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Market for lead (Pb) batteries in Europe—current situation and prospects

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Abstract

Lead–acid batteries are often termed as mature technical products serving stable, commodity markets, and are hence seen as less exciting or interesting than investing in advanced battery couples or exotic advanced applications. But lead–acid batteries have also attracted some major investors over the last few years with big plans and exceptions.

The markets for lead–acid batteries in Europe, as for much of the rest of the world, have not been stable in recent years, not in demand trends, company structures, or even application based preferences for variations in lead–acid battery technologies.

Multiple factor are expected to contribute to long term growth of lead based batteries. It appears a bumpy ride for some time ahead, and surely some technical approaches and/or developments will help shape the growth curve for lead–acid batteries.

We will assess the prospects for growth in Europe for lead–acid batteries over the next few years across the major sectors of starting, motive power, back-up power and speciality batteries.

Following are some insights on the challenges and opportunities in Europe for the various markets using lead based designs for energy storage.

Keywords: Market for lead (Pb) batteries; Energy storage; Growth

1. Euro area economies

For the mid-term, European economies look to remain weak. After a solid 2000 with 3.5% growth in GDP, the second half of 2001 slowed considerably bringing full year growth down to 1.5% last year.

As of early summer 2002, economists were still forecasting 1.3% growth for 2002, buoyed by a strong fourth quarter of 2.5% or more. As of September these GDP growth forecasts are now down to 1% or so with a possible recovery delayed into 2003 (Fig. 1).

Unemployment and capital spending are likely to remain quite painful for many people and companies against this flat economic background. In addition, many companies are still adjusting to the realities of market convergence brought on by the €, and the concurrent de-regulation of some sectors from Brussels.

In addition to weaker European demand, there is further adverse pressure from less than expected US demand for global products, and the partial recovery of the € toward parity with the US$. The higher € will make exports a little more difficult, and facilitate more imports, displacing some local production and employment.

2. Euro value

The € and pound sterling declined over 25% against the US$ through early 2002. The € was launched January 1999 and had an average value of 1.16 per USD in its first month. After declines through the first 3 years, things started to change in March 2002. From a low in March 2002, the € has recovered over 15% in 5 months, with many forecasting further € strength considering US economic and political issues (Fig. 2).

Sterling, though many would argue it is relatively high (or higher than suitable for possible entry to the €), has moved broadly consistent with the € since early 1999.

Though short term, the stronger € and sterling helps with the lower preferred inflation rates, inevitably this must moderate the growth rate of Western European exporters from Germany, France, UK, etc.

3. Global telecom carrier Capex

Before focusing on back-up power battery demand, it helps to offer the perspective on overall investment and spending trends for telecom operators. Along with some insight by sector, this will help us better understand the drivers to the battery demand for telecom, which remains the largest application for back-up power batteries. Capital spending by

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Euro Area Economics

		2000	2001	2002E	Q4.02E	2003E
GDP GROWTH	%	3.5	1.5	1.3	2.5	3.1
Machinery + Equipment Investment Growth	%	7.8	-0.2	-1.0	6.1	5.8
Unemployment	%	8.5	8.1	8.3	8.2	7.8

- Slower overall 2002, with a big 4th quarter pick-up forecast ??
- Dramatic Investment Changes : Machinery, Telecom, IT, Forklifts, etc.
- What is the Impact on Europe Exports from a softer US economy and currency ?

Source : Morgan Stanley Research & EuroStat

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Fig. 1.

Global Telecom Carrier CAPEX

$ Billions	2000	2000 % to Total	2001	2002E	2003E	2003 % to Total
N America	$ 118.6	46%	$ 107.9	$ 77.9	$ 75.5	39%
Europe	52.8	21%	48.6	45.5	46.0	24%
Asia	65.5	25%	67.4	59.5	54.8	29%
Row (w/ Latin America)	21.4	8%	22.5	16.3	15.8	8%
TOTAL	**$ 258.3**	**100%**	**$ 246.4** - 5%	**$ 199.1** - 19%	**$ 192.1** - 4%	**100%**

- The bubble of 2000/2001 spending (esp. NA) is behind us
- Europe spending (except 3G licenses) rose and fell less
- Spending projected lower for 2003 vs 2002

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Fig. 3.

telecom carriers varied dramatically year to year from 2000 through an estimated 2003.

