Journal of Power Sources, 42 (1993) 283–290

Towards the year 2000 – the prospects for lead/acid batteries in Europe

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Abstract

A review is presented of lead/acid battery production in the countries of Western and Eastern Europe (except CIS), based on statistics for lead consumption in lead/acid batteries. The breakdown between automotive and industrial batteries is also detailed. The foreseeable development of the various markets for lead/acid batteries towards the year 2000 is described. The analysis uses a broad range of published forecasts. Emphasis is given to the accuracy of the forecasts, as it is common for the latter to be based on forecasts for other industrial activities and to rely heavily on assumptions that are made about the evolution of battery service life. The range of forecasts obtained for each battery market is discussed, especially in Eastern Europe, where many different scenarios are still possible. It is concluded that quantitative growth of the lead/acid battery market should be higher in Western than in Eastern Europe, and higher for industrial than for automotive batteries.

Review of lead/acid battery production in Europe

It is possible to describe lead/acid battery production in terms of the quantity of lead used rather than in the number of units that are manufactured or the cash value of these units. For Europe as a whole, this corresponds to a lead consumption of about 1 million tons; the data for each country are detailed in Fig. 1 (note, data for Eastern and Western Germany are combined as 'Germany').

It can be concluded that the production of lead/acid batteries is concentrated in a few countries. For example, the combined activities in Germany, France, Italy, UK and Spain represent 70% of the total European production. Battery manufacture is slightly less developed in Eastern Europe than in Western Europe, when compared with the population of each region. The population of Eastern Europe is 120 million, i.e., one-quarter the 500 million inhabitants of Europe. By comparison, the battery production of Eastern Europe is less than 20% the total output of Europe (measured via the lead used in batteries).

The breakdown of battery production in terms of the main types of batteries can also be determined by measuring the consumption of lead, but not with a very high degree of accuracy. Figure 2 presents the results for Western and Eastern Europe. The following conclusions can be reached:

(i) The production of automotive (SLI) batteries for original equipment in Western Europe exceeds the total battery production of Eastern Europe. This reflects the huge difference in the size of the automotive industry in the two regions.

(ii) The remaining production of automotive batteries is not in proportion with the respective vehicle population of each region. For example, 20 million vehicles are

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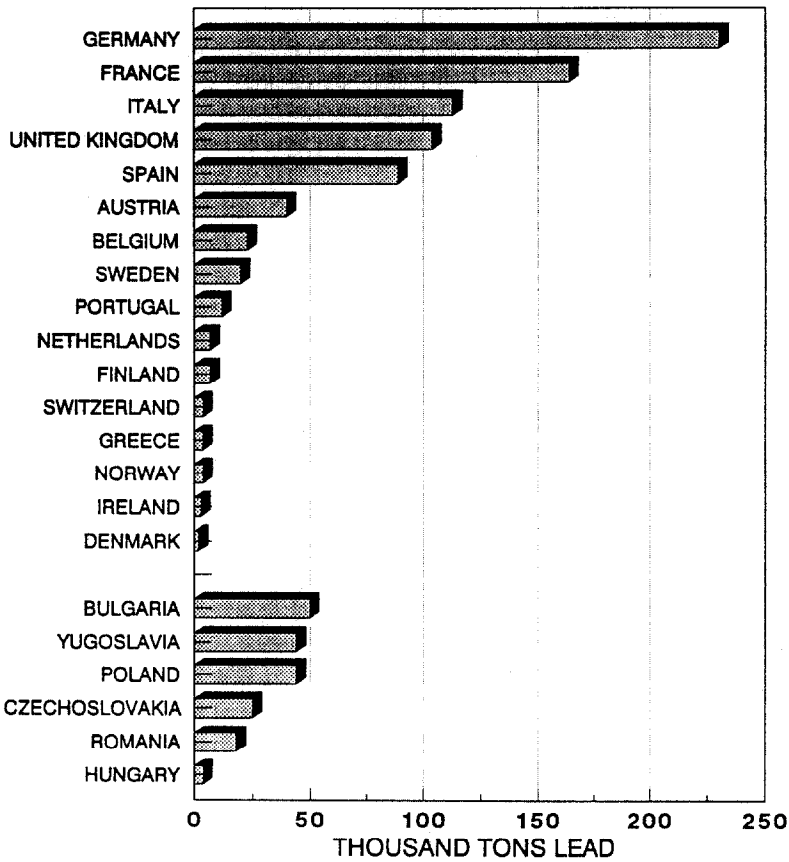

