Batteries and accumulators in France
The present report gives an overview of the batteries and accumulators market in France in 2011 based on the data reported through ADEME’s Register of Batteries and accumulators.

In 2001, the French Environmental Agency, known as ADEME, implemented a follow-up of the batteries and accumulators market, creating the Observatory of batteries and accumulators (B&A).

In 2010, ADEME created the National Register of producers of Batteries and Accumulators in the context of the implementation of the order issued on November the 18th, 2009. This is one of the four enforcement orders for the decree 2009-1139 issued on September the 22nd, 2009, concerning batteries and accumulators put on the market and the disposal of waste batteries and accumulators, and which transposes the EU-Directive 2006/66/CE into French law. This Register follows the former Observatory for batteries and accumulators.

This Register aims to record the producers on French territory and to collect the B&A producers and recycling companies’ annual reporting: the regulation indeed requires that all B&A producers and recycling companies report annually on the Register the quantities of batteries and accumulators they put on the market, collect and treat. Based on this data analysis, ADEME issues an annual report allowing both the follow-up of the batteries and accumulators market in France and communication regarding the achievement of the collection and recovery objectives set by EU regulation.

This booklet presents the situation in France in 2011.

Updated data are posted annually at www.ademe.fr
In 2009 the EU-Directive 2006/66/CE was transposed into French law with the decree n°2009-1139 issued on September 22nd, 2009:

The three types of Batteries and Accumulators are defined by the European Directive:

- **Portable batteries and accumulators**: Portable batteries or accumulators are any battery, button cell, battery pack or accumulator that:
  - are sealed; and
  - can be hand carried; and
  - is neither an industrial battery or accumulator nor an automotive battery or accumulator.

- **Automotive batteries or accumulators**: Automotive batteries or accumulators are any battery or accumulator used for automotive starter, lighting or ignition power.

- **Industrial batteries or accumulators**: Industrial batteries or accumulators are any battery or accumulator designed for exclusively industrial or professional uses or used in any type of electric vehicle.

The Directive 2006/66/CE defines two types of objectives:

- **Collection rates objectives for each member state** for portable batteries and accumulators. Those rates should reach 25% in 2012 and 45% in 2016 for used batteries and accumulators.

- **Recycling efficiency targets** calculated thanks to the average weight of batteries and accumulators for each recycling process: lead-acid 65%, nickel-cadmium 75%, other 50%, by September 2011.
## Synthesis of the regulations effective in France in 2011

<table>
<thead>
<tr>
<th>Text</th>
<th>Scope</th>
<th>Content (non exhaustive)</th>
<th>Enforcement date</th>
</tr>
</thead>
</table>
| Decree 2009-1139 | All types of batteries and accumulators | • Maximum mercury and cadmium content for the batteries and accumulators put on the market  
• Labelling of batteries and accumulators  
• Arrangements for the setup of the selective collection and the treatment of batteries and accumulators depending on the types of batteries and accumulators (portable, automotive, industrial) in the context of increased producer responsibility  
• Treatment of batteries and accumulators with the best available techniques and meeting the minimum recycling process efficiencies indicated in the order  
• Creation of a producer Register | September 22nd, 2009 |
| Order of November 9th, 2009, related to the treatment, modified with Order of October 26th, 2011 | All types of batteries and accumulators | • Technical requirements for treatment (meeting the best available technologies), minimum recycling process efficiencies (recycling rate)  
• Order of October 26th, 2011 modified the following points:  
- Update of wastes terminology (modification of articles 1 to 4 of the original Order)  
- Update of required conditions for batteries and accumulators wastes abroad treatment (set in article 15.1 of Directive 2006/66/CE)  
- Update of conditions to take batteries and accumulators wastes exports into account in the compulsory recovery rate calculation (set in article 2 of Directive 2006/66/CE)  
- Ban of landfill or incinerator disposal of automotive and industrial batteries and accumulators wastes, in accordance to article 14 of Directive 2006/66/CE as well as portable batteries and accumulators collected wastes (modification of article 6 of the original Order). | November 9th, 2009  
October 26th, 2011 |
| Order of November 18th, 2009, related to the substances modified with Order of November 21st, 2011 | All types of batteries and accumulators | • Exemptions to the limitation on cadmium content for batteries and accumulators used in:  
- Emergency and alarm systems (notably for emergency lights)  
- Medical equipments  
- Wireless electric tools  
• The modifications (Order of November 21st, 2011) concern the update of the electric tool definition as set in Article 3.16 of Directive 2006/66/CE. | November 18th, 2009  
November 21st, 2011 |
| Order of December 22nd, 2009 on the approval of the organisms | Portable batteries and accumulators | Approval of the collective schemes COREPILE and SCRELEC in order to ensure the removal and the treatment of the waste portable batteries and accumulators collected selectively.  
> Approval specifications for portable batteries and accumulators | December 22nd, 2009 |
| Order of January 7th, 2011 on the approval of the organisms | Portable batteries and accumulators | Approval of the individual system for MOBIVIA Groupe SA, to ensure the removal and treatment of used portable batteries and accumulators.  
> Approval specifications for an individual system for portable batteries and accumulators | January 7th, 2011 |
The Decree n°2012-617, published on May the 2nd 2012

The Decree n°2012-617, published on May the 2nd 2012, concerning batteries, accumulators, electric and electronic equipments waste management has modified the seventh section about batteries and accumulators of the third chapter of the fourth title of the fifth book of the regulatory part of the Environment Code and more specifically, articles :

- R.543-125 (modification and addition of definitions)
- R.543-127 (lift of non compliant batteries and accumulators from the market)
- R.543-128 (addition of minimal selective collection rates of batteries and accumulators waste, set by the Directive 2006/66/CE. This addition, in order to complete the Directive transposition, follows a request from the European Commission.