All producers participated in the dramatic ramp-up in telecommunication spending in 2000 and 2001, spurred by rosy scenarios for internet and other traffic. This was most visible in North America where their share of total global spending reached over 45% of the total world-wide for 2000, which in perfect hindsight is now viewed as a bubble in investment, which is now in the past (Fig. 3).

However, it has left us all with some bankruptcies, more unemployed and excess capacity in many sectors, and only stretched balance sheets for the lucky survivors.

European capital spending on equipment did not rise or fall as much as North America spending, however, investments in third generation licenses certainly consumed as much cash. Total European purchases of 3G licenses are estimated at about € 115 billion, of which about half has since been written to zero. Though predictably there is less excess European capacity as equipment investments were more balanced, the impact on carriers' debt was equally as severe as in the US, with partial state ownership alone staving off any comparable bankruptcies to these seen in the US.

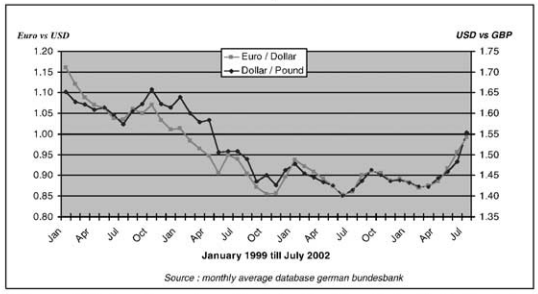
Total future carrier capital spending for 2003 by carriers is forecast broadly flat.

4. Telecom battery spending/Europe

In the case of battery spending, it is better to highlight the direction and trends of demand for each sector. Due to lower traffic, debt imposed restraint, etc. demand from the major fixed or wireline sector is expected to decline further. Cable operators' expectations and strategies have been dramatically altered by restructuring, limited new funding (so far), and lower adoption rates for high speed multiple application services (Fig. 4).

Wireless spending on 2.0 and 2.5G or higher speed transmission based systems have also been volatile, but broadly the investments in higher capacity in Central Europe along with competing networks in the West have provided some stability in both 2002 and forecast for 2003. There are now lower and deferred expectations for 3G network investments.

€ vs $ vs £



- Many of Western Europe's major industries (also Industrial batteries) are net exporters.
- Sustained « Recovery » of the Euro will impact GDP, Inflation (Material costs) and competitive pressures.

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Fig. 2.

Telecom Battery Spending/Europe…

what we hear from customers

	2002	2003	Comment
NEW + UPGRADES			
Wireline	↘	↘	Excess capacity and traffic decline
Cable	↘	→	Uncertainty in Funding & Strategy
Wireless : 2.0/2.5 G	→	↗	Smarter Adaptation
3 G	Slow start	↗	Conversion begins, new systems upgradeable
REPLACEMENT	↘	→	Network Quality is important
TELECOM TOTAL	**- 15 %**	**Flat to 5%**	**Another Tough Year**

(Last two month indications are lower)

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Fig. 4.

The initial rollouts in 2002 and 2003 will help shape the scale of these network investments in 2–5 years.

"Replacement" spending will continue to be restrained by debt-squeezed capital and maintenance budgets, however, network quality is one differentiator in the crowded service market, and some initial wireless rollouts are coming to their normal upgrade cycle.

Overall, 2003 is forecast to be another tough year for telecom back-up power batteries with no growth or possibly modest recovery.

5. Reserve power—encouraging and challenging trends

There are some encouraging developments, however, for back-up power batteries (Fig. 5).

1. Customers are again testing not only for initial discharge, but for performance over credible life expectations. In the supply-strained recent past, nearly anyone from anywhere could quickly "qualify" into important applications. The industry is often supplying critical applications (be it in business, medical, etc.), and there is a return to a balanced focus on reliability.
2. Many new applications and the transmission speeds are calling for more energy, which simply means bigger batteries in back-up. The trend to shared power structures may partially offset this.
3. Leading company engineers are striving to optimise their systems and batteries to unique region and or node applications and their global supply chains. They are considering cycling performance, weight, standlife, etc.

The challenge of the tough, lower markets for customers means their expectations for all criteria have increased. It is a requirement today to respond faster and virtually anywhere in the world with high reliability in product and service.

It is worth noting that the most recent market trends coming out of the summer (even holiday) adjusted in Europe, seem to be yet lower.

