

- SMnN
 - Nickel: 1.3 %
 - Copper: 1.1 %

– Cobalt 0.2 %

Replacement:

- Magnets: Barium, strontium, neodium, nickel
- Paints: Cerium, Iron, lead, manganese, vanadium
- Jet engines: nickel
- Batteries: manganese, nickel,

2014	mined	refined	tons
Australia	V	V	5400
Belgium		V	5850
Botswana	V		
Brazil	V	V	1400
Canada	V	V	5250
China	V	V	39300
Cuba	V		
Finland		V	11450
France		V	220
India		V	100
Japan		V	3650
Madagascar	V	V	2950
Morocco	V	V	1400
N. Caledonia	V		
Norway		V	3600
Russia	V	V	2300
South Africa	V	V	3300
DR Congo	V	V	3300
Uganda		V	0
Zambia	V	V	4300

year	Cobalt reserves (ton)	Production (ton)	Recycling %	Tesla (ton)	E-cars (ton)
1990	3 300 000		14 %	0	
2005			20 %*	0	
2010	4 600 000	30 800	30 % ?	0	
2014		92 000		945	18 400
2016	7 100 000	?	40 %**	2700	32 400
2020	?	?	?	13 500	54 000

*20 % equalled 10 000 t

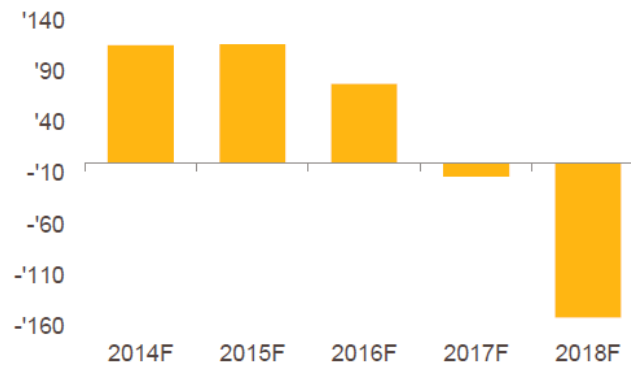
** EU target Li-ion batteries

1 deep sea mining operation:

CO: 4 000 tons / year

Ni: 22 000 tons / year

2014 - 2018 Nickel Market Balance (kt)



Li-ion battery market worldwide by application in volume, 2014 (50 GWh)