Fig. 1. Lead consumption for battery production in 1990.

in use in Eastern Europe which represents 10% of the total European fleet, whereas the production in Eastern Europe of automotive batteries that are not dedicated to original equipment (OE) is 20% the European figure. This is due to the fact that Eastern Europe used to export significant quantities of batteries to the former USSR, and that the region experiences a service life for automotive batteries that is much smaller than in Western Europe.

(iii) The proportion of industrial batteries within the total battery production appears to be similar (viz., 30%) in the two regions of Western and Eastern Europe. The production of industrial batteries is more specifically located in the following countries: Germany, UK, France and Bulgaria. These four countries represent more than half the European production of industrial batteries.

Prospects of the West European market for lead/acid batteries

Forecasts and comments about forecasts may not be attractive to everyone, so readers can refer directly to the synthetic table of forecasts shown later in Table 2. From now on, to fit with the breakdown of statistics, Eastern Germany will be reported in Eastern Europe.

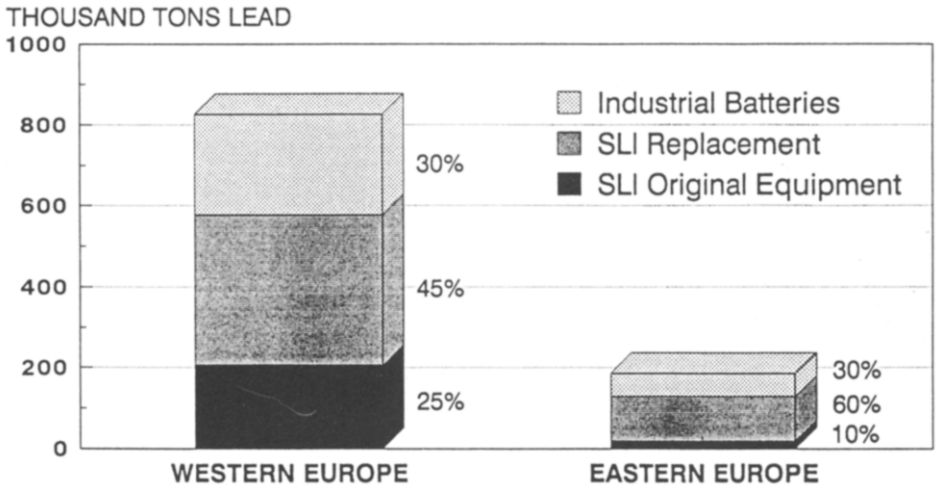

Fig. 2. Breakdown of lead consumption in batteries in 1990; CIS not included, Eastern Germany reported in Western Europe.

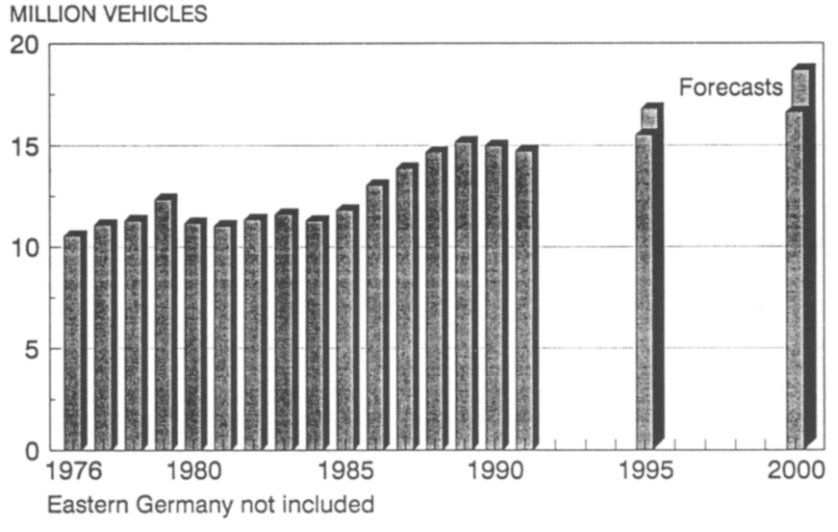

Fig. 3. New registrations of vehicles in Western Europe; Eastern Germany not included.

