa, base year 2015, £m) - central carbon values	£0.01	£0.04	£0.39
	Discounted value (at 3.5% pa, base year 2015, £m) - high carbon values	£0.07	£0.12	£1.14

[21] See footnote 20 for sources.

Discussion and summary of options

Table 5 summarises the costs and benefits of options 1 and 2, showing that whilst both result in net costs, the NPV for option 1 is less negative.

Whilst the scenarios take into account alternative assumptions based on expert opinion, in reality it is possible that a different outcome could occur given the uncertainty involved in any forecast/scenario.

Factoring in the non-monetised costs and benefits of each option is not expected to change the finding that option 1 has a higher (less negative) NPV. Whilst option 2 is expected to deliver greater environmental benefit than option 1 (by reducing quantities of batteries in landfill or incineration), this is more than offset by higher costs to businesses.

Table 5: Summary of costs and benefits over the 10 year appraisal period (£m 2014 prices, PV base year 2015)

	Option 1	**Option 2**
Costs	£7.05m to £7.79m	£9.59m to £14.04m
Benefits	£0.06m to £0.89m	£0.12m to £1.25m
NPV	-£7.69m to -£6.54m	-£13.91 to -£8.33m

For the purposes of the summary sheets at this start of this Impact Assessment, central estimates have been made of the NPVs. These are based on the EA assumptions from scenario B and with benefits calculated using DECC's central estimate of the value of carbon. We use scenario B because we believe these assumptions to be representative of the whole industry (whilst scenario A makes use of industry estimates, a number of the assumptions were provided by a single compliance scheme and represent the costs to their members only).

The central estimate NPV for option 1 is -£7.48m PV over 10 years.

The central estimate NPV for option 2 is -13.64m PV over 10 years.

Option 1 (4kg threshold) minimises the cost for producers to meet their obligations compared to option 2. A 4kg threshold was the most popular option in the original consultation, being the preferred option for 7 of the 18 respondents. In responses to the original consultation, advocates of a 4kg threshold argued it would cause the minimum disruption to the system since it is in line with the current guidance. Producers would avoid revisiting past compliance years' data to apply a different hand-carriability threshold. Treatment operators would not be required to significantly revise sampling operations and protocols. This view appears to be supported by the above analysis of costs and benefits.

A 3kg threshold (option 2) was the second most popular option in the original consultation, being the preferred option for 6 of the 18 respondents who expressed a preference. However due to errors in the original consultation a 3kg threshold was calculated as having the least cost impact on producers, which may have influenced preferences. A 3kg threshold would be in line with HSE guidance on manual handling but does require the revision of sampling operations and protocols.

A 4kg threshold (option 1) would present a lower risk than a 3kg threshold to the UK meeting future collection targets, since a 4kg threshold allows more lead-acid batteries to be classified as portable. However this is achieved at the expense of bringing more non-lead acid batteries into the recycling network.

Either a 3kg or 4kg threshold would bring waste lead-acid collections more in line with the total quantity placed on the market than the current guidance.

7. Risks and sensitivity analysis

Risks

Though all respondents to the initial consultation agreed for the need for change in the current guidance, there was broad appreciation that the hand-carriability clarification would not on its own address the current imbalance in portable lead-acid collections. There is therefore still a (reduced) risk of infraction proceedings being brought against the UK.

Furthermore, it is possible that changing the definition of a portable battery will discourage firms from over-complying with their recycling obligations, and this could increase the risk of the UK not meeting its recycling target of 45% by 2016. This also carries infraction risk.

In particular, this risk arises because UK legislation requires each obligated producer to hit a 45% target by 2016, but not all producers are obligated. As such, if all obligated producers exactly hit their own target, or if some fail to, the UK would see an overall recycling rate of less than 45% in 2016. To date, this has not been a problem because it makes business sense to recycle lead acid batteries. Under option 2 in particular, continued over-compliance seems unlikely.

In order to deal with this, we will be seeking to raise the Batteries targets to provide a degree of tolerance and ensure the UK meets the 2016 Directive targets. This will be addressed separately in due course.

Sensitivity analysis and summary of assumptions

Sensitivity analysis has been conducted throughout the process of estimating the costs and benefits of each option, so all results are presented with a low-high range across the two scenarios in this Impact Assessment.

The key differences between figures in the two scenarios are described in Whilst the scenarios take into account alternative assumptions based on expert opinion, in reality it is possible that a different outcome could occur given the uncertainty involved in any forecast/scenario.

The analysis assumes no significant change in compliance compared to current levels. If the change in definition were to result in increased non-compliance then there could potentially be a modest increase in enforcement costs from prosecutions.

Table 6. We consider the scenario B assumptions to be more representative of costs and impacts across the industry, because a number of the scenario A assumptions are based on the view of a single compliance scheme. Scenario B therefore constitutes our best estimate of the costs and benefits of each option.

