EUROPEAN COMMISSION

Brussels, 26.3.2012
SWD(2012) 65 final

COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

amending Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators as regards the placing on the market of portable batteries and accumulators containing cadmium intended for use in cordless power tools

{COM(2012) 136 final}
{SWD(2012) 66 final}

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1. PROBLEM DEFINITION

In the problem definition, the political and legal context are important. The Batteries Directive[1] seeks to make the use of batteries and accumulators, as reflected in the activities of all operators involved in their life-cycle, less harmful to the environment. It lays down specific rules on placing batteries and accumulators on the EU market and on the collection, treatment, recycling and disposal of waste batteries and accumulators containing cadmium, mercury and lead[2].

Concern about cadmium's toxicity persuaded the European Parliament and the Council to restrict the use of cadmium in portable batteries to 0,002% of cadmium by weight, even though this restriction was not included in the Commission's proposal.

The Commission was requested to review the exemption in relation to cordless power tools (CPT) and to submit a report to the European Parliament and the Council by 26 September 2010, 'together, if appropriate, with relevant proposals, *with a view to the prohibition of cadmium in (portable) batteries and accumulators*' (Article 4(4) of the Directive, emphasis added). This exemption was included in the Directive at the time of its adoption as there were doubts whether technical substitutes were already available for this application. Article 4(4) does not require the Commission to re-assess exemptions provided for (a) and (b)[3]. It was demonstrated that the availability of viable substitutes is disputed for the emergency lighting applications for safety reasons and no viable substitutes have been identified for the medical equipment applications[4]. The scope of this impact assessment is therefore solely limited to a review of Article 4(3)(c) of the Batteries Directive and will not engage in a debate about the costs and benefits of restricting cadmium in general nor will it analyse impacts of the wider

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1 Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (OJ L 266, 26.9.2006, p. 1).

2 In this Executive Summary the term 'batteries' is used to mean both batteries and accumulators.

3 (a) emergency and alarm systems, including emergency lighting; (b) medical equipment.

policy decision on the general prohibition on using cadmium in portable batteries and accumulators.

The most recent studies prove that appropriate substitutes are commercially available on the market and already widely used for CPT batteries. In fact, the EU market for CPT in 2010 witnessed sales worth €3.2 billion and the share (by value of the tools sold) of nickel-cadmium (NiCd), nickel-metal hydride (NiMH) and lithium-ion (Li-ion) technologies was as follows:

– NiCd CPT: 34%;

– NiMH CPT: 6%;

– Li-ion CPT: 60%.

A natural trend in the sales of these alternative battery technologies used in CPT see the continued replacement of NiCd batteries by existing NiMH and Li-ion technologies. It is estimated that the overall CPT market in the EU will grow by 5% annually between 2010 and 2020. The market share of NiCd portable batteries is expected to decrease by 50% between 2008 and 2020, which leads to a natural annual decrease in NiCd batteries of 5%. It can be expected that the above trends in the overall CPT market will continue.

The question now is whether a removal of the exemption can be justified on the basis of the economic, social and environmental impacts.

2. OBJECTIVES

The general objective is to help achieve the objectives of the Batteries Directive, in particular to Article 4(1) thereof, namely the development and marketing of batteries which contain smaller quantities of dangerous substances or which contain less polluting substances, in particular substitutes for cadmium.

The specific objectives are to:

– Specific Objective 1: minimise environmental impacts from portable batteries intended for use in cordless power tools;

– Specific Objective 2: minimise economic costs for users of CPT, inter alia by ensuring that technically feasible solutions are available.

The operational objectives are to:

– reduce the introduction of cadmium into the EU economy as a result of the use of portable batteries in CPT.

– reduce the emissions of cadmium in the EU associated with the use of portable batteries in CPT.

– reduce the overall environmental impact in the EU associated with the use of portable batteries in CPT.

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[4] Extended Impact Assessment prepared by the Commission services in preparation of the Batteries Directive (2006/66/EC), [COM(2003)723 final], see p. 27 and Annex V.

3. POLICY OPTIONS

The first possible option (the 'baseline option') would consist in keeping the current legislation (Batteries Directive) unchanged. This would essentially mean that cadmium-containing batteries intended for use in CPT would continue to be supplied to consumers and professional users but that these would be progressively replaced by the existing alternatives, namely nickel-metal hydride (NiMH) and lithium-ion (Li-ion) tools and battery packs.