The decree came into force on May the 5th.

National Register for producers

According to the 2006/66/CE Directive, the batteries and accumulators (B&A) covered by the reporting include all types of batteries and accumulators, regardless of their shape, volume, weight, material composition or use.

The B&A producers must report annually on the quantities of B&A put on the market, collected and treated. Recycling companies only have to report the quantities treated in their plant.

All reporting requirements are detailed below by actor:

### Obligation to report

<table>
<thead>
<tr>
<th>Placing on the market (POM)</th>
<th>Producer</th>
<th>B&amp;A put on the market according to 5 statuses:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Manufacturer: when producing B&amp;A in France</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Introducer: when importing B&amp;A from another EU country</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Importer: when importing B&amp;A from a country located outside the EU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reseller under its own brand: when distributing B&amp;A under its brand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Distant seller: when selling B&amp;A to households from abroad</td>
</tr>
</tbody>
</table>

| Collective scheme | Accredited by the Ministry in order to manage for their members the collection and treatment of waste B&A: can report annual data for its members |

| Collection | Producer | Places B&A on the market according to 5 statuses (refer to the above section) |
| Collectivescheme | Accredited by the Ministry in order to manage for their members the collection and treatment of waste B&A. |

| Treatment | Producer | Places B&A on the market according to 5 statuses (refer to the above section) |
| Collectivescheme | Accredited by the Ministry in order to manage for their members the collection and treatment of waste B&A. |

| Recycling companies | Processes, recovers or dispose of waste B&A |

For the year 2011, **1 533** producers, **2** collective schemes and **13** recycling companies (working on 16 sites), are registered on the B&A Register.
In compliance with the Directive, B&A are divided into 3 types: **portable, automotive and industrial.**

The major players in the sector are detailed in the following paragraphs:

### The producers

**Producer:** any person located on the national territory placing professionally for the first time on the French market, by any selling technique (even from abroad), batteries and accumulators, including those incorporated into electrical and electronic equipments or vehicles.

### The possibilities provided by the law for each type of batteries and accumulators are:

<table>
<thead>
<tr>
<th>Type of batteries and accumulators</th>
<th>Possible choices for the organisations to be set up by the producer to fulfil its obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable</td>
<td>- Join an accredited collective scheme: COREPILE or SCRELEC are currently accredited</td>
</tr>
<tr>
<td></td>
<td>- Have its own individual system approved by the state authorities: one producer (Mobivia Group) is approved</td>
</tr>
<tr>
<td>Automotive</td>
<td>- Join an accredited collective scheme: none to date</td>
</tr>
<tr>
<td></td>
<td>- Have its own individual system approved by the state authorities: no one to date</td>
</tr>
<tr>
<td></td>
<td>- Transfer their obligations to the end-user, except for households</td>
</tr>
<tr>
<td>Industrial</td>
<td>- Ensure directly the treatment of their waste B&amp;A (individually or collectively)</td>
</tr>
<tr>
<td></td>
<td>- Transfer their obligations to the industrial or professional end-user</td>
</tr>
</tbody>
</table>

### The consumers

Consumers play an **important role** as:

- **Consumers and users of batteries and accumulators:** their consumer habits significantly influence market trends. For example, they notably take part in the progressive replacement of alkaline-Leclanché batteries with rechargeable accumulators, by favouring the purchase of devices using such technologies.
- **First collection actors:** they have to make the effort to bring back all of their waste batteries and accumulators (including -when needed- the extraction of the battery and the accumulator from the device) to the nearest collection point (reseller, dumping point or other public places).
The collection actors

Portable B&A’s collective schemes

The two state-accredited collective schemes (COREPILE and SCRELEC) are in charge – on behalf of their members – of the collection and treatment of waste portable B&A. They play a dynamic role in the collection management of household waste batteries and accumulators: they ensure its organisation, the awareness campaigns, the deployment and follow-up of the collection points on national territory as well as B&A’s transportation to recycling plants. They represent almost all of the B&A’s collection.

Companies or state institutions can also set up collection points in the context of their sustainable approach: thus, they ask collective schemes to equip them with collection furnishings and have them proceed with waste removal.

On an operational level, the collective schemes then organize the collection and transportation of used batteries and accumulators to collection centers by using logistics providers. Used batteries and accumulators are finally sent to different sorting and recycling plants, where the different materials will be recovered.

Accredited collective schemes:

- **COREPILE**
  - Accredited for the portable batteries and accumulators

- **SCRELEC**
  - Accredited for the portable batteries and accumulators

Other actors for portable battery and accumulator collection

Batteries and accumulators are taken back by resellers and local authorities:

- **The resellers** (major outlets, specialized stores, traditional stores, smoke shops, garage owners, photo shops, jewellers...) must offer the free take back of waste batteries and accumulators brought back by their customers when they are the same kind than those sold in their shop. This obligation manifests itself in one or several collection points located at the entrance or exit point of the shop;

- **Local authorities** can set up collection devices in their dumps or public places, or by signing a contract with collective schemes.