Whilst the scenarios take into account alternative assumptions based on expert opinion, in reality it is possible that a different outcome could occur given the uncertainty involved in any forecast/scenario.

The analysis assumes no significant change in compliance compared to current levels. If the change in definition were to result in increased non-compliance then there could potentially be a modest increase in enforcement costs from prosecutions.

Table 6: Summary of assumptions

Parameter	Scenario A (and source)	Scenario B (and source)
Growth in weight of batteries placed on the market	0% pa (consultations with industry for 2008 waste batteries and accumulators IA)	0% pa (consultations with industry for 2008 waste batteries and accumulators IA)
Average collection and processing cost per tonne for portable batteries	Baseline: £1000 in 2015; £1,100 thereafter (Compliance Scheme)	Baseline: £1000 in 2015; £1,100 thereafter (EA)
	Op 1: £1,050 in 2015; £1,150 thereafter (Compliance Scheme)	Op 1: £1,100 in 2015; £1,150 thereafter (EA)
	Op 2: £1,100 in 2015; £1,200 thereafter (Compliance Scheme)	Op 2: £1,200 in 2015; £1,250 thereafter (EA)
Fall in weight placed on the market	Op 1: 0% (Compliance Scheme)	Op 1: 0% (EA)
	Op 2: 3% (Compliance Scheme)	Op 2: 5% (EA)
Fall in lead acid batteries defined as portable	Op 1: 27% (AIBOLG)*	Op 1: 47% (EA)
	Op 2: 68% (AIBOLG)*	Op 2: 63% (EA)
Traded price of carbon (£ per tonne CO_2e)	DECC low, central and high values presented	DECC low, central and high values presented

8. Direct costs and benefits to business calculations

All costs calculated in this IA are direct costs to business, so our best estimate of the net present value to business of option 1 is -7.79m over 10 years (in 2014 prices and with a 2015 base year for the PV calculation). For option 2, it is -£14.04m.

Table 7 below summarises the equivalent annual net cost to business (EANCB) of each option once they have been adjusted to reflect 2009 prices, and once they have been discounted to 2010, in line with OITO guidance.

Table 7: Equivalent Annual Net Cost to Business (2009 prices, 2010 PV base year)

	EANCB
Option 1	£0.69m cost
Option 2	£1.25m cost

Small firms

Different businesses will be affected by these changes in proportion to the number of batteries they “place on the market”.

The portable batteries regime allows for “small firms” to be exempted, but this is defined in the EU Directive in terms of the weight of batteries placed on the market rather than the firms’ turnover or number of staff. The Batteries Directive and Regulations include a 1 tonne de minimis, whereby businesses that place less than 1 tonne of portable batteries on the market per annum are not required to fund the recycling of batteries.

Therefore there is no exemption for SMEs based on the UK definition of relative turnover and number of employees.

For many firms, batteries placed on the market in the UK represent a relatively small part of their business (these batteries may be included to help the “main product” work).

As such, the impacts of these proposals on small firms are uncertain, but likely to be lower than the impacts on larger firms.

9. Wider impacts

Environmental Impacts

The environmental impacts in terms of GHG savings and potential impacts on water, air and soil have been discussed above. The GHG impacts have been included in the monetised value of the benefits of each option, but other impacts have not.

10. Summary of preferred option with description of implementation plan.

Currently the Waste Batteries and Accumulators Regulations are failing to result in the recycling of all types of batteries, not just lead acid batteries. The lack of clarity in the definition of a portable battery has been identified as a cause of this problem. Responses to the initial consultation by industry participants welcomed the idea of a single weight threshold defining whether batteries are portable or industrial. The analysis shows that a 4kg threshold, as outlined in option1, is likely to impose the least cost to producers and have the highest net present value compared to option 2. Option 0 (Do Nothing) does not address the issue and does not resolve the potential infraction risk. Option 1 is therefore the preferred option.

The environment agencies will support industry through the provision of advice and guidance to adapt to the change in hand-carriability guidance. There will be clear communication of the changes to all affected customers. Compliance monitoring by the environment agencies of producers and compliance schemes will ensure that producers are correctly classifying the batteries they place on the market and are picking up the appropriate obligation. Additionally their compliance monitoring of waste treatment operators and exporters will also ensure that these operators are properly classifying waste batteries and are only issuing evidence against

batteries which fall within the revised definition of portable batteries. There will be no new compliance or monitoring costs associated with this change.

We anticipate amended guidance will be ready for publication in December 2014 and will take effect from 1 January 2015. Approved Battery Treatment Operators (ABTOs) will need to review their sampling and inspection plans and agree revised protocols, which reflect the revised definition, with the relevant environment agencies. Battery Compliance Schemes (BCSs) will have the opportunity to apply the revised definition to their members' placed on the market data for previous years so that their recycling obligation for 2015 onwards reflects the new definition. Data on UK battery recycling performance published to date will not be amended.