In 1991, the market for OE automotive batteries in Western Europe was about 15.5 million units. Forecasts of the sales of OE batteries are derived from forecasts of the vehicle production in Western Europe. Forecasts of the vehicle production are themselves based on estimates of sales of new vehicles (also called 'new registrations'), and of imports/exports of new vehicles.

Historical figures for new registrations, as well as the range of forecasts available for 1995 and 2000, are given in Fig. 3. The average annual growth rates for new registrations over the period 1991 to 2000 are between 1.3 to 2.5% per annum (according to various car manufacturers and specialized consultants). This variation is due to the uncertainty of the prevailing economic situation.

In the past, new registration figures have been very close to production figures. In the future, however, other parameters will have to be considered, such as the increase of imported Japanese cars, or the evolution of the import/export balance of new vehicles with Eastern Europe. Even if importation quotas have been negotiated between the EEC and Japan, or between countries of Eastern Europe and the EEC, only estimates of the future trade flows can presently be given.

Finally, the average, annual, growth rates for vehicle sales (thus, for OE automotive batteries) over the period 1991 to 2000 are estimated to lie between 0.2 and 2.8% per annum. This leads to a potential increase in sales of OE batteries of 0.5 to 4.5 million units between 1991 and 2000.

In 1991, the market for replacement automotive batteries in Western Europe was approximately 30.5 million units. Forecasts of sales of replacement batteries are linked to forecasts of the vehicle population. The vehicle population of Western Europe has increased very regularly in the past, and the range of available forecasts for 1995 and 2000 is tighter than for new registrations (see Fig. 4). The corresponding average, annual, growth rates for the period 1991 to 2000 are predicted to be 1.8 and 2.4% per annum (according to various car manufacturers and specialized consultants). These growth rates could be applied to replacement batteries if the service life of batteries and the age structure of the vehicle population remained unchanged throughout the period 1991 to 2000. This is very unlikely.

The average service life of automotive batteries is difficult to measure, but a good indication of its evolution can easily be obtained using the ratio (vehicle population)/(sales automotive battery replacement). This ratio progressed from 3.5 at the end of the 1970s to 5.5 at the end of the 1980s (see Fig. 5). Of course, this ratio does not measure a battery lifetime, but gives an approached value – in excess – of the average service life. It is impossible to rule out any other increase in the service life during the 1990s because of the constant efforts made to increase the reliability of automotive batteries, and to improve the electronics of vehicles.

In order to understand the sensitivity of automotive replacement sales to the variation in battery service life, it is interesting to do the following calculation. Assuming an increase in the ratio from 5.4 in 1991 to 6 in 2000, the afore-mentioned annual

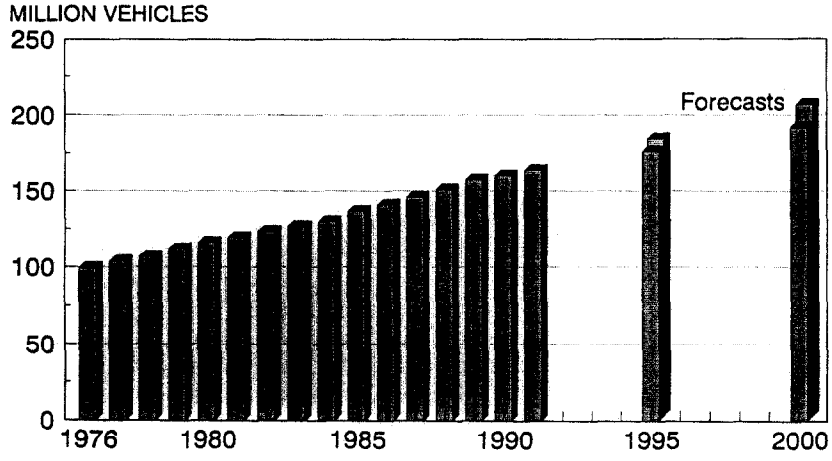

Fig. 4. Vehicle population in Western Europe; Eastern Germany not included.