The actors for automotive battery and accumulator collection

The n°2009-1139 decree plans the approval of one or several collective schemes for automotive B&A in order to allow their producers to fulfil their obligations. To date, no automotive collective scheme is accredited. Indeed, the collection of automotive batteries has been organised for several years through a self-funded circuit in Metropolitan France, thanks to the market value of lead. In the DOM/COM (French overseas administrative departments and communities), however, the industry is not as stable due to the additional costs of cross-border waste transfers and the repatriation to the mainland for processing. One (or more) automotive compliance scheme(s) should be approved by the Ministry in the future to support the sector of automotive batteries and accumulators in the DOM/COM.

The actors for industrial battery and accumulator collection

The 2006/66/CE Directive also imposes an extended producer responsibility for industrial batteries and accumulators: the producers (and not the holders) must manage the end-of-life of the batteries and accumulators they put on the market. Most of the producers (56% of the producers of industrial B&A) have dealt with this individually, by calling in collection private providers or by adding

the collection and disposal of batteries and accumulators to their maintenance operations.

This responsibility can be delegated to the end-user: the holders of industrial batteries and accumulators then manage the collection and treatment, through their own collection devices. This kind of organisation concerns 44% of the industrial B&A reporting.

The particular case of collection in French overseas departments

To date, in the absence of recycling plants in the overseas departments, and considering the European regulatory requirements, the streams of waste batteries and accumulators are repatriated to be treated and recovered in Metropolitan France, raising issues relating to cross-border transportation of waste (costs and administrative procedures in particular). For several years, associations of producers have been established in Reunion Island (ATBR), Guadeloupe (TDA), Martinique (TDA for the accumulators and TPU for the batteries), Guyana (ARDAG) and Mayotte (ATBM), for the management of collection and shipment of used batteries and accumulators to Metropolitan France. These organizations were in charge of reporting to the B&A Observatory for all of its members. With the implementation of the new Register, the producers represented by these organisations can delegate their responsibility and the related reporting to the organisations by signing a delegation proxy.

For the portable B&A, two accredited collective schemes cover the overseas departments and communities: a referral agent is present in each concerned department or community via a paid local intermediary. COREPILE is in charge of Reunion Island, Guadeloupe and Mayotte, while SCRELEC manages Martinique and Guyana.
Batteries and accumulators in France - 2011 Data

In 2011, the treatment of waste batteries and accumulators in France was organised around 19 plants presented on the following map.

Since the previous reporting year, the recycling companies’ highlights are:
- the closing down of the recycling plant Duclos Environnement;
- the launch of a B&A treatment activity of Séché Environnement;
- the activity cessation of the Valdi Feurs plant as a result of a lethal accident.

Location of the pre-treatment and treatment plants for batteries and accumulators in France

Leclanché and alkaline batteries
EURODIEUZE: hydrometallurgic treatment;
VALDI VFE: pyrometallurgic treatment;
PAPREC D3E: sorting, crushing, magnetic separation and metallurgic refining.

Button/stick batteries with mercury
MBM: calibration, magnetic separation, cryogenic pulverization, lamination

Lithium batteries
EURODIEUZE: hydrometallurgic treatment;
VALDI VLP: pyrometallurgic treatment;
RECPYL: treatment in R&D – not used in 2011.
Séché Environnement: incineration with thermal recovery and recycling

Zinc air batteries
VALDI VLP: pyrometallurgic treatment;

Ni-Cd, Ni-MH and Lithium accumulators
SNAM: thermal treatment;
VALDI VLP: pyrometallurgic treatment;
EURODIEUZE: hydrometallurgic treatment
RECPYL: sorting and crushing

Lead accumulators
APSM: transfer;
EPUR: sorting and pre-treatment (crushing);
STCM, METALBLANC: pyrometallurgic treatment;
RECYLEX, GDE: crushing, separation by density and by flocculation.
Market

In 2011, 1 225 million of batteries and accumulators of all kinds were put on the market in France, which represents a slight decrease of 1% compared to 2010 (1 237 million units in 2010).

This represents a total weight of 221 859 tons, that is, a 2% increase compared to 2010 (216 705 tons in 2010).

The increase in tonnage and the slight decrease in number of units on the market is the result of a B&A average weight increase. Indeed, the portable batteries put on the market have decreased by 10 million units whereas automotive accumulators, which are heavier, only decreased by 0.9 million in number of units.

The slight increase in tonnage is due to the effect of the slow economic recovery following the economic crisis that impacted France in 2009 and 2010. However, each type of battery and accumulator is experiencing changes depending on policy measures adopted (e.g. scrapping bonus for car batteries), the specific characteristics of sectors (industrial investments) and vulnerability to economic conditions.

Portable batteries and accumulators

In 2011, 1 211 million portable B&A were put on the market, which represents 32 821 tons (representing a very slight 1 % decrease in number and a 2 % decrease in tonnage, compared to 2010). The iso-perimeter evolution shows the same orders of magnitude, as the decrease is of 2% in number and 2% in tonnage.

Household consumption decreases as a result of the economic gloom (source: Xerfi, April 2012) and mainly impacts batteries put on the market.

The number of members of accredited collective schemes has strongly increased. As a matter of fact, the two collective schemes counted 487 members in 2009, 705 in 2010 and 885 in 2011 (82% increase in two years).