Reserve Power
Encouraging and ChallengingTrends

ISSUES	BACKGROUND/DETAILS
➢ Customers are again testing for performance and quality	• In 2000, anyone with VRLA on plastic could supply
➢ New applications/transmission call for more Energy. Also shared power structures.	• UPGRADES and 3G often means bigger batteries
➢ Engineers are niche specifying for best «solutions»	• Higher cycling demand • Lighter products for installation • Better standlife for supply chains
➢ Tough markets means higher expectations	• Better cost supply chains worldwide • Very short response times

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Fig. 5.

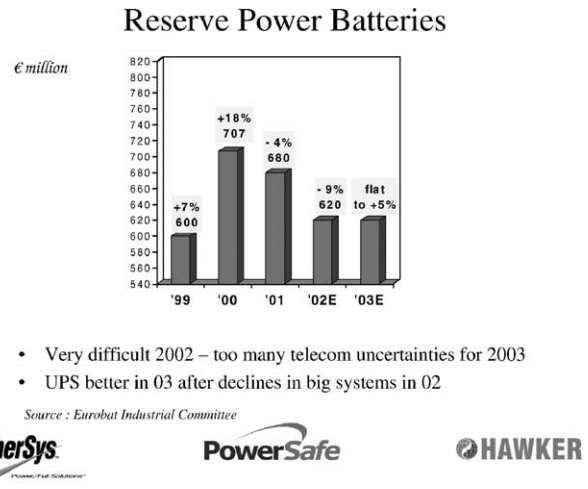

Fig. 6.

6. Reserve power batteries

Battery demand for back-up or reserve power applications jumped about 18% to over 700 million € in 2000 and continued strong in early 2001 before falling hard in the second half of 2001 (Fig. 6).

For 2002, the industry in Europe is experiencing another major reduction in demand of 8–10%, with an expectation of some stability in 2003 at levels close to 1999 levels of just over 600 million € with a little support from better UPS sales. Some dedicated factories will remain under-utilized or be closed, with the added pressure of a recovering €.

7. Motive power batteries

Demand is also weak for material handling through early fall, 2002. After five solid years of demand including high growth in 2000 and early 2001, demand for motive power cells slowed appreciably last fall 2001, ending with about 8 million cells in total demand in Europe. Note 2 V cells are configured into 24 –80 V batteries as installed in electric powered trucks (Fig. 7).

Demand for cells for new trucks and replacement batteries are forecast to decline about 8% in 2002 as capital spending cutbacks, and the return of extra leased trucks forced cutbacks by all truck and battery makers.

The forecast for 2003 (made by the Eurobat Industrial Committee in June 2002) was for a recovery in 2003 of 5% back to year 2000 levels. Given slower economic development than expected even 2 months ago, these forecasts may prove optimistic. It is worth noting that North America truck and battery shipments have endured back to back years of declines in demand for this capital sensitive industry.

A couple of bright spots have to be mentioned: first, retail or consumer based applications are reasonably steady

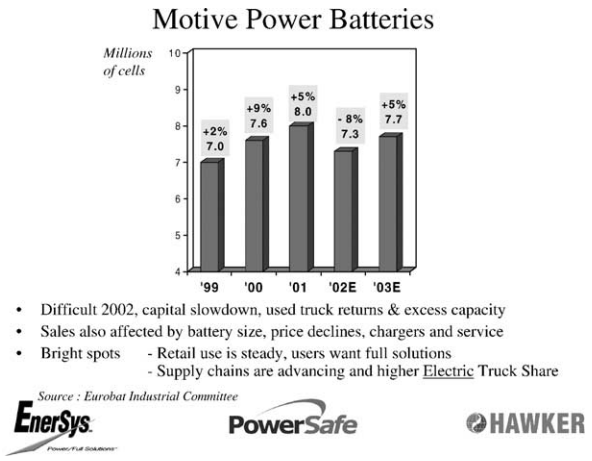

Fig. 7.

for supply into retailers and beverage companies. Customers are also preferring real and full solutions from motive power products and services—that is sealed (or VRLA types to be precise) batteries that perform consistently, really smart chargers, and battery management systems. As industries' supply chains keep improving, they may have less inventory, but a lot of it seems to be moving nearly all the time, so sometimes even trucks are needed with less inventory. Also the evolution to electric forklift trucks keeps progressing modestly each year as AC drive technology in electric trucks offer greater efficiency and less maintenance, and the environmental constraints on exhaust from IC engine trucks continues.