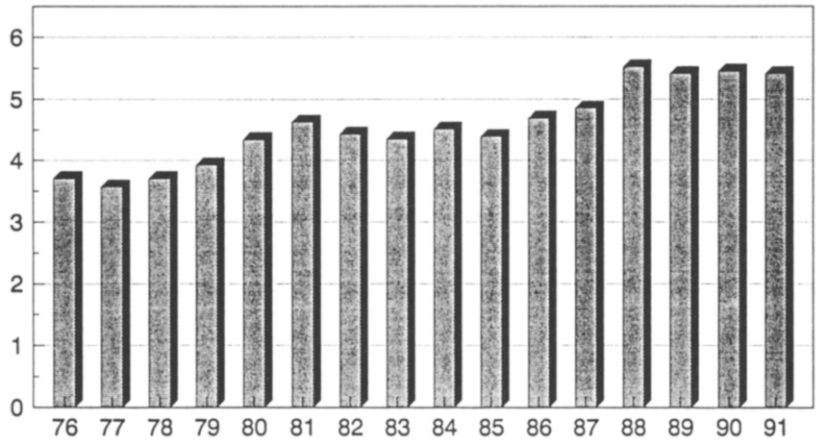

Fig. 5. Ratio (vehicle population)/(automotive battery replacement) in Western Europe.

growth rates of 1.8 to 2.4% per annum calculated for the vehicle population would fall to 0.7 to 1.3% per annum for replacement battery sales. The assumption of an increase in the ratio to 6 by 2000, corresponds to a potential increase in automotive replacement sales of approximately 2 to 3.5 million units between 1991 and 2000.

The influence of the age structure of the vehicle population will not be developed here, as it is a long and dull calculation, and because is has no influence on long-term trends, but only on short-term variations. Anyway, it can be mentioned that the age structure is influenced by the changing level of the new registrations, the legislation for technical inspection of vehicles, the imports/exports of used vehicles, and so on.

Forecast for industrial batteries are more difficult to perform than for automotive batteries, which means that they are even more uncertain. This is explained by the fact that industrial batteries are split between many different markets, each with its own evolution. These markets are far less documented than that of the motor industry and, therefore, forecasts are not always available.

Industrial batteries can be divided into traction and standby batteries; the two groups are nearly equivalent in terms of lead consumption. Standby batteries are used to provide emergency power to a wide range of electrical equipment, such as telephone networks, computer installations, hospitals, power plants, railroads, and security systems. Telecommunications and uninterruptible power supply represent nearly half the market for standby batteries in Western Europe, and are the markets that are foreseen to achieve the best growth rates in the future. Individual forecasts for each market will not be detailed here, and only aggregate forecasts for standby batteries are given. The average, annual, growth rates for standby batteries in Western Europe over the period 1991 to 2000 are generally estimated by battery manufacturers at between 3 and 4% per annum (in quantity).

Traction batteries are used mainly to power electric fork-lift trucks, but also power delivery vehicles, service vehicles at airports and docks and, increasingly, automatic guided vehicles. The average, annual, growth rates for traction batteries in Western Europe over the period 1991 to 2000 are generally estimated by battery manufacturers as 2 to 3% per annum (in quantity).

The potential development of electric cars and commercial vehicles powered by lead/acid batteries is not considered in the data presented here. The growth of the

sales of industrial batteries in their traditional markets has been stimulated by the development of maintenance-free batteries. Moreover, these new batteries have a shorter service life than the previous technologies. This will tend to increase further the sales of replacement batteries in the long run.

