

# Nickel-Cadmium (Ni-Cd) Rechargeable Batteries and EPR

## Summary

**United States:** The Rechargeable Battery Recycling Corporation (RBRC) is the poster child for voluntary EPR in the U.S. It was the first national, industry-wide take-back program. Established in 1994 in response to state legislation requiring state take-back of Ni-Cd batteries, and in response to proposals in Europe to *ban* Cd, RBRC was launched amid great fanfare. RBRC initially set a goal of 70% Ni-Cd battery collection by 2001. In 1998 RBRC moved the 70% target back to 2004 and stopped reporting collection rates (only pounds). Subsequently, RBRC stopped talking about rates. By 2000 it was apparent that RBRC was grossly failing to meet the targets it had set – it was closer to 10% than to 70%. But the legislative pressure was off in the U.S. and E.U. was retreating from banning Cd. Meanwhile other product sectors (e.g., thermostats) are seeking to copy the RBRC model.

>> **Should RBRC be the new poster child for the failure of voluntary EPR?**

**Europe:** A movement to ban Cd and focus on alternative chemistries gathered steam in the mid-1990s. Bans looked like a sure thing in 1999, still talked about in 2001. But industry organized a counter attack, promising hefty recycling instead. In the absence of grassroots pressure, bans are now off the table, the discussion is “back to square one,” with the issue now being weak (30%) or strong (80%) recycling targets.

## Key Facts

### **Cadmium**

- Highly toxic, bioaccumulative, persistent
- Cd comprises 0.1% of the U.S. waste stream, Ni-Cd batteries accounts for 75% of Cd content in landfills [EPA 1994]
- 70% of world’s Cd is used in rechargeable batteries [2000, 2003]<sup>1</sup>

### **Ni-Cd Batteries**

- 10% of U.S. batteries are rechargeable; 80% of those are Ni-Cd; 80% of those are enclosed in products [1995]
- ¾ of Cd in smaller consumer batteries, ¼ in industrial cells [2000].
- Ni-Cd market share decreasing slowly; NiMH (more Nickel, Zinc, some Cobalt in place of Cd) and Li-ion rechargeables (<25% Cobalt in place of Cd) are now dominant in mobile phones and laptop computers.
- World production of rechargeables: 1 billion/year in 1990, **2.5 billion/year in 2000** (Japan dominates consumer product rechargeable battery market).
- In U.S. & Canada, **RBRC has collected only 30 million batteries in 8 years**, 1995 to 2002 [RBRC 2003]
- Florida: Cd in MSW landfills increased 113 tons in 1995 to 156 tons in 1998, despite increase in recovery rate from 11.2% to 25.7%

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<sup>1</sup> The use of cadmium compounds falls into five categories: active electrode materials in nickel-cadmium batteries (70% of total cadmium use); pigments used mainly in plastics, ceramics, and glasses (12%); stabilizers for polyvinyl chloride (PVC) against heat and light (17%); engineering coatings on steel and some nonferrous metals (8%); and components of various specialized alloys (2%) (ATSDR). During the past 30 years, cadmium applications have shifted steadily away from coatings (which accounted for about 50% of consumption in the 1960s) to NiCd batteries (Plachy, 2001).

## Timeline

- 1991 Portable Rechargeable Battery Association (PRBA), government affairs arm of rechargeable industry, splits from Battery Council International.
- 1994 Rechargeable Battery Recycling Corporation (RBRC) formed by PRBA to recycle NiCds and preempt further state legislation; first industry-wide EPR program in U.S; **sets recycling goal of 70% by 2001**
- 1996 Mercury Containing and Rechargeable Battery Act (U.S.) -- (1) Universal Waste Rule allows interstate transport of Ni-Cds without haz waste tracking, (2) uniform labeling for Ni-Cds, (3) required reduction of mercury.
- 1997 RBRC reports 22% recycling rate (little retail recovery, some municipal, most from pre-existing institutional, commercial and industrial recycling)
- 1998 RBRC stops reporting recovery rate (only pounds collected); moves 70% goal to 2004; est. rate 13%. [Thermostat Recycling Corporation launched, modeled on RBRC.]
- 2000 RBRC no longer talks about recovery goals; **est. recovery rate < 10%** [Alicia Culver, INFORM]
- 2001 RBRC starts taking back all consumer rechargeable batteries (NiMH, Li-ion); San Francisco passes first local battery resolution on rechargeables.
- 2002 **RBRC collected 3.4 million lbs. of all types** in 2002; discards projected by RBRC in 1998 for 2002: **28.2 million lbs. (23.7 in RBRC prog.) just Ni-Cds** in U.S. & Canada (thus **probably < 10% Ni-Cd battery recovery**)
- 2003 RBRC claims 30,000 N.Am. retail locations for returns.

## Comparison with EPR Principles

- XX Voluntary, not mandatory
- XX Voluntary performance standards and deadlines abandoned without consequence
- XX No mandatory phase-out of hazardous materials; Recycling instead
- XX No accountability
- X Collective rather than individual responsibility
- Physical and limited financial responsibility (shipping not funded for biz)
- v Labeling – required by 1996 U.S. Battery Act
- v Ban on waste disposal -- legislated by at least 7 U.S. states

## Comparison with Effective Battery Management Schemes

**Lead-Acid Batteries:** Mandatory deposits or deposit-like ‘fees’ in almost all North America results in 95% recovery. (L-A batteries have \$ value - approx. \$2.50 each?)

**Mercury-Containing Batteries:** Near ban on mercury in batteries in 1996 U.S. law resulted in drastic reduction of releases. (Mercury not essential to power, absorbs gas.)