8. Starter batteries

The largest part of the starter battery market looks quite stable compared to all other sectors, with average annual growth in the 1.5% per year range, to about 41 million batteries today in Europe (Fig. 8).

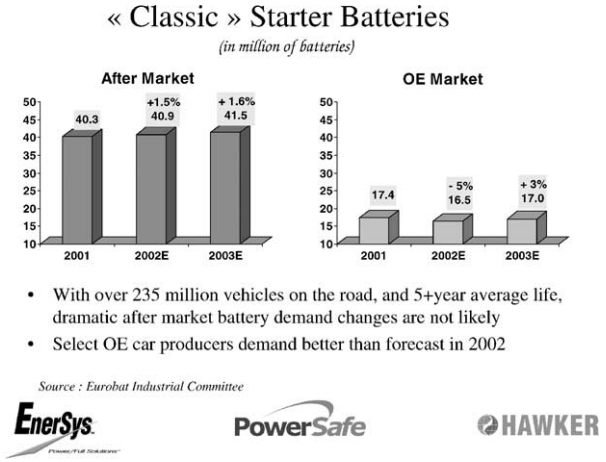

Fig. 8.

With over 235 million vehicles on the road, and a weighted average life of some 5.1 years (according to studies by the Eurobat Starter Battery Committee), and the fact that the purchase is not discretionary, this part of the forecast a little bit easier.

New vehicle battery purchases were forecast to decline some 5% for 2002 to 16.5 million batteries for Europe, though the variation in producers is more pronounced ranging from BMW to FIAT this year due to individual country demand and position, and new model popularity.

9. Advance vehicle batteries

These are segregated into four categories for lead based batteries.

The "market" has thus far determined the pure EV cars are not viable vehicles, and Ford's latest cutback on its THINK project in Norway is one more signal of limited pure EV car appeal and prospect (Fig. 9).

1. A number of "demonstration" commercial EV bus and van fleets continue the generally modest development in system design and constraint of fixed routes and timetables and shifts, and with the appeal of reduced in-city emissions and pollution. Such applications continue to be a prospective good fit and market for lead based designs. Weight and range specifications of such applications are achievable, and cost, recyclability, life and power are appealing.
2. Japanese makers have successfully produced and launched hybrid vehicles, generally with nickel-metal hydride batteries assisting the small IC engines. Projects of the ALABC and industry leaders are targeting this application for lead based design. It appears likely that hybrids will mature into a huge application with the revenue and income flowing to the best value package. Cost and recycling issues are very important and will influence the technology preferred.

Advanced Vehicle Batteries (Pb)

Segments	Demand Today	Prospects for Pb
Commercial EV Vans & Buses	Demonstration Fleets	? +
Hybrid cars (Toyota, Honda, etc) with high voltage structures	NIMH – good today/future question mark Pb – no fleet applications	? ++
Niche Replacement and OE «solutions» - High Power VRLA	Continues to grow	? +++
42v platforms	Test platforms OK Major roll-outs delayed	? ++++ but later

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Fig. 9.

3. A number of high-end niche batteries with premium starting power and other characteristics have progressed across over more than 10 years, including the brands Optima, Orbital, Odyssey and others. They are solving unique application issues, and may continue to grow in sales.
4. The 42 V development just keeps on going, and unfortunately getting slightly further delayed due to system and costs issues. It will be an important market with a huge chance for lead based batteries, but the engineers have to keep driving.

10. Other sectors

Four niche sectors are likely to provide higher than average growth for the mid-term in Europe as compared with other industrial and vehicle based markets (Fig. 10).

After a difficult 2001 and 2002, the markets for people movers, lifts and cleaning equipment are likely to see 3% plus growth from a roughly 40 million base today.

Consumer cycling applications, representing an estimated 30 million € in 2002, should continue to grow based primarily on growth in wheelchair applications.

Battery demand for defence applications for vehicles and submarines is now forecast to increase after declines through the 1900s.

Solar applications, especially for Southern Europe, Middle East and Africa may continue to grow at 5% plus annual rates.

11. Industry structure

What is the impact of the continuing change in industry structure on prospects for industry development and growth (Fig. 11)?

To put the change in perspective, even after the consolidation and changes in the 1990s, today some 75% of the current European lead battery industry has just completed or is going through ownership or major capital structure changes, as companies re-position themselves to service or support global markets and customers in a suitable manner.