Prospects of the East European market for lead/acid batteries

In 1991, the market for OE automotive batteries in Eastern Europe was estimated at about 0.9 million units. The vehicle production in Eastern Europe was very low in 1991, compared with historical standards (see Fig. 6). This resulted from a significant reduction in the sales of new vehicles, because of the price increase of vehicles, components, insurances, taxes, etc. (due mainly to the convertibility with the US $, and the vertical disintegration of the motor industry). Moreover, locally-manufactured vehicles are competing with importations of used vehicles from Western Europe that are often less expensive. The fall of the vehicle production results also from the disorganization of production, the shift of assembly lines to new models of vehicles, shortages of components, etc.

Forecasts of the vehicle production are available, because the plans for revamping or rebuilding the production facilities for vehicles are well known. The unpredictable evolution of the parameters listed previously, as well as the level of protection each country will decide to give to its motor industry, explain the very large range of forecasts available for 2000. Nevertheless, a significant growth of the vehicle production seems to be achievable, and the average, annual, growth rates over the period 1991 to 2000 are estimated to be between 9.5 and 13.5% per annum (according to various car manufacturers and specialized consultants). This is leading to a potential increase in the sales of OE batteries of 1 to 2 million units between 1991 and 2000.

In 1991, the market for replacement automotive batteries in Eastern Europe was estimated at about 8.5 million units. The vehicle population of Eastern Europe has increased quite regularly in the past, but at a higher rate since 1990 because of massive importations of used vehicles from Western Europe (see Fig. 7). Forecasts of the vehicle population in 1995 and 2000 are given, but they are very uncertain because it is rather difficult to foresee, for several years, the exact evolution of the vehicle

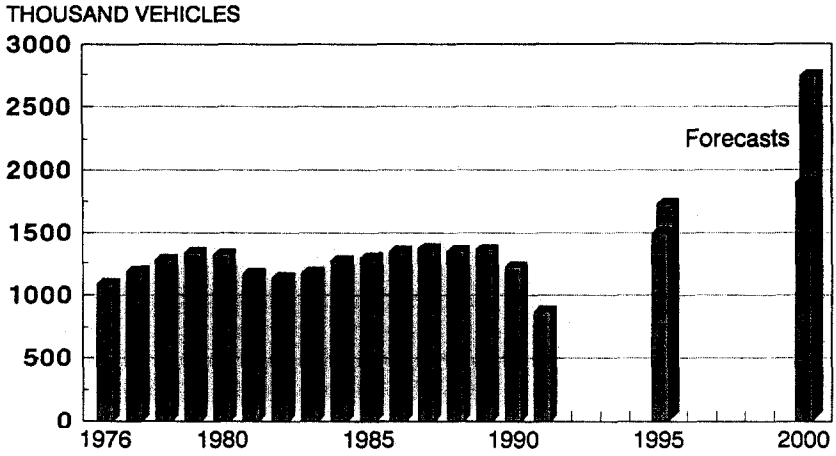

Fig. 6. Vehicle production in Eastern Europe; Eastern Germany included, and CIS excluded.

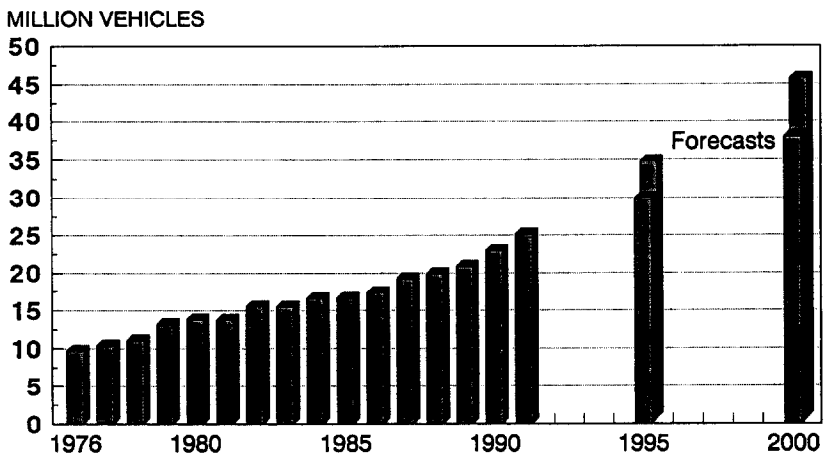

Fig. 7. Vehicle population in Eastern Europe; Eastern Germany included, and CIS excluded.

production in Eastern Europe, of the vehicle prices versus the living standards, of the control on the imports of new and used vehicles (especially from Western Europe), of the rate of broken vehicles, of the size of the road network, and so on. The average, annual, growth rates of the vehicle population considered to be achievable during the period 1991 to 2000 are estimated at between 4.7 and 7% per annum.

