

LEAD SUPPLY AND DEMAND

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Introduction

This paper discusses the economy within which the lead and lead/acid battery industries are presently operating and its immediate outlook. Also considered are the longer-term prospects for the lead industry with particular reference to its strengthening interdependence on the lead/acid battery. Finally, a brief survey is made of the more immediate developments that are of vital importance to industry.

World economy

The future prospects for the lead business in terms of the world economy within which all companies operate can be addressed in alternative scenarios. Both start from a recognition that the world is now in its fourth year of cyclical recovery and sound growth. Notice should be taken in this overall picture of the trends to very low levels of inflation, slowly falling interest rates, and weak oil prices. Lead producers will readily testify, however, to the fact that commodity prices have not responded to the improvement in the world economy.

The first scenario is that, towards the end of 1986 or early in 1987, world economic growth will further improve. This would require policy changes in Japan and Germany designed to stimulate domestic activity in those important countries and a more positive response from the U.S. economy to the combination of lower inflation, lower interest rates, and a resolution of the taxation reform debate. This is a cheerful scene which would prolong the recovery by up to another two years or more, but still leave a low inflation rate. Industries sensitive to even lower levels of interest rates (*e.g.*, construction and automobiles) would witness strong demand if this prospective scene develops. Other battery-related industries, such as telecommunications, data processing, industrial and transport equipment, would all benefit in this environment.

The second scenario might be called "muddling along", or more of the same conditions that have been seen so far in 1986. Falling inflation — or deflation — dominates this outlook. It assumes that Japan and Germany are slow to make the major adjustments needed in restructuring their economies to stimulate domestic demand and reduce trade surpluses. The fear is that

an inadequate response by these key economies would impact adversely on both the U.S economy and world trade generally. It would follow in this rationale, that the U S economy would continue to be slow, and in the short term would even be unable to reduce its massive trade deficit Prolongation of the present economic pause in the U. S would lead to lower growth rates and possibly into recession next year Fortunately, such a harsh outlook is ranked only as a possibility at this time and agreeably at long odds.

Interdependence of lead and lead/acid industries

Let us now briefly examine the strengthening interdependence of the lead and lead/acid battery businesses and the influence that this relationship has on the future prospects and the economics of each of them The views adopted are based on recent market development studies undertaken in the author's Company to better understand the world market for lead and other commodities in which the industries will be operating towards the year 2000

Lead demand

In terms of demand, Fig 1 shows the anticipated growth in western world refined lead consumption, from 3.96×10^6 t in 1984 to 4.6×10^6 t by the year 2000, with variations in regional growth patterns

The main message of this analysis is the increasing importance of the developing nations, particularly in Asia, which move from 6% of the world demand for lead in 1984 to 11% at the end of the century, whilst Western Europe is expected to decline from 42% to 32% and North America from 32% to 29%. This implies that a close to nil growth in the major advanced economies is more than offset by attractive growth rates in many Asian countries and other newly industrialising economies.

