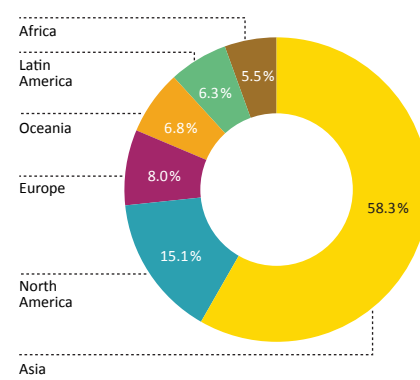


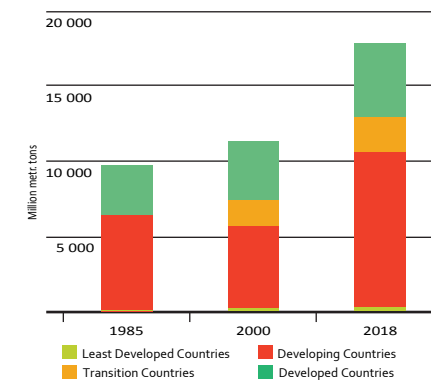
Minerals – Lifeblood of the economy

Major current
developments
in global mining
production based on
World Mining Data
2020

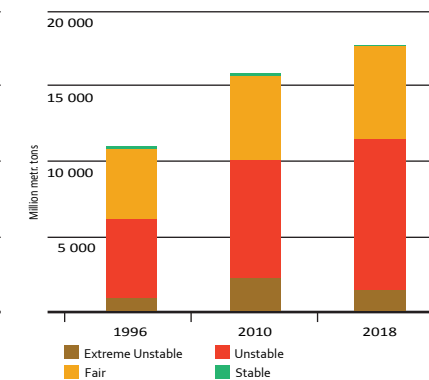
Total production 2018
by continents



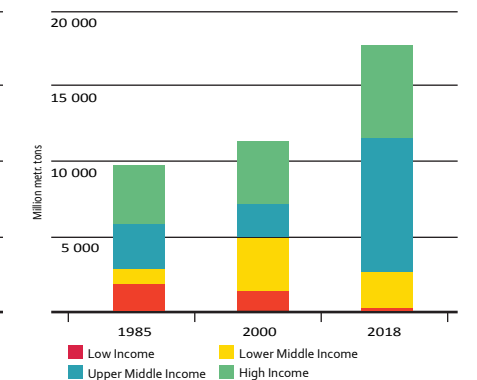
Development status of
producer countries



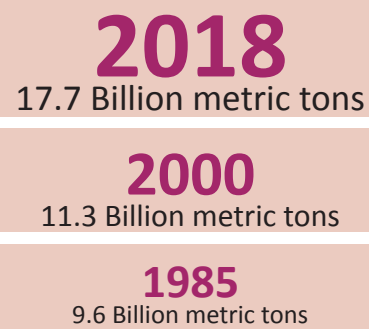
Political stability of
producer countries



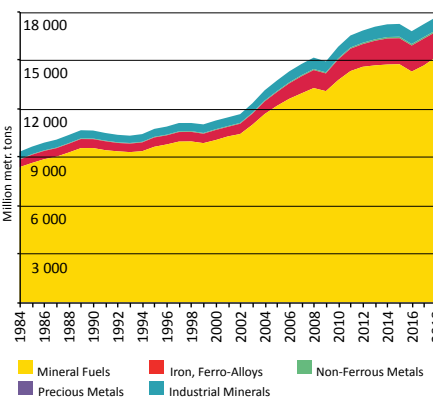
Per capita income in USD –
Mineral production contributes to wealth