The second option (Option 2: 'Immediate withdrawal of the exemption in 2013') would consist of immediately (in 2013) withdrawing the exemption in force, thus restricting the use of cadmium in portable batteries for CPT to no more than 0,002% by weight.

Compared to Option 1, under Option 2 as of 2013, the cadmium batteries intended to be used in CPT will be replaced by Li-ion and NiMH batteries.

Over the period 2013-2025 and compared to Option 1:

– the total amount of Li-ion battery packs intended for CPT use placed on the EU market will increase from 610.70 million units (Option 1) to 696.79 million units, which means an increase of 14%;

– the total amount of NiMH battery packs intended for CPT use will increase from 157.45 million unites of battery packs (Option 1) to 178.97 million units, which means an increase of 13.6%;

– 107.61 million units of cadmium batteries will no longer be placed on the market, a decrease of 100%.

The third option (Option 3: 'Delayed withdrawal of the exemption in 2016') would consist in withdrawing the exemption in force in 2016 thus restricting the use of cadmium in portable batteries for CPT to no more than 0,002% by weight. This option would allow the battery industry to further adapt the relevant technologies to the new requirements were the current exemption for the use of cadmium-containing batteries in CPT to be withdrawn.

Compared to Option 1, under Option 3 as of 2016, the cadmium batteries intended to be used in CPT will be replaced by Li-ion and NiMH batteries.

Over the period 2013-2025 and compared to Option 1:

– the total amount of Li-ion batteries intended for CPT use placed on the EU market will increase from 610.70 million units (Option 1) to 670.85 million units, which means an increase of 9.8%;

– the total amount of NiMH batteries intended for CPT use will increase from 157.45 million units (Option 1) to 172.49 million units, which means an increase of 9%;

– the total amount of NiCd batteries intended for CPT use will decrease from 107.61 million units (Option 1) to 32.42 million units, which means a decrease of 70%.

4. ASSESSMENT OF IMPACTS

As recommended by the impact assessment guidelines, the assessment has focused only on the additional impacts of the other options compared to the baseline scenario.

Available information sources indicate that the emissions related to NiCd batteries would be small compared to the emissions from oil/coal combustion, iron and steel production or phosphate fertilisers. Thus NiCd batteries would only be responsible for 1.35% of the atmospheric cadmium emissions, and 1.41% of the cadmium emissions into water and 0.65% of the total emissions. NiCd batteries used in the EU in CPT are responsible for 10.5% of all cadmium intentionally introduced into the economy.

The environmental impacts of the three options are assessed on the basis of two approaches. First, on the basis of the amount of cadmium introduced into the EU economy by CPT batteries. This approach is chosen because the main reason the co-legislator decided to ban the use of cadmium in batteries was to limit the amount of cadmium intentionally introduced into the economy. Secondly, environmental impacts are also assessed on the basis of aggregated environmental impacts which are based on the conclusions of the comparative Life-Cycle Assessment (LCA) of the three battery types (NiCd, NiMH, Li-ion) used in CPT. This method was used to allow for a meaningful comparison between the different environmental impacts assessed by the LCA. Each policy option's value for each environmental indicator was normalised to its 'inhabitant equivalent' and an aggregation scheme was used to calculate a value for the total environmental impact of each policy option.

In Option 1, around 30550 tonnes of cadmium will be introduced into the EU economy over the period 2010-2025 via the use of portable NiCd batteries in CPT. The waste CPT batteries which are not collected separately (for recycling) and instead are landfilled could lead to around 945 tonnes of cadmium emissions through leachate to water, potentially giving rise to cancer and non-cancer diseases in around 405 people.

In Option 2, around 8060 tonnes of cadmium will be introduced into the EU economy over the period 2010-2025 via the use of portable NiCd batteries in CPT. The waste CPT batteries which are not collected separately (for recycling) and instead are landfilled could lead to around 300 tonnes of cadmium emissions through leachate to water, potentially giving rise to cancer and non-cancer diseases in around 128 people. This is 68% less than the 'Business as Usual' scenario (Option 1).