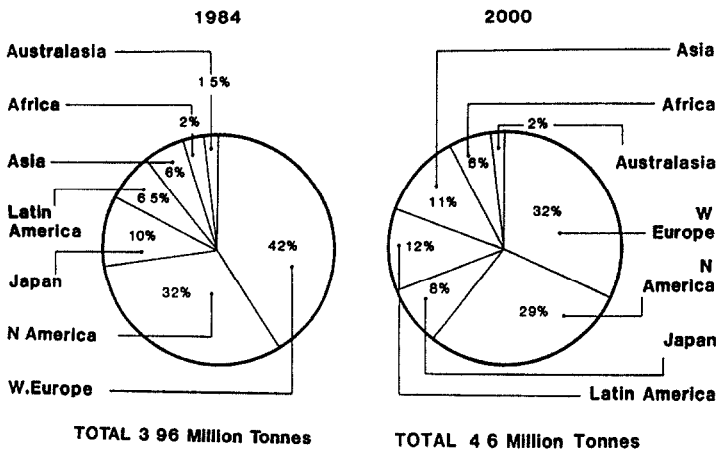


Fig 1 Western world demand (by area) for lead

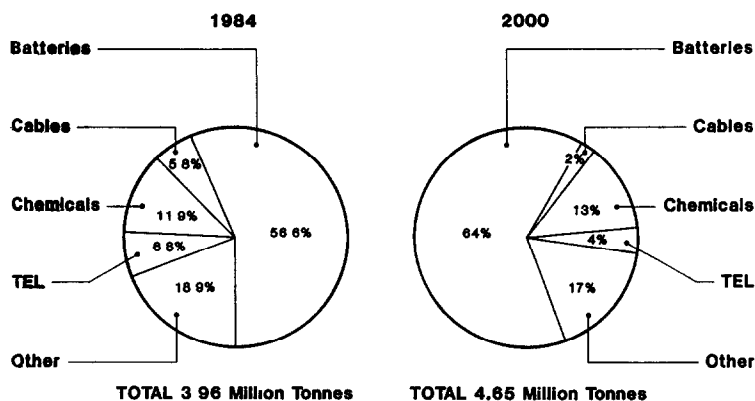


Fig 2 Western world demand (by major end use) for lead

Battery lead demand

Turning to the interdependence of the battery and lead industries, Fig. 2 indicates the increasing concentration of lead consumption on lead/acid batteries in general and the SLI battery in particular. Lead demand from this sector is estimated to grow from just over half of total western world consumption in 1980 to some 64% by the year 2000. This dramatic increase in dependence on the lead/acid battery is against a background of decline in cable sheathing, gasoline additives, and other end uses.

Forecasts of consumption, based upon predictions of vehicle output and fleet sizes to the end of the century, are illustrated in Table 1. A study of these data reveals an expected 1.95% p.a. growth rate in western-world

TABLE 1

Forecast of western world vehicle fleet size and vehicle production in the year 2000 (source: Australian Mining & Smelting Ltd, Australia)

	Vehicle production (p a)		Total vehicle fleet	
	1980	2000	1980	2000
N America	9.1	15.4	169.9	234.7
W Europe	12.6	13.1	119.2	155.4
Japan	11.0	14.0	37.9	56.8
Asia	0.4	3.8	8.5	31.6
Latin America	1.8	7.8	24.1	63.5
Middle East	0	0.1	5.8	17.3
Africa	0.3	0.7	8.1	23.2
Oceania	0.3	0.6	9.4	15.3
Total	35.5	55.5	382.9	597.8

Continued strength of established markets in U.S.A. and Europe due to scale of original and replacement batteries

Large increase in vehicle production and fleet size in Latin America and Asia

vehicle fleet size over two decades. Translated into lead demand from the SLI battery sector, this means growth of 1% p.a., even after adjusting for downsizing. It is assumed that improvements in lead/acid battery technology will bring about an average of 15% decrease in lead contained in SLI batteries by the year 2000

In Asia, the growth in vehicle fleet size and production is expected to be much higher than in any other region, albeit from an extremely small base. Also, much of the domestic battery lead demand in Asia at present, and well into the future, will be based upon growth in motorcycle rather than in passenger car fleets. Unit size will, therefore, be lower, but fleet size growth should be dramatic. A large portion of battery lead demand from this region services fabrication for export markets, and it is expected that this will continue

Asia also offers excellent possibilities for the development of certain types of batteries to suit particular needs. Chief amongst these is the use of lead/acid batteries to power household appliances. It is particularly interesting that something like 50% of the lead/acid (generally SLI) batteries which are marketed in Indonesia each year are used to power household appliances, televisions and the like, in areas where either there is no reticulated power, or where the cost of connection to the existing grid is beyond the scope of the householder. The author has long wondered whether this 'Indonesian' approach to the use of such batteries can be further developed in other countries with similar circumstances, *i.e.*, large populations and power problems. In this context, India, China, parts of South America, and Africa appear to be candidate regions.

Already Japanese and Taiwanese manufacturers are producing large quantities of small, sealed, recombinant lead/acid batteries for powering appliances, but it appears that, to date, most of the marketing thrust is towards large western markets. Yet, a vast market appears to lie here on the Asian doorstep. The combination of fast growing incomes, the resulting demand for consumer goods, together with geographical lags in the provision of uninterrupted power supply, would seem to provide a sound climate for the promotion of this battery concept. Apart from application in powering television sets and videos, there is the huge potential market of medical, hospital and scientific applications, not to ignore personal computers for a multitude of uses.

