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Potential "Free Riders" in the US Battery Waste Stream

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Introduction

As part of the battery collection and recycling work by the Dry Battery Section of NEMA in 2011, two reviews of battery waste streams in the US were conducted to try to understand the proportions of NEMA-member to non-NEMA member batteries. Understanding the ratio of NEMA vs. non-NEMA member batteries is important when determining how a state-wide or national collection and recycling program for batteries would be financed. These reviews took place in Lee County, Florida in January 2011 and San Mateo County, California in March 2011. Both locations operate a residential curbside collection program where residents place batteries in sealed plastic bags that are picked up as part of residential recycling collection.

Results

Lee County – 20 January, 2011 (All weights in pounds)

Alkaline and Carbon Zinc Batteries

	AA	AAA	C	D	9V	Total	Percentage
Duracell	137	26	36	166	37.5	402.5	36.3%
Energizer	116.25	17	46	173	25	377.25	34.0%
Other NEMA Members	32.5	4	13.5	36.5	4	90.5	8.2%
Non NEMA	Not broken out individually					240	21.6%

Total sample weight: 1110.25 lbs.

NEMA member companies accounted for 78.4% of alkaline and carbon zinc batteries collected in Lee County during 11 weeks.

Percentages of each size (By Weight / NEMA Members Only)

	AA	AAA	C	D	9V	Total
NEMA Sum (lbs)	285.75	47	95.5	375.5	66.5	870.25
Percentage	32.8%	5.4%	11.0%	43.1%	7.6%	

San Mateo County – 2 March 2011 (All weights in pounds)

Alkaline and Carbon Zinc Batteries

	AA	AAA	C	D	9V	Total	Percentage
Duracell	33	6.8	11.4	31	15.4	97.6	50.0%
Energizer	8.2	2.6	5.4	9.2	6	31.4	16.1%
Other NEMA Members	4	0.4	0.8	1.4	1.8	8.4	4.3%
Non NEMA	35.4	7	2.6	7.6	5.2	57.8	29.6%
Kirkland (part of total Non NEMA)	21.2					195.2	

Total sample weight: 195.2 lbs.

NEMA member companies accounted for 70.4% of alkaline and carbon zinc batteries during the two days of collection represented by the San Mateo sample.

The San Mateo sort showed a very large number of AA Kirkland batteries. While wholesale club batteries do always show up during sorts, NEMA has never observed the large quantity seen in the AA size. The 21.2 lbs. of Kirkland AA batteries represented 26.3% of all AA batteries and was second only to Duracell.

Percentages of each size (By Weight / NEMA Members Only)

	AA	AAA	C	D	9V	Total
NEMA Sum (lbs)	45.2	9.8	17.6	41.6	23.2	137.4
Percentage	32.9%	7.1%	12.8%	30.3%	16.9%	

The San Mateo sort also presented an opportunity to review the entire waste stream of batteries in-depth beyond just the alkaline and carbon zinc types. Details are given below.

Non NEMA Brand AA and AAA Alkaline and Carbon Zinc Batteries – Brands
(Not Including Kirkland AA)

AA Size

Brand	Count	% Total
555	3	2.1%
+Zero	1	0.7%
AC Delco	1	0.7%
Aerolatte	3	2.1%
CVS	11	7.7%
Desay	1	0.7%
Dynex	1	0.7%
East Power	2	1.4%
EMAX	2	1.4%
Fidak	1	0.7%
Fuji	9	6.3%
Golden Power	7	4.9%
GP	11	7.7%
Greencell	4	2.8%
Hong Feng	2	1.4%
HW Max	3	2.1%
IKEA	2	1.4%
Kendal	3	2.1%
Legion	1	0.7%
Mallory	3	2.1%
Mastercell	1	0.7%
Maxell	7	4.9%
New Leader	2	1.4%
New Star	1	0.7%
Ningli	2	1.4%
Pakko	1	0.7%
Philips	6	4.2%
Radio Shack	1	0.7%
Rite Aid	6	4.2%
Rocket	4	2.8%
Safeway	5	3.5%
Sony	2	1.4%
Sunny Select	5	3.5%
Ultralast	1	0.7%
Universal Electronics	5	3.5%
Varta	2	1.4%

AAA Size

Brand	Count	% Total
Bexel	21	13.5%
CVS	2	1.3%
Kirkland	56	36.1%
AC Delco	7	4.5%
Longs Drugs	4	2.6%
Safeway	4	2.6%
Thrify Pay Less	2	1.3%
PowerFuel/Hasbro	2	1.3%
Vinnic	5	3.2%
GP	10	6.5%
Blackstone	3	1.9%
NEBO	2	1.3%
Golden Power	10	6.5%
Maxell	5	3.2%
RCA	4	2.6%
AO WEI	5	3.2%
NOVA	2	1.3%
Fuji	2	1.3%
Walgreens	2	1.3%
Rite Aid	1	0.6%
Large	1	0.6%
Supergard	1	0.6%
Audiovox	3	1.9%
Philips	1	0.6%
Total	**155**	

Vinergy	3	2.1%
Vinnic	5	3.5%
Walgreens	2	1.4%
Zhaoneng	11	7.7%
Total	143	

Rechargeable Batteries

Chemistry	**Total Units**	**Weight (lbs)**
Lithium Ion	32	11.2
Lead Acid	2	1.6
Rechargeable Alkaline	2	0.2
Nickel Metal Hydride	60	9.2
Nickel Cadmium	101	28.2
Total	**197**	**50.4**

Lithium Batteries

Type	**Brand**	**Number**
2016 (Coin)	Panasonic	1
	Energizer	1
2032 (Coin)	Lixing	2
	Energizer	8
	Panasonic	4
	Duracell	2
	Other	6
1216 (Coin)	Panasonic	1
AA	Energizer	14
AAA	Energizer	10
123	Not recorded	6
223	Not recorded	2
CRV3	Energizer	4
2CR5	Not recorded	2
Total	**--**	**63**

Button Batteries

Type	**Number**
LR44	4
Unknown 44 size	2
SR44	3
AG-10	1
SR-1135	2

L1154	6
GPA-76	2
357/303	2
357	1
675 Size (Zinc Air)	5
10 Size (Zinc Air)	6
13 Size (Zinc Air)	32
312 Size (Zinc Air)	54
SR521SW	1
392	5
Total	**126**

Total Weight – Button Cells (including lithium coin): 19.6 lbs.

Other Battery Types

Type	**Number**
N-size alkaline	6
A23 Button Cell Stack	9
Total	**15**

Combined Results

Using a weighted average of both sorts, when considering alkaline and carbon zinc batteries, NEMA members account for 77.2% of the batteries entering the waste stream.