In Option 3 around 14830 tonnes of cadmium will be introduced into the EU economy over the period 2010-2025 via the use of portable NiCd batteries in CPT. The waste CPT batteries which are not collected separately (for recycling) and instead are landfilled could lead to around 520 tonnes of Cadmium emissions through leachate to water, potentially giving rise to cancer and non-cancer diseases in around 222 people. This is 45% less than the 'Business as Usual' scenario (Option 1).

The aggregated environmental impacts were assessed using the following environmental indicators: Global Warming Potential (GWP); Photochemical Oxidant Formation Potential (POFP); Terrestrial Acidification Potential (TAP); Abiotic Resource Depletion Potential (ARDP); Particulate Matter Formation Potential (PMFP) and Freshwater Eutrophication Potential (FEP). These environmental indicators were assessed in two scenarios: a 25% and 45% collection target (future collection targets for batteries for 2012 and 2016 as required by the Batteries Directive – scenario 1) and a 10% collection rate, which represent the current collection rate of CPT in the EU as reported under the WEEE Directive (Directive 2002/95/EC on waste electrical and electronic equipment – scenario 2).

The annual environmental impact associated with the use of CPT in the EU in Option 1 is equivalent to between 559831 (scenario 1) and 597896 (scenario 2) of its population,

compared to 530581 (scenario 1) and 552781 (scenario 2) in Option 2**.** Accordingly**,** Option 2 results in a 5% to 8% lower overall environmental impact when compared to Option 1. In Option 3, the aggregated environmental impact is 540460 weighted inhabitant-equivalents (scenario 1) and 566374 weighted inhabitant-equivalents (scenario 2). In Option 3, the annual environmental impact associated with the use of cadmium batteries in CPT is, depending on the collection rate, 3% to 5% lower when compared to Option 1.

Economic impacts were assessed for the following stakeholders: mining companies, raw-material suppliers, battery-cell manufacturers, battery-pack assemblers, CPT manufacturers, retailers, consumers, recyclers and Member States.

For Option 1, no economic impacts could be identified or quantified for most of the stakeholders. The recycling costs/benefits depend on various parameters such as the recycling technology used, types of materials recovered, value of the recovered metals and economies of scale. Currently, the recycling of Li-ion batteries is carried out at a net cost. This is because battery recycling is still in a development phase; and as the technology evolves and economies of scale emerge, the cost of recycling Li-ion batteries is expected to decrease.

For Option 2, it is estimated that over the 2013-2025 period, no major economic impacts would occur for the mining companies, raw-material suppliers or battery-pack assemblers.

Currently there is no company with production facilities in the EU for manufacturing NiCd, Li-ion or NIMH cells for portable batteries intended for the use in CPT. All portable batteries used in CPT are imported to the EU, mainly from Asia. The dominant NiCd batteries manufacturers are located in Japan and the dominant Li-ion batteries manufacturers are located in China. Even though most battery manufacturers produce more than one battery chemistry, Option 2 could shift from Japan to China the dominance of the sector producing batteries for CPT.

Some battery recyclers claimed that Option 2 would lead to increased recycling costs as more Li-ion batteries would become available for recycling, compared to Option 1 (estimated in the range of €13- 20 million for the period 2011-2025).

EPTA (CPT manufacturers) claims that this option will entail one-off technical costs consisting of research and development (R&D), upgrading of production lines and operating expenditures in the range of €40 – 60 million. It is however doubtful whether all these costs should be attributed to Option 2, as even under Option 1 the amount of NiCd batteries used in CPT will decrease by 50% between 2013 and 2025.

Consumers may be affected by the higher manufacturing cost of an alternative CPT battery technology based CPT. Over the period 2013-2025, an average NiMH-battery based CPT will cost €0.8 more, whereas an average Li-ion-battery CPT will cost €2.1 more to the consumer than the average NiCd-battery CPT. Turning to the price of the CPT itself (including two battery packs and a charger) in 2013, according to EPTA, a NiMH-based CPT would then cost €66.90, and a Li-ion-based CPT €76, compared to a NiCd-based CPT which costs €60.80.

For Option 3, it is estimated that over the 2013-2025 period, no major economic impacts would occur for the mining companies, raw-material suppliers or battery-pack assemblers.

