

Environmental and social responsibility for the 21st Century

Battery production and recycling

Recycling in the Informal Sector

The informal recycling of lead is strongly disapproved of by the global regulated lead industry because it is often conducted under poor conditions of safety, health and environmental performance. However the social impact of policies and programs to improve environmental performance and reduce population exposure to pollutants cannot be overlooked when many communities in less developed countries remain viable only as a result of such activities. The global lead industry has a social responsibility to help improve working practices and reduce exposure for all workers and communities and in doing so strives to direct them into the formal regulated sector. That said, while nobody would knowingly defer projects and technologies designed to raise the standards of environmental performance, it is important to take into account the social needs, priorities and aspirations of those people directly affected by Government policies, national legislation, new technologies and changes in trading patterns. This is certainly true when considering the most appropriate strategies to ensure that used lead acid batteries are recycled in an environmentally sound manner.

The Importance of Recycling in Developing Countries

- ▶ For many developing countries there is a battery manufacturing sector that provides 'locally produced' automotive components either for use in car assembly plants or for cheaper replacement car batteries.
- ▶ Most countries do not have any natural deposits of lead ore and so the recycling industry provides the only local source of lead bullion.
- ▶ Indigenous battery industries can only survive if primary lead is imported or local secondary industries can recycle sufficient quantities of used lead acid batteries to meet the demand for refined lead.
- ▶ The recycling of used lead acid batteries reduces the risk of environmental and population lead exposure from the millions of automotive batteries which reach the end of their useful life every year.

Lead Supply

Domestic lead supplies are generated by recycling used lead acid batteries in the 'formal' lead recycling sector, that is usually licensed and Government regulated, and the 'informal', that is the unregulated and often illegal back-street operations.

If lead imports are required to supplement any locally produced secondary lead it will invariably be in the form of either primary refined lead ingots or imported used lead acid batteries. In many cases the imported used lead acid batteries will be drained of electrolyte prior to shipment and then transported to the recycling plant in a dry state.

Social Impacts

In most countries it is possible, one way or another, to calculate the tonnages of lead bullion produced by the informal sector and the magnitude of the lead output will provide a very useful guide to the economic impact of the informal sector and the extent of its influence in social interactions.

Those companies involved in the formal sector are the licensed battery recyclers and battery retailers that return used lead acid batteries to the regulated secondary smelters. These organizations are large, often multinational corporations, employing a relatively small number of people either directly, indirectly or part time.

In complete contrast, the informal sector comprises 'backyard smelters' and battery reconditioners usually owned and managed by small family groups, but employing many thousands through elaborate networks that source and deliver the used lead acid batteries. In many developing countries the income generated by this sector will run into millions of dollars, albeit much of it within the 'black economy' thereby denying national Governments valuable tax revenues. Nevertheless, the personal incomes of those working in the informal sector are usually only just sufficient to keep their families above the subsistence level.



Environmental Impacts

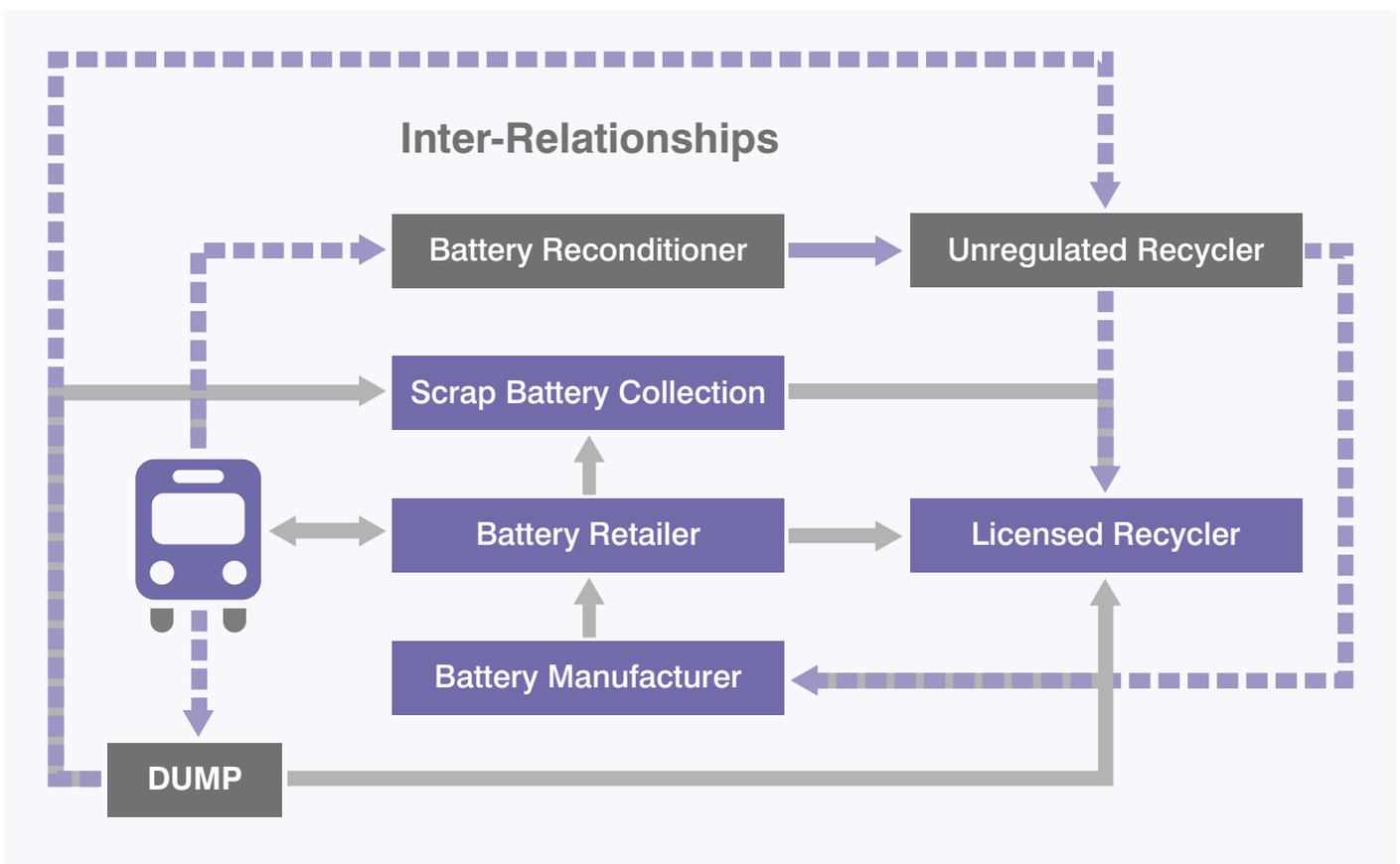
Whilst the income generated by the families in the informal sector is vital to their daily survival, this sector has been found to be responsible for virtually all of the pollution arising from the recycling of used lead acid batteries in most developing countries. Operating practices and working conditions in the informal sector vary tremendously, but on the whole:

- ▶ There are few or no facilities for the neutralization and safe disposal of battery electrolyte. Hence acidic effluent percolates into the water table, rivers and sanitary system.
- ▶ Occupational hygiene is poor and few operators wear more than a wet towel to protect themselves from the lead fumes.

- ▶ There are few furnace exhaust control systems to prevent atmospheric pollution.
- ▶ Furnace residues are unstable and leachable, and tend to have a high lead content. The residues are dumped indiscriminately either around the premises of the unlicensed smelter or are sent to landfill.
- ▶ Many of the informal operations are located close to shops and homes, increasing the risk of population lead exposure.

Inter-Relationships

So where do unlicensed secondary smelters obtain their scrap materials and where do they sell their lead ingots? The used lead acid batteries supply chain and the sales outlets for the informal sector follows a familiar trail in many countries in the developing world. For example:



Inter-Relationships (continued)

- A battery manufacturer will sell a battery to a retailer.
- The retailer will sell the battery to the owner of a vehicle.
- When the battery is 'spent' the vehicle owner will need a replacement and he can return the used battery to the retailer for recycling and a possible discount on the new battery.
- In this case the retailer will send the battery to a licensed recycler and the recovered lead will be sold to the manufacturer. The non-metal components will also be treated in an environmentally sound manner, some recycled, others neutralized prior to disposal.
- However, the retailer might not take back used batteries and the vehicle owner may have to take the used battery to a suitable used battery collection point.
- The battery scrap collector will then send the used batteries to the licensed recycler for recovery of the recyclable materials.
- However, depending on the prevailing market conditions there might be a better financial reward for the vehicle owner if the used battery was sold to a battery reconditioner. Sometimes a reconditioner can reclaim a used battery by cannibalizing another and using those components with some 'life' left in them. These reconditioned batteries will not have a long life, but often find a ready market amongst the poorest in society.
- Those 'spent' components that the reconditioner cannot reuse are usually sold to an unlicensed 'backyard' recycler. This secondary lead sector of the industry is called the informal sector and operating practices will rarely conform to sound environmental and occupational performance standards.
- In order to establish an accurate picture of the life of a battery in a particular country or region account must be taken of all of the possible scenarios outlined above.
- Nevertheless, the informal secondary lead sector will often supply the battery manufacturers and the licensed recyclers with unrefined lead bullion. Another outlet for the lead bullion produced by the informal sector is fishing sinkers.
- Sometimes the vehicle owner is unable to take a used battery to any recycling collection point and the battery is disposed of in the nearest municipal 'dump'. This scenario not only poses serious long-term problems for the environment, but is a loss of a valuable resource.
- Where municipal authorities have sorting facilities, any used batteries are segregated and either sent to the nearest used battery collection point for shipment to a licensed recycler or directly to the licensed recycler.
- In many cases, particularly in the developing world, scavengers scouring rubbish dumps for anything of value will recover the used battery as a saleable recyclable commodity and sell it to a secondary lead plant, usually an unlicensed recycler.

Informal Characterization

In many of the major cities of the developing world there are hundreds possibly thousands of small battery reconditioners providing valuable employment for local people. The typical battery reconditioner occupies a small motor accessory or repair shop located along main city roadways with street access and is usually found amongst other shops selling a variety of provisions, fast foods, and domestic and consumer goods.

Battery reconditioners perform two main tasks, namely recharging 'flat' batteries and rebuilding batteries that are 'spent' by cannibalizing 'good' cells from one battery to replace those that are 'dud' in the spent battery. Despite the fact that reconditioned batteries have a very short life compared to a new battery, particularly in hot climates, trade thrives, especially in the poorer areas of cities.

The unregulated recyclers have their own collection infrastructure to capture those batteries that are not returned to the major battery retailers for recycling and they also purchase and smelt the 'spent' cell plates from the reconditioners. At best the recyclers probably recover no more than 90% of the available lead in the grids and battery paste.

The informal sector's environmental performance is usually very poor, but despite this they do bring some benefits to the recycling process. The reconditioners provide a valuable recharging service that increases battery life and thereby reduces the recycling burden whilst the unregulated recyclers collect batteries that are uneconomic for the major secondary smelters to recover and at least prevent them from being dumped in landfill sites.