In 2011, 24 203 tons of portable batteries (1 070.0 million units) were put on the market, representing a 2 % decrease compared to 2010. Portable batteries represent 88% of the batteries and accumulators put on the market in France (in number of units).

For several years, portable batteries have been continuously replaced by portable accumulators, mainly because of an increasing amount of electric and electronic devices sold with incorporated accumulators. Replacement of Alkalines and Leclanché batteries by rechargeable accumulators is however slower because accumulators cost up to four times the price of batteries (even if the return on investment is reached after 15 refills, electricity cost being insignificant). Besides, for certain low consumption uses, disposable batteries are relevant (e.g. clocks and remote controls) while accumulators are relevant for devices with high energy needs (e.g. cameras and videogames) (source: “60 millions de consommateurs, Essais comparatifs, 14 piles jetables et 8 chargeurs avec leurs accumulateurs”, January 2012): regarding experts, an accumulator may replace 100 alkaline batteries.

Market of portable B&A (million units)
In 2011, the tonnage of portable accumulators put on the market increased by 4%.

**General trends**

- Slow economic rebound, which impacts all batteries and accumulators types.
- Constant sales growth of game consoles and electronic devices such as MP3 walkmans, digital cameras and personal navigation devices, which includes portable accumulators.

**Trends affecting specific batteries and accumulators types**

- The quantity of Leclanché’s accumulators put on the market decreased (-16 % in tonnage in 2011). This trend has been observed since 2005 and is confirmed by the possible mid-term disappearing of this technology, gradually replaced by Alkaline batteries. This is mainly due to the low lifetime of such batteries. Alkaline Batteries are replaced as well by Ni MH accumulators in devices with high energy consumption.
- Lithium batteries show a high increase, with +22% in units accompanied with a decrease in tonnages, in 2011. Lithium batteries can be button batteries (very light) or battery sticks (heavier). In 2011, amount of button batteries put on the market has increased by 29% while the amount of battery sticks put on the market decreased by 25%.
- Between 2010 and 2011, a 24% increase of the number of zinc-air batteries put on the market is observable, simultaneous with a 4% increase in tonnage. This phenomenon can be explained by a stabilization in battery sales for electric fences along with an increase of sales for button cells (medical devices and hearing aids), resulting in a decrease in the average weight of zinc-air batteries between 2010 and 2011.
- A significant background trend is the progressive substitution of NiCd technology by lithium and NiMH. It is mainly because of the European partial ban of NiCd usage. Experts consider that legislation is heading towards a ban of every portable B&A using Ni Cd technology.
- NiMH batteries put on the market record a 4% increase in tonnages. Experts notice that this kind of accumulators is mainly produced in Asia and that the technology is not industrially mastered in France, since France never industrialized such technology.
- Lithium batteries put on the market increased significantly (4 839 tons in 2011 versus 4 510 in 2010). Consumption trends of mobile electronic products (MP3, digital cameras, GPS, campaign consoles) and electric bicycles contribute to this development. The increase has slowed in 2011 mainly due to natural disasters in Asia (earthquake and tsunami in Japan, water floods in Thailand) : according to experts interviewed for this report, hi-tech products distant sells have grown by 5% which constitutes a slowdown compared to previous years. The decrease of number of units put on the market (while tonnages increased) can be explained by the French market penetration of smartphones (44% in 2011 versus 30% in 2010) whose accumulators are twice heavier than classic cell phones. An increase of these B&A is expected due to smartphones and mobile tablets popularisation.
- The average weight of portable batteries and accumulators placed on the market regularly decreases because of both their miniaturization, and the global WEEE size reduction.
- Experts forecast an increase of Lithium and Alkaline B&A used in home fire alarm systems.

<table>
<thead>
<tr>
<th>Batteries and accumulators in France - 2011 Data</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leclanché</td>
<td>2 763</td>
<td>2 328,7</td>
<td>1 823,2</td>
</tr>
<tr>
<td>Alkalines</td>
<td>20 292,3</td>
<td>22 115,6</td>
<td>21 785,8</td>
</tr>
<tr>
<td>Zinc air</td>
<td>180,7</td>
<td>124,3</td>
<td>129,8</td>
</tr>
<tr>
<td>Lithium Accumulators</td>
<td>3 240,6</td>
<td>4 510,4</td>
<td>4 839,6</td>
</tr>
<tr>
<td>Lithium Batteries</td>
<td>254</td>
<td>411,1</td>
<td>355</td>
</tr>
<tr>
<td>Silver</td>
<td>48,8</td>
<td>46,9</td>
<td>18,2</td>
</tr>
<tr>
<td>Ni Cd</td>
<td>1 071,3</td>
<td>1 228,7</td>
<td>1 132,9</td>
</tr>
<tr>
<td>Ni MH</td>
<td>1 575,6</td>
<td>1 887,6</td>
<td>1 959,2</td>
</tr>
<tr>
<td>Lead</td>
<td>472</td>
<td>683</td>
<td>685,5</td>
</tr>
<tr>
<td>Other</td>
<td>12,4</td>
<td>17,5</td>
<td>2,1</td>
</tr>
</tbody>
</table>
Share of the collective schemes

The two portable collective schemes cover 99% (in tonnage) of all portable batteries and accumulators put on the market. 1% of the tonnages put on the market for 2011 were reported by producers whose collection system was not approved by the Ministry of Environment on the 31/12/2011. In 2012, these producers will either have to have their individual system approved or join a collective scheme.