The above discussion leads to the concept of the use of storage batteries for remote-area power supply. Parts of this huge Asian region are ideally suited to the use of lead/acid storage batteries in conjunction with photovoltaics, diesel-powered generators, wind-powered generators, or hybrids of these (see, for example, ref. 1).

Finally, mention should be made of the possibility of using lead/acid batteries as load-levelling devices for conventional sources of power. Indian and Chinese delegates to this Conference are probably familiar with the problems arising from interruptions to power supplies. It would appear that there are excellent opportunities for developing battery-based load-levelling concepts in the Asian region.

Lead supply

The recession in commodity prices in recent years, although slightly less apparent from the perspective of non-dollar denominated currencies and countries, will be a contributing factor in containing growth in lead mine production in the years ahead. Reacting to several years of depressed prices, costs in both the mining and the secondary lead industry have been dramatically reduced — to a point where further significant economies would seem to be generally beyond reasonable reach. As an example, one major secondary producer in the U.S.A. has, in the last 5 years, increased production by 20% whilst, at the same time, reducing the workforce engaged by over 50%. There are many other examples, in both the mining and the secondary industry, of similar dramatic improvements in productivity. At the same time, a number of marginal operations in both primary and secondary industry have closed.

Despite the above changes, world lead refining capacity remains in excess of the current and anticipated size of the market. It is estimated that combined world-wide primary and secondary capacity at the end of 1985 totalled over 5.1×10^6 t, while actual output was under 4×10^6 t. Adequate supply is almost certainly assured in the medium term, based on the demand for zinc as lead's major co-product underpinning the primary industry, and the growing "above-ground mine", in the form of spent batteries, sustaining the secondary industry. It is anticipated, therefore, that at current prices lead mine output should remain constant at about present levels of 2.4 - 2.5 $\times 10^6$ t through the next 15 years.

The secondary lead picture is less clear, since this beleaguered sector lurches from crisis to crisis, generated more by environmental problems than by its own dynamics. The fact remains that growing world vehicle populations ensure future growth in battery production, and that pools of spent, "hazardous" batteries are unlikely to remain unused. This automatically defines the parameters of the secondary lead industry, although geographical concentrations may undergo a degree of change.

The author's view of the refined lead supply picture is summarized in Fig. 3. Primary output by the year 2000 should be roughly at today's levels, and the secondary industry should contribute about 50% of the total supply — despite an unavoidably higher cost structure related to essential modernization to meet recently promulgated environmental standards. Development of a modern secondary lead industry in Asia based on local and imported scrap will most likely bring about major changes in this region's demand/supply balance.

The outlook for lead prices

In discussing the question of the economic interdependence of the two lead industries, reference must be made to the sensitive question of the current and future outlook for lead prices and their impact on supply.

Figure 4 shows that the current lead price in real terms is at its lowest level for this Century. It is well known that both the secondary and primary

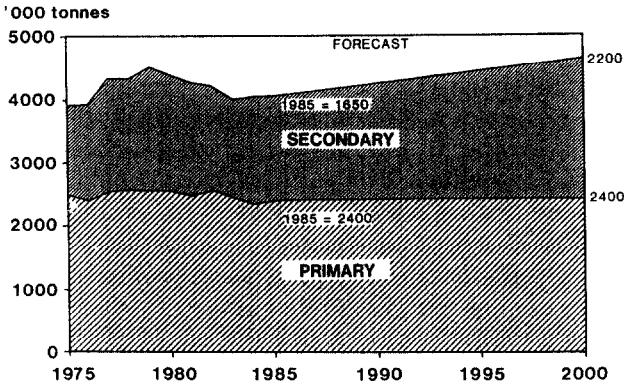


Fig 3 Western world output of lead

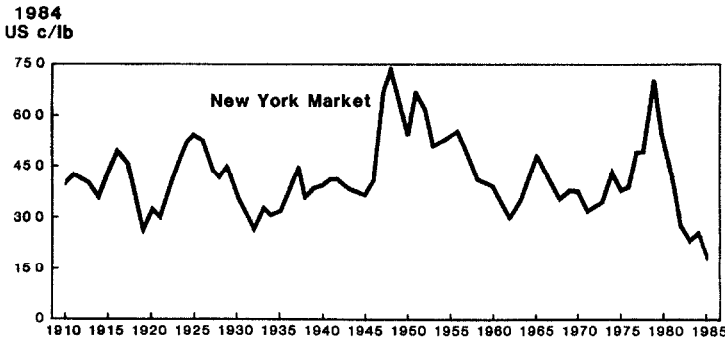


Fig 4 Real lead price (in 1984 US c/lb)