A different approach produces the same result. As the ratio (number of inhabitants per vehicle) is nearly the same for Eastern Europe in 1991 as it was in the mid-1960s for Western Europe, the East European ratio in 2000 should be close to that for Western Europe in the mid-1970s.

On top of this, the evolution of battery service life has to be considered. The ratio (vehicle population)/(sales automotive battery replacement) can be calculated for Eastern Europe (except Eastern Germany) in 1991, and it gives 2.75, which is much lower than the 5.4 ratio of Western Europe. Different climatic conditions are not the only explanation for such a difference, but also different battery and vehicle technologies. This means that, in the forthcoming years, Eastern Europe should witness an increase of the battery service life similar to the increase that happened in Western Europe during the past 15 years (see Fig. 5).

Assuming, for example, a ratio of 4.5 in 2000 for Eastern Europe, the average, annual, growth rate for the sales of replacement batteries over the period 1991 to 2000 would be in the range 0 to 2% per annum. In such a case, nearly all the growth of the vehicle population is balanced by the increase in battery service life. Once this increase of life has occurred, however, all the growth in the vehicle population should benefit the sales of replacement batteries. The assumption chosen means a potential increase in the sales of replacement batteries of 0 to 1.5 million units between 1991 and 2000. As previously mentioned, the influence of the age structure of the vehicle population, which should experience significant changes during the 1990s, is not considered here.

The market for industrial batteries is facing good prospects for growth in Eastern Europe. Many plants have to be renewed or rebuilt in the forthcoming years, and the infrastructure has to be expanded considerably (telecommunications, power supply, transport, etc.). The example of the telephone density per inhabitant (see Table 1) is showing alone the huge potential for growth that exists in Eastern Europe.

TABLE 1

Telephone density per 100 inhabitants in countries of Europe in 1990

Switzerland	51
West Germany	48
France	48
Bulgaria	19
Czechoslovakia	14
Rumania	12
East Germany	9
Hungary	9
Poland	8

TABLE 2

Forecasts of average, annual, growth rates over the period 1991 to 2000, according to assumptions given in the text

	SLI original equipment (%)	SLI replacement (%)	SLI total (%)	Industrial batteries (%)	Total batteries (%)
Western Europe					
low	0.2	0.7	0.5	2.5	1.1
high	2.8	1.3	1.8	3.5	2.3
Eastern Europe					
low	9.5	0	1.2	5	2.3
high	13.5	2	3.7	10	5.6

The timing for the development of these infrastructures and for the renewal of the industry is very uncertain (and is very likely to be different from one country to another), so the range of forecasts is very large. The average, annual, growth rate for industrial batteries in Eastern Europe over the period 1991 to 2000 is estimated to be within the range 5 to 10% per annum (in quantity), i.e., superior to the rates in Western Europe.

Synthesis of prospects for Europe

Considering the sales of automotive batteries in Europe over the period 1991 to 2000, the potential growth appears to be much higher in Western Europe than in Eastern Europe, even if the growth rates are higher in the second region (see Table 2). According to the assumptions made previously, the potential increase is 2.5 to 8 million batteries for Western Europe, and 1 to 3.5 million batteries for Eastern Europe, between 1991 and 2000.

Forecasts of the growth rates for industrial batteries are higher than for automotive batteries (see Table 2), and measured through the lead used in the batteries, the potential increase over the period 1991 to 2000 should also be higher for industrial than for automotive batteries. The forecasts of the aggregate growth rates for lead/acid batteries in Eastern and Western Europe are shown in Table 2 (calculation is made *pro rata* the lead used for each type of battery).