Automotive accumulators

7.3 million Automotive accumulators were put on the market in France in 2011 (that is, 11% less than in 2010), which represent 119,835 tons (a decrease of 3% compared to 2010).

The lead accumulators represent more than 99% in tonnage of the automotive batteries and accumulators’ market. The remaining 1% seems for the most part to be Ni MH accumulators used for traction and thermal engine start in specific hybrid vehicles and other automotive accumulators such as Calcium accumulators. Lead technology is stable, inexpensive, and becomes a waste economically recoverable at its end of life, which promotes the sustainability of its use for starter batteries. According to experts interviewed for this report, the substitution of Lead accumulators by Lithium accumulators is technically feasible, but would generate an extra cost of 300 € per vehicle.

Market of automotive accumulators (million units)

Market of automotive accumulators (tons)
The 3% decrease in tonnage of starter lead batteries put on the market is consistent with:

- The government's allowance for end-of-life cars which has revitalized car sales until mid-2010 and has had a positive effect on the lead batteries market. In 2011, this allowance was not available leading a decrease of vehicles put on the market;
- The 2011 winter was particularly hot, contrary to the very cold winter in 2010 which had a significant effect since it shortened the life of batteries and therefore increased the sale of spare batteries;

According to experts interviewed for this report, the automotive market has dropped in 2011, especially in the last quarter. The accumulator market has remained stable due to replacement accumulators, which is an indication of an aging vehicle fleet. Furthermore, they note that battery production is increasingly concentrated in Asia, where production is less expensive but quality could be poorer.

Besides, we notice a 39% increase of Ni MH accumulators sold in specific hybrid vehicles. However, this tonnage is low compared to the lead batteries tonnage (123 tons versus 118,987 tons).

A strong decrease in 2012 is forecasted by experts. According to Xerfi Report “Piles, batteries et accumulateurs” (April 2012), the uncertain economic climate has encouraged households and companies to postpone their vehicles fleets renewal. New cars sells should decline by 7% in Western Europe in 2012.

Industrial batteries and accumulators

In 2011, 7.1 million of industrial B&A were placed on the market, representing 69,202 tons (that is, a decrease of 10% in number and an increase of 10% in tonnage compared to 2010). According to industrial B&A experts, evolutions of industrial B&A markets must be analyzed through tonnages data which are more reliable than number of units data. Hence, our analyses rely on tonnages data.

Lead technology is the most used technology due to its low cost. The 15% increase of industrial B&A in tonnages (8,860 tons increase between 2011 and 2010) is a result of the lead B&A increase (8,093 additional tons). This increase is not the result of new producers registered on the B&A Register since the iso-perimeter analysis shows a similar increase, confirming the existence of a market effect. This increase could be an indicator of a market rebound. The 2010 decrease is offset and even exceeded. The increase reflects investments for production equipments, tools and handling vehicles renewal. According to experts interviewed for this report, a slight recovery of civil works has been noticed, accompanied with an increase of lead accumulators (used for handling vehicles) put on the market and an increase of accumulators used in fork lift trucks.

Market of industrial B&A (million units)

<table>
<thead>
<tr>
<th>Year</th>
<th>Alkalines</th>
<th>Lithium Accumulators</th>
<th>Lithium Batteries</th>
<th>Ni Cd</th>
<th>Ni MH</th>
<th>Lead</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6.9</td>
<td>0.6</td>
<td>1.4</td>
<td>1.7</td>
<td>0.2</td>
<td>2.8</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>2010</td>
<td>0.7</td>
<td>0.4</td>
<td>2.0</td>
<td>1.3</td>
<td>0.5</td>
<td>3.0</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>2011</td>
<td>0.8</td>
<td>0.3</td>
<td>1.1</td>
<td>1.4</td>
<td>0.3</td>
<td>3.0</td>
<td>&lt; 0.1</td>
</tr>
</tbody>
</table>

Experts forecast the emergence of heavy goods vehicle using two different accumulators. A starter lead accumulator (automotive accumulator) and a service lead accumulator (industrial accumulator) used for electric needs when the engine is turned off. This could impact lead batteries put on the market in the years to come.

Lithium accumulators put on the market have increased seven fold. The related tonnages are low (750 tons in 2011 versus 107 in 2010) but reflect the emergence of full electric vehicles and the development of energy storage solutions combined with renewable energy installations. This trend should be confirmed in the years to come, especially in Corsica and in the DOM/COM territories where renewable energies have a good development potential.
The 18% increase of Ni MH accumulators put on the market is consistent with the decrease of industrial use of these accumulators offset by the increase of hybrid vehicles sells.

Ni-Cd accumulators’ sales are relatively stable (slight decrease of 2%). According to experts interviewed for this report, this technology should develop in the future.

At last, lithium primary batteries put on the market increased by 16% (536 tons in 2011 versus 453 tons in 2010). According to the experts, this evolution is related to the replacement of mechanical metering systems by electric metering systems used in fluid networks.

According to the Xerfi study “Piles, Batteries et Accumulateurs” (April 2012), industrial B&A market will be supported by the growing aircraft manufacturing sector.

The collected tonnages used for 2011 (tonnages received by the recycling companies and tonnages exported for treatment) are 215 030 tons of waste B&A of all types from France, that is, a decrease of 3.2% for 2011.