As in Option 2, Option 3 could shift from Japan to China the dominance of the sector producing batteries for CPT.

Some battery recyclers claimed that Option 3 would lead to increased recycling costs as more Li-ion batteries would become available for recycling compared to Option 1. These costs would be less than in Option 2 (less than €13 million for the period 2011-2025).

EPTA (CPT manufacturers) claims that this option will entail one-off technical costs consisting of research and development (R&D), upgrading of production lines and operating expenditures in the range of €33 million. It is however doubtful whether all these costs should be attributed to Option 3. Industry was in favour of increasing the recycling rates. It was, however, not considered appropriate to do so as the Batteries Directive requires that all batteries collected should be recycled. In addition, the Directive specifies minimum recycling efficiency levels that the battery recycling processes must meet by September 2011.[5]

Consumers may be affected by the higher manufacturing cost of an alternative CPT battery technology. Over the period 2013-2025, an average NiMH-battery CPT will cost €0.4 more, whereas an average Li-ion-battery CPT will cost €0.9 more to the consumer than the average NiCd-battery CPT. As for the price of the CPT itself (including two battery packs and a charger) in 2016, according to EPTA, a NiMH-based CPT would then cost €64.10, and a Li-ion-based CPT €69.20, compared to a NiCd-based CPT which costs €60.80.

The administrative burden is limited for all policy options and they should not lead to compliance issues. In principle, none of the options has a direct impact on the EU budget.

As regards the social impacts, Option 2 could have slightly negative social impacts, as some stakeholders reported some job losses in NiCd-battery recycling activity. They could be compensated by job gains in NiMH and Li-ion battery recycling activity. Option 3 would have more neutral impacts in the short, medium and long term.

One could conclude from the above that under Option 3, the environmental benefits would be slightly lower than under Option 2 but the costs would be much lower compared to Option 2.

5. COMPARISON OF OPTIONS

The policy options have been assessed against the criteria of effectiveness, efficiency and coherence.

From an effectiveness point of view, Option 2 would seem the most attractive. Indeed, it offers the highest potential level of achievement of Specific Objective 1 in the short term, while Option 3 would be very effective only in respect of Operational Objectives 1 and 2.

From an efficiency point of view, Option 3 would be more efficient than Option 2. The economic cost could be slightly negative for CPT manufacturers, consumers and recyclers at least in the short term, whereas it would be marginal or neutral for other stakeholders.

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[5] The minimum recycling efficiencies specified in the Batteries Directive (Annex III, Part B) are the following: (i) Nickel-cadmium batteries: recycle cadmium as far as technically feasible, and recycle a minimum of 75% of batteries by average weight; (ii) Lead-acid batteries: recycle lead as far as technically feasible, and recycle a minimum of 65% of batteries by average weight; (iii) Other batteries: recycle a minimum of 50% of batteries by average weight.

Options 2 and 3 are coherent with the overarching objectives of EU policy. They are also in line with similar requirements on the prohibition of cadmium use in other Directives such as the End-of-Life Vehicles (ELV) Directive and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive.

Taking into account the political and legal context, one could conclude that while it appears that none of the policy options assessed emerges as a clear winner in terms of environmental benefits, in relative terms Option 3 achieves almost the same level of effectiveness at a higher efficiency and is therefore a good candidate for the preferred option.

6. MONITORING AND EVALUATION

Monitoring implementation if the current exemption for the use of cadmium containing batteries for CPT were to be withdrawn should be relatively straightforward, given that the use of cadmium in batteries in general is already prohibited by the Batteries Directive.

Progress indicators in this context could in particular comprise:

– market trends for additional substitute technologies for NiCd batteries used in CPT;

– trends in new recycling and treatment techniques.

Member States must submit a national implementation report to the Commission every three years as set out in Article 22 of the Batteries Directive. A review of the Batteries Directive will be carried out after the second round (2016) of national implementation reports from Member States. During its evaluation of the reports, the Commission will examine the appropriateness of further risk management measures, minimum collection targets and minimum recycling obligations, and if necessary propose amendments to the Directive. During this review process, data collected for the monitoring indicators can also be assessed to evaluate the outputs and outcomes of the proposed intervention and to assess its implementation process.

Should compliance problems occur, further actions could be undertaken at EU level under the Batteries Directive.