lead producing industries have had, and continue, to face dramatic increases in environmental and other costs. The remarkable achievements of these industries in addressing problems of productivity and cost improvement have been noted above. Despite this, the industry is yet again saddled with additional costs, the most recent being those associated with the Clean Water Act and the Resource Conservation and Recovery Act in the U.S.A.

The audience at this Conference will be aware of the dramatic impact of such a low level of price on the financial performance of both primary and secondary lead producers. This issue is raised not in any way to be offensive or impolite to battery manufacturers, but rather to indicate the prospects, despite many forecasts to the contrary, of a sizeable upward revision of lead price over the next few years. Although levels of lead price are critical to battery costs, the author does not wish to delve too far at this Conference into such a controversial subject. The author considers, however, that the following two points of view are worthy of reflection.

The first point of view relates to fundamentals. World stocks of refined lead are now extremely low, equal to about 6.5 weeks' supply, and western world demand/supply are reasonably balanced. Supply, in this connection, is not to be confused of course with capacity, much of which remains unavail-

ably idle in current economic circumstances. The author believes that it is a reasonable view that breakeven cash costs cannot possibly be lowered any further, nor even sustained at current levels. Indeed, they seem bound to rise under current and forthcoming pressures, particularly in relation to punitive environmental standards imposed on production facilities. Cost push will therefore be a key factor in affecting supply and price of the metal over the next few years. Any further weakening of the U.S. dollar is also likely to raise the floor price of lead, since returns to non-U.S. producers would have to rise to compensate for this.

The second point of view relates to the pricing basis for lead in world markets. Media reports in recent days indicate concern in the U.S.A. with current reference price arrangements, as reported daily sales now constitute such a small percentage of the overall lead market. Therefore, the question may be asked: does the published price in the U.S. properly reflect the true market value of the metal, let alone its intrinsic worth? Likewise, whilst precise figures of the volume of daily trade in lead on the London Metals Exchange (LME) are difficult to obtain due to unreported inter-office trade, suggestions are that the lead trade is extremely low following sharp declines in LME turnovers both before and subsequent to the tin crisis. In the light of current relatively low world and LME stocks, reasonable balance of demand and supply, and record low real prices for lead for this century, it seems reasonable to question the ongoing adequacy of the LME to properly reflect the current value of the metal. Decline in LME lead turnover from 1984 is consistent, as Fig. 5 indicates, with failure of the market to continue to reflect in its traditional manner the fundamental stocks/price relationship. This adds to growing concern over the validity of the LME pricing basis. It is true, however, that one or two other commodities have exhibited similar trends but none with such dramatic impact as in the case of lead. This matter will be viewed with increasing concern should LME turnover decrease under the emerging clearing house system.

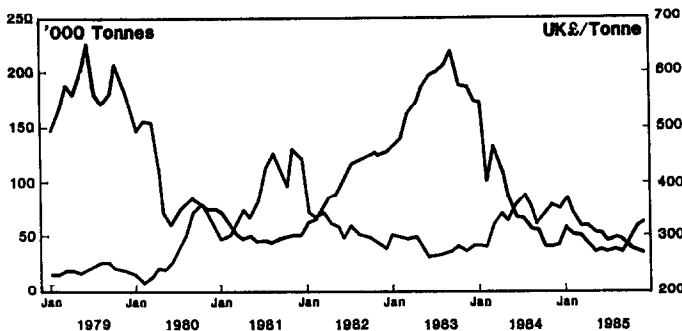


Fig 5 LME lead stocks as a function of cash price

Conclusion

If the lead price increases in the immediate future, either by response to cost push factors referred to earlier, or by some form of correction or change

in the basis of pricing, it is possible the battery industry would not begrudge reasonable change. It may, in that event, look to lead as its industrial partner to find ways via research, development, and promotion to increase the role of the lead/acid battery in today's society.

Reference

- 1 M Watt, E Hart and A Langworthy, *J Power Sources*, 16 (1985) 205