The collection of portable B&A shows an increase of 8%. This figure is consistent with the high collection levels maintained by the two collective schemes, a result of the intensified communication efforts made towards resellers, the general public and local authorities.

Collective schemes cover more than 99% of collected B&A tonnage. The awareness raising work performed by ADEME and both collective schemes has enabled to reduce the share of non-conformant producers, from 8.9% on 2009 to 0.16% in 2011.

In France, the collective schemes count more than 50 000 collection points spread across retailers, communities and other holders (companies, collectors, dismantlers...).
Focus on financial aspects of B&A collection

The total amount of financial contributions received by the collective schemes reached 11.3 million Euros in 2011, that is, a 20% increase between 2009 and 2011. The operating costs are 8.5 million Euros and 1.8 million Euros are spent for communication and support to collection actors.

National collection rate for portable batteries and accumulators

The collection rate of portable batteries and accumulators for 2011 is 36.3% a stable figure compared to 2010 (2 percentage points of increase). The objective of reaching 25% in 2012, imposed by the European Directive, is already attained in France for 2011. Nevertheless, efforts are still needed in order to reach the 45% objective set for 2016.

The 2006/66/CE Directive defines a calculated collection rate by taking into account the average of the last three years of sales:

\[
T_{c\,dir} = \frac{3 \times \text{amount collected the year } N}{\text{amount put on the market of the years } (N) + (N-1) + (N-2)}
\]

Evolution of collection rate

Automotive accumulators collection

Automotive accumulators’ collection recorded a 1.5% decrease. According to the experts, on medium term, the automotive sector will face a major change concerning vehicle accumulators. Hybrid and electric vehicle accumulators (considered as industrial accumulators) are very heavy and users won’t be able to replace the accumulator on their own.
The industrial collection decreased by 28% between 2010 and 2011, erasing the increase noticed in 2010. This evolution is explained by the fact that the price of Lead in 2010 was extremely high and encouraged the lead B&A collection actors to reduce inventories. In addition, the life of industrial batteries being between 4 and 20 years (depending on the use), the figure of industrial collection reflects the placing on the market 4 to 20 years ago and not the 2011 market. Also, many of the batteries and accumulators placed on the market in France are incorporated into products ending their life abroad, in particular in trains, airplanes or oil facilities in Asia or in Middle-East.

Electric vehicle accumulator collection has not started yet since the first vehicles were sold two years ago. Besides, depending on the car manufacturer, the electric vehicle purchaser will buy or rent the accumulator. Hence unauthorized dumping should be limited.

However, contrary to lead automotive accumulators, the recycling process of Ni MH and Lithium accumulators is unlikely to be profitable. Indeed, sales of products resulting from the treatment process would not cover the price of the treatment process.

The total amount of treated batteries and accumulators reported in 2011 by the recycling companies in France amounts to 275,023 tons, versus 278,738 tons in 2010 representing a slight decrease of 1%. All in all, 211,010 tons of batteries and accumulators (of which 5% of portable B&A, 89% of automotive B&A and 6% of industrial B&A), representing 77% of the tonnage treated by French recycling companies, come from France.

Moreover, 4385 tons of batteries and accumulators (2322 tons of automotives batteries and 2063 of portables batteries) were exported to be treated by the producers or their collective schemes.

17,397 tons of portable batteries and accumulators were treated by recycling companies in France in 2011, of which 55% were coming from France, whose:

- **14,424 tons of portable batteries** were treated in 2011, compared to **16,310 tons** in 2010, which represents a decrease of almost 12%. The observed decrease is exclusively related to a lower treatment of Leclanché, Alkaline and Zinc-Air batteries, and is primarily due to the closure of the treatment plant of Valdi Feurs in 2011, halving the treated tonnage (about 4,700 tons less). Part of the tonnage was redirected to treatment plants in France, but a little more than 2,000 tons were also exported by the collective schemes to European recyclers (Germany, Belgium and Spain).

- **2,973 tons of portable accumulators** were treated in 2011, compared to **2,927 in 2010**, which represents a slight increase of 2%. In particular, there was a significant increase of treated Lithium accumulators (268 tons in 2011, compared to 70 in 2010). The observed increase is entirely consistent with the increase of the lithium accumulators launched on the market these last few years (use in laptops, smartphones, GPS, tablets, mp3 players...)

The portable industry experts forecast a large amount of batteries and accumulators to treat in the coming years, related to the tonnage stored on the site of the ex-recycling company Citron. Moreover, they estimate that many tonnages contained in WEEE are still not collected, due to the complex process to separate the battery from the WEEE (some equipment need to be destroyed to catch the battery).
Treated portable batteries and accumulators reported by the recycling companies in 2011 (tons)