World mining production



Total mining production 1984–2018



Non-Ferrous Metals

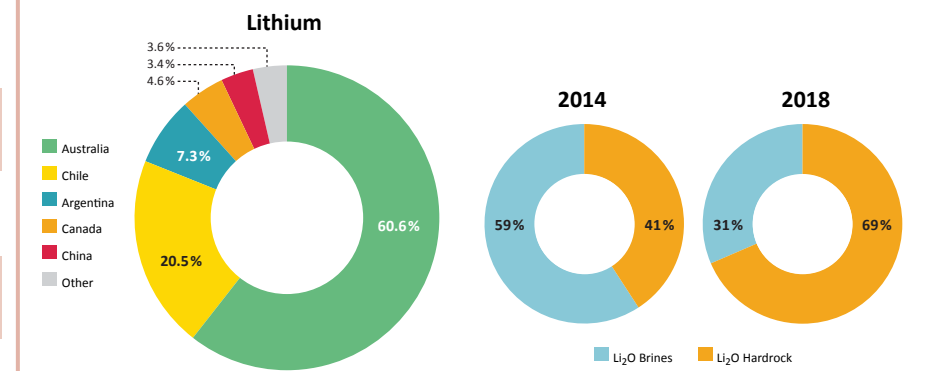
Ratio of 4 base metals Al, Cu, Zn, Pb to all other Non-Ferrous Metals

99.1% to 0.9%

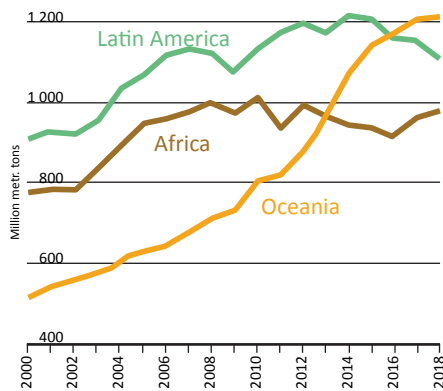
Growth rate of total Non-Ferrous Metals production 2000/2018 (2017/2018)

103.8% (+2.7%)

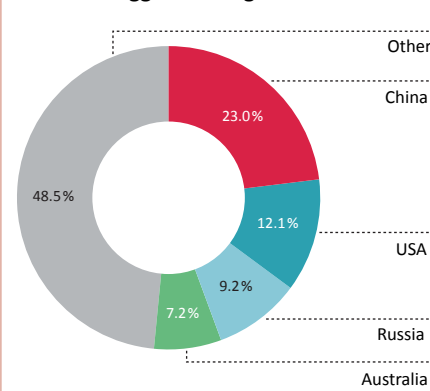
Key commodities for battery technology: Lithium, Cobalt, Manganese, Graphite



Minerals production: Oceania passed
Africa in 2013 and Latin America in 2018



China, USA, Russia and Australia
are the 4 biggest mining nations



Key commodity Iron Ore

Ratio of Iron Ore to all other Ferro-Alloy Metals

97.1% to 2.9%

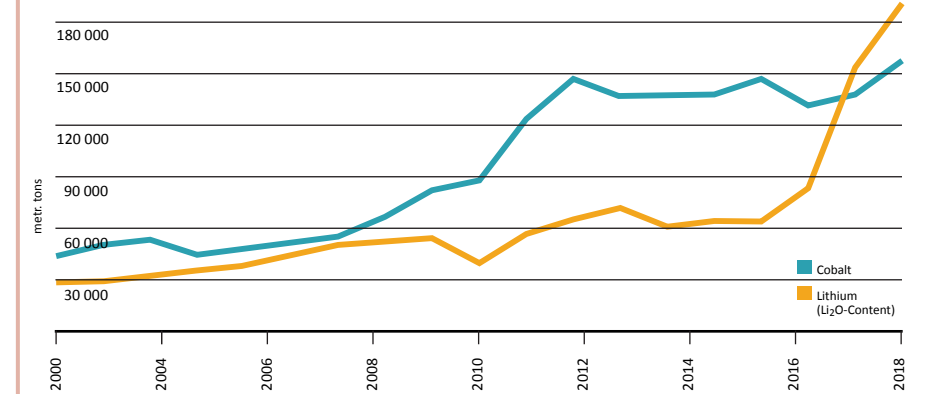
Growth rate of total Iron Ore production 2000/2018 (2017/2018)

151.5% (-6.5%)

Big changes

Commodity	Δ 2000/2018
Lithium	596.4%
Gallium	521.2%
Cobalt	265.2%
Arsenic	-7.5%
Phosphates	-22.8%
Tantalum	-40.4%