For the moment, the European-only rankings have not changed, but the global ranking have shifted notably as a result of the recently announced changes. And surely there will be more changes, particularly in Europe. These changes—be they sales, mergers, de-mergers, financial reorganizations, or whatever—all have significant impact on the focus of companies and their personnel, regardless what the press releases claim.

It is essential that the industry's leaders keep the right balance for its customers, who are going through challenging demand changes, for its suppliers, who are "challenged" with each change, and, of course, for its employees. All companies must fight against the bias to focus inside, in order to improve service, product development, environmental "solutions" and, of course, suitable returns so that all are satisfied and paid.

12. Rechargeable (Pb) battery market

In conclusion, the following remarks represents a very brief 20 year perspective and a concurrent challenge from a perspective beyond the European borders or the typical lead based applications (Fig. 12).

Estimated demand for rechargeable lead batteries in 2002 was about US$ 11 billion world-wide, broadly segregated into SLI or vehicle based markets, and industrial and other.

The key messages are simple—over the last 10 years the market for rechargeable lead batteries has expanded reasonably well, in spite of the all the "mature" technology talk generally surrounding the lead–acid batteries, probably at a CAG rate of some 2.5%, led more recently by Industrial and Niche consumer applications. Yet, through this period,

Other Sectors

APPLICATIONS	TRENDS
➢ Industrial Cycling for cleaning machine, lifts, people movers	> €40 m > 3% mid-term growth
➢ Consumer Cycling wheelchair, golf, toy, etc	> €30 m > 4% mid-term growth
➢ Defense Submarine, vehicle & aircraft	Now increasing after 90's declines
➢ Solar for Southern Europe & Africa	> 5% growth

All areas use mix of flooded & sealed (VRLA) solutions (tubular & flat plate)

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Fig. 10.

Industry Structure

Starter batteries	Reserve Power	Motive Power
EUROPE • EXIDE • VARTA / JCI	• ENERSYS/HAWKER • EXIDE	•EXIDE •ENERSYS/HAWKER
GLOBAL • JCI • EXIDE • DELPHI	• ENERSYS • EXIDE • C&D	• ENERSYS • EXIDE • EAST PENN

- 75% of the European Lead Batteries Industry has just completed/or is going through capital structure and/or ownership changes
- Additional changes are probable
- It is essential for customers, suppliers and industry growth prospects that the right balance on service, R&D, environment and returns are maintained.

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Fig. 11.

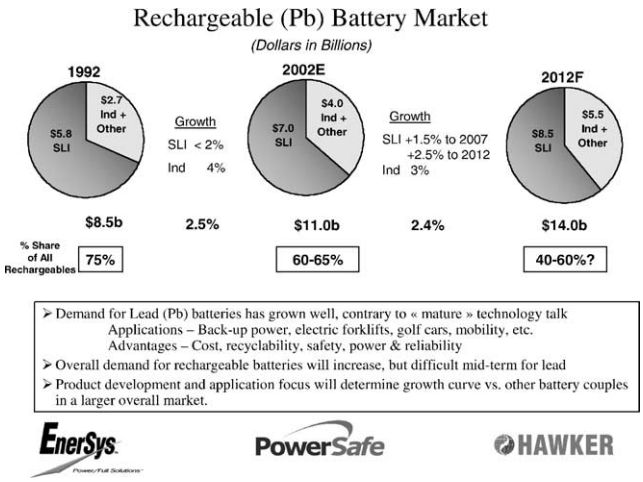

Fig. 12.

back 10 years, the market for all rechargeable batteries has grown faster for all the applications that are now taken for granted, decreasing by default the overall "share" of lead based technologies to 60–65% of total revenue for rechargeable battery applications, and increasing the resources and alternative battery couple or solution developments.

What about the next 10 years to 2012? For the short to mid-term, for reasons already described it will be a very difficult demand market in Europe, especially for industrial batteries. Yet across the next 10 years, with the "bubble of telecom" and the economic weakness of the early 2000s in the past, it is possible with the right sustained products and application/system investment that a range of potential applications could even exceed the good historical industry growth rates. This is not dreamy, or idealistic, but rather the effective exploitation of a technology that is inherently good cost, easy to recycle, and with a number of unique performance attributes. This industry's customers and potential customers want solutions that are better, cheaper, recyclable and reliable.

It will, however, important and sustained product and application/system investments to assure that companies take this fair share of these growing markets.