**PORTABLE BATTERIES AND ACCUMULATORS**

<table>
<thead>
<tr>
<th>Stocks variation (Initial - final)</th>
<th>Button Batteries</th>
<th>Alkalines, Leclanché and Zinc Air batteries</th>
<th>Lithium Batteries</th>
<th>Other batteries</th>
<th>Ni-Cd Accumulators</th>
<th>Ni-MH Accumulators</th>
<th>Lithium Accumulators</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-76</td>
<td>-15</td>
<td>-255</td>
<td>28</td>
<td>-135</td>
<td>-71</td>
<td>-522</td>
<td></td>
</tr>
<tr>
<td>Tonnages received from France</td>
<td>18</td>
<td>8 655</td>
<td>160</td>
<td>255</td>
<td>465</td>
<td>149</td>
<td>220</td>
<td>9 922</td>
</tr>
<tr>
<td>Tonnages received from abroad</td>
<td>0</td>
<td>5 656</td>
<td>25</td>
<td>0</td>
<td>1 826</td>
<td>371</td>
<td>119</td>
<td>7 997</td>
</tr>
<tr>
<td>Recycled (sum)</td>
<td>20</td>
<td>14 235</td>
<td>170</td>
<td>-</td>
<td>2 319</td>
<td>385</td>
<td>268</td>
<td>17 397</td>
</tr>
<tr>
<td>Share of tonnages received from France</td>
<td>100 %</td>
<td>60 %</td>
<td>86 %</td>
<td>100 %</td>
<td>20 %</td>
<td>29 %</td>
<td>65 %</td>
<td>55 %</td>
</tr>
<tr>
<td>Exported tonnages for recycling</td>
<td>0</td>
<td>2 016</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>2 063</td>
</tr>
</tbody>
</table>

Automotive accumulators reported by recycling companies are exclusively lead accumulators (for vehicle start-up). According to the experts, the amount of lead batteries exported to be treated has decreased this year, due to the increase of the transportation prices, making this practice less profitable.

Recycling companies reported that they treated 240 718 tons of lead accumulators in 2011 (of which 78 % come from France) versus 239 057 tons in 2010, representing a very slight increase of 1%.

Accumulateurs AUTOMOBILES

Quantities of automotive batteries and accumulators treated in France (collected in France and abroad)

**AUTOMOTIVE ACCUMULATORS**

<table>
<thead>
<tr>
<th>Stocks variation (initial-final)</th>
<th>Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>425</td>
<td></td>
</tr>
<tr>
<td>Tonnages received from France</td>
<td>188 065</td>
</tr>
<tr>
<td>Tonnages received from abroad</td>
<td>52 227</td>
</tr>
<tr>
<td>Recycled (sum)</td>
<td>240 717</td>
</tr>
<tr>
<td>Share of tonnages received from France</td>
<td>78 %</td>
</tr>
<tr>
<td>Exported tonnages for recycling</td>
<td>2 322</td>
</tr>
</tbody>
</table>

Batteries and accumulators in France - 2011 Data
The industrial batteries and accumulators include the Ni-Cd, Ni-MH and Lead technologies.

The recycling companies reported that they treated 16,909 tons of industrial batteries and accumulators in 2011 (of which 77% come from France) versus 20,443 tons in 2010, representing a 17% increase, erasing the sharp increase of the last year. Regarding lithium accumulators coming from electrical vehicles, the first tonnages are expected in 5 or 6 years. For the time being, the recycling companies don’t have the capacity to treat such tonnages, but the treatment processes of electrical vehicles batteries are under development.

### Quantities of industrial batteries and accumulators treated in France (collected in France and abroad)

![Bar chart showing quantities of industrial batteries and accumulators treated in France from 2009 to 2011]

#### Treated industrial batteries and accumulators reported by the recycling companies in 2011 (tons)

<table>
<thead>
<tr>
<th>IN TONS</th>
<th>INDUSTRIAL ACCUMULATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead</td>
</tr>
<tr>
<td>Stocks variation (Initial-final)</td>
<td>709</td>
</tr>
<tr>
<td>Tonnages received from France</td>
<td>12,697</td>
</tr>
<tr>
<td>Tonnages received from abroad</td>
<td>1,686</td>
</tr>
<tr>
<td>Recycled (sum)</td>
<td>15,092</td>
</tr>
<tr>
<td>Share of tonnages received from France</td>
<td>88%</td>
</tr>
</tbody>
</table>

### Recycling indicators

The Directive 2006/66/CE relating to batteries and accumulators and to battery and accumulator waste sets the following minimum recycling efficiencies rates:

- **65%** of the average weight of lead-acid batteries and accumulators has to be recycled, which includes the recycling of the lead content as technically thorough as possible at an economically acceptable cost.
- **75%** of the average weight of nickel-cadmium batteries and accumulators has to be recycled, which includes the recycling of the cadmium content as technically thorough as possible at an economically acceptable cost.
- **50%** of the average weight of the other waste of batteries and accumulators has to be recycled.

### Destination of by-products from the treatment of batteries and accumulators per type of B&A

<table>
<thead>
<tr>
<th></th>
<th>Total treated (tons)</th>
<th>Recycled by products</th>
<th>Destroyed by products</th>
<th>By-products eliminated with energy recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable</td>
<td>17,937</td>
<td>14,913</td>
<td>369</td>
<td>1,498</td>
</tr>
<tr>
<td>Automotive</td>
<td>240,718</td>
<td>199,997</td>
<td>13,361</td>
<td>0</td>
</tr>
<tr>
<td>Industrial</td>
<td>16,909</td>
<td>13,904</td>
<td>1,195</td>
<td>4</td>
</tr>
</tbody>
</table>

The difference between the treated tonnages and the by-products from the treatment is due to the loss of material during the treatment process.

**Material recovery** is the main recovery process for batteries and accumulators: it roughly represents 93.3% of the reported tonnage going through the treatment process.

