Defining Household Battery Recycling
in California's AB 488

Progressive product stewardship law requires that end-of-life management guidelines be founded on independently vetted, science-based standards established for a preferred environmental outcome, which will guide corporations in the right direction when discharging their new obligations.

Therefore, the definition of household battery recycling in AB 488 requires carefully crafted words, to ensure that higher standards of recycling are not replaced with lower standards. Loopholes from poorly worded definitions in law should be avoided at all costs.

To this end, the **new definition** of recycling in the amended version of AB 488 (see text box on page 2) presents a serious downgrade of the definition that was used in previous versions of the Bill, and is being used in similar proposed laws[1] on household battery recycling in other US States.

The benefits derived from recycling household batteries come from avoiding having to extract virgin metals and materials over and over. Each time virgin metals and elements are substituted with recycled raw material; there is a significant reduction in pollution, greenhouse gas emissions and energy consumption. Metal recycling derives the greatest environmental benefits compared to recycling plastic and paper-based products.

End-of-life management practices for spent household batteries range dramatically in terms of environmental performance and recycling efficiency. Specifically:

- **Mechanical battery recycling** uses a series of magnets, filters and other separation technologies to extract over 85% of the original battery and produces metals like copper and iron, and pure elements, like manganese and zinc used as raw materials in fertilizer production.
- **Pyro-metallurgical treatment** (thermal) of old household batteries uses a combustion smelter to remove the most valuable contents (like Nickel for example), which make-up less than a third of the battery, with the remaining components mixed together in a combined, or "large magnitude" material stream called slag, which can be used as road fill in construction projects.
- The United Nations Environmental Program **(UNEP) published the *Recycling Rates of Metals – A Status Report*[2]** in 2011. The report was compiled by UNEP's Resource Panel; a group of experts from industry, academia, and government to evaluate recycling rate information for sixty different metals. The report clearly defines recycling rates and explains

[1] Minnesota's House Environment Finance bill uses the exact same language as the definition of "recycling" now stricken in AB488.
[2] *Recycling Rate of Metals – A Status Report,* United Nations Environment Programme (UNEP), 2011

that the benefits of recycling are found in a **closed-loop system** where metal can be continually recovered and used to substitute virgin metals.

- Metal that is not collected for recycling, but rather used in a manner in which the functionality of the end-of-life metal is lost is considered as open loop or "non-functional" recycling, **and is excluded in the recycling rate**.

- UNEP defines "non-functional" recycling[3] as:

> *"Non-functional recycling is that portion of end-of-life recycling in which the metal is collected as old metal scrap and incorporation in an associated large magnitude material stream as a "tramp" or impurity elements. This prevents dissipation into the environment, but represents the loss of its function, as it is generally impossible to* recover it from the *large magnitude stream. Although non-function recycling is here termed a type of recycling it will lead to an open metal life cycle."…"Recycling failures occur whenever metals are not recovered from recycling fractions (e.g. final wastes**, slag,** effluent and dust).*

- The definition of recycling which was stricken from the amended AB 488 (text box below – left) **contained language with the intent of supporting closed-loop recycling**, and subsequently making it difficult to approve a program plan, which will utilizes open-loop or non-functional recycling.

- Further to this, the **new definition** of recycling (text box below – right) specifically allows for "reconstituted materials[4]" (non-functional recycling); and

- The **new definition** (text box below – right) also suggests that as long as they are "returning them to the economic mainstream" this is considered as recycling. It should be noted that waste and reconstituted waste like slag as well as other hazardous wastes may generate economic activity, but this activity has no bearing on the recycling performance, and usually presents of less favorable treatment option.

AB488 – Recycling Defined	
Standard language to define recycling (Stricken)	**New definition of recycling (Section: 40180)**
Recycling means the process of collecting and ***preparing recyclable materials and reusing the materials in their original form or using them in manufacturing processes that do not cause the destruction of recyclable materials in a manner than precludes further use****.*	*"Recycle" or "recycling" means the process of collecting, sorting, cleansing, treating,* ***and reconstituting materials*** *that would otherwise become solid waste, and* ***returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products*** *which meet the quality standards necessary to be used in the marketplace.*

[3] Ibid., page 14
[4] Definition of "reconstitute": To provide with a new structure;

- Non-functional recycling should be avoided in AB 488, especially when better options exist, like mechanical recycling. Failure to prohibit these types of non-functional recycling practices will certainly result in stewards choosing the lowest cost option, which in the case of battery recycling is always sending them to a smelter.

- Smelting batteries for certain metals also carries a greater burden of risk associated with the emissions (some of which are not monitored) as well as the application of slag and the content (toxicity) of that slag at that time. Consider some recent examples:

    1. Recently (April 2013), The Vermont Department of Toxic Substances Control ordered the Vernon-based battery recycler, Exide Technologies (one of the largest car battery recyclers in the world) to suspend operations. The order came after reports revealed that they posed a danger to as many as 110,000 people because of arsenic emissions, that they have been continuously releasing hazardous waste into the soil beneath their plant because of a degraded pipeline.[5]
    2. Pennsylvania-based Inmetco, a steel smelter currently receives the bulk of US and Canadian batteries. The process recycles a mere 26% of the battery (mostly nickel and iron) with the bulk of what's left managed as slag. Slag is shipped for backfilling, road aggregate and cement, and the company benefits from avoided disposal costs. The allowance was issued by the State after analyzing samples 20 years ago – a time when battery chemistry was different, and far fewer batteries were being smelted.[6]

[5] Los Angeles Times, April 24, 2013

[6] Inmetco is the largest recycler of batteries (alkaline, NiCd, and NiMH) in North America. They were issued allowance to use their slag as a co-product in various construction applications. The State issued the approval in 1993 and based its decision on testing done 20 years ago.