**Energy recovery** mainly concerns miscellaneous plastic parts and a portion of crushing waste, that is to say less than 0.6% of the reported tonnage going through the treatment process. Other treated tonnage (6.1%) are **eliminated without recovery** (landfill, notably for metal waste, burning without energy recovery for crushing wastes that cannot be recovered, physicochemical treatment of the electrolyte).
Outlook

Highlights

Portable batteries and accumulators

Regarding portable batteries and accumulators, there was a slight decrease in the quantity of batteries (-3%) compared to an increase of 4% for accumulators placed on the market in 2011. These variations are consistent with the progressive replacement of disposable batteries by accumulators as well as the telephone, laptop, and small electronic equipment market boom using lithium batteries.

As a consequence of the 2006/66/CE Directive, that bans placing on the market cadmium accumulators since 2010, NiCd accumulators are being progressively replaced by NiMH technology.

For two years, the number of members to the collective schemes COREPILE and SCRELEC has experienced a strong growth: 487 members in 2009, 705 in 2010 and 885 in 2011 (increase of 82% in two years). Thus, the objective of achieving a collection rate of 36% in 2011 has been reached.

Good collection levels are maintained by the collective schemes, as a result of their awareness campaigns targeting the general public and the development of their collection points on French territory and overseas departments for several years.

Automotive accumulators

The tonnage of the automotive batteries industry put on the market has slightly decreased in 2011 (-3%). This decrease is compliant with the crisis period in the automotive industry, but can also be explained by:

- The absence of government’s allowance for end-of-life cars in 2011. It had boosted car sales until mid-2010 and had had a positive impact on the number of lead batteries put on the market.

- The winter in 2011 was very mild compared to 2010. The particularly cold winter in 2010 had contributed to a quicker life ending of the batteries leading to an increased turnover, which wasn’t the case in 2011.

Furthermore, this slight decrease is confirmed by the analysis at constant scope that shows a same order of variation (-6% between 2010 and 2011). Thus, while in 2009 the increase of batteries and accumulators placed on the market was due to a significant improvement in reported data comprehensiveness, the evolution noted in 2011 showed the reality of the market.

Lead accumulator treatment and collection performance is stable (slight increase of 1%) and maintains a high level of efficiency (according to the experts) notably thanks to the lead market value and the presence of numerous recycling companies on French territory.
Industrial batteries and accumulators

The industrial battery and accumulator market has recorded a significant increase in 2011 (+15% in tonnage). This phenomenon can be mainly explained by an incipient end of the crisis and a revival of the activity. In particular:

- A substantial increase of lead accumulators put on the market, used in handling equipment, forklifts, etc. which can illustrate the recovery of investments oriented to the renewal of production and construction tools.
- A significant increase of lithium accumulators used in electrical vehicles placed on the market. The quantity placed on the market of this accumulators is still marginal (751 tons) but will keep on growing strongly in the coming years, according to the experts.

Portable batteries and accumulators

Regarding portable batteries and accumulators, the disappearance of Leclanché technology should be confirmed in the coming years. In general, the replacement of batteries and accumulators is an underlying trend which will be maintained. An accumulator can sometimes replace tens of batteries, thus batteries and accumulators put on the market should decrease in number and tonnage.

Lithium accumulators used in electronic devices (cameras, telephones, laptops, GPS, portable video games, MP3 players, tablets...) placed on the market will continue to increase in number. The miniaturisation of these accumulators will limit the increase of the tonnage.

The placing on the market of Zinc air batteries will grow in number because they are used in miniaturised hearing aids increasingly widespread, which should help decreasing the average weight of this kind of B&A.

The collection of portable batteries and accumulators should continue to grow, due to continued efforts of collective schemes. Reflections could be undertaken to support the sector in their performance research, by organising a systematic delivery of portable batteries and accumulators collected by the certified collective schemes of the WEEE sector or by dismantlers to the collective schemes.

Automotive accumulators

Regarding the automotive B&A sector, the coverage of the reporting to the Register should not be strengthened as no collective scheme for automotive batteries exists in 2012. Reflections could be undertaken in order to increase the reliability of the data in the register. They could lead to the creation of one or several collective schemes certified for automotive batteries and accumulators, or to a means of information feedback from the operators to an instance of performance monitoring and financial health of the sector financed by the producers.

Industrial batteries and accumulators

The tonnage of industrial batteries and accumulators put on the market depend heavily on the economic context. After two years of increases, the turnover of battery and accumulator producers should decrease in 2012, with the economic downturn (pressure on the purchasing power of households, purchasing postponement...). (Source: Xerfi Study, April 2012). However, the development of electrical vehicles (Lithium-ion battery) and hybrid vehicles (NiMH battery) suggests a strong increase of products placed on the market.

Regarding the industrial sector, which includes household waste (battery equipping electrical vehicles) and professional waste, no structure certified by the state is planned in the regulation. Thus, the difficulties found on the reliability of the automotive batteries and accumulators’ data occur and lead to the same reflexions to ultimately creating an instance of performance monitoring and financial health of the industrial sector.
ABOUT ADEME

The French Environment and Energy Management Agency (ADEME) is a public agency under the joint authority of the Ministry of Ecology, Sustainable Development and Energy, and the Ministry for Higher Education and Research. The agency is active in the implementation of public policy in the areas of the environment, energy and sustainable development. ADEME provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work the agency helps finance projects, from research to implementation, in the areas of waste management, soil conservation, energy efficiency and renewable energy, air quality and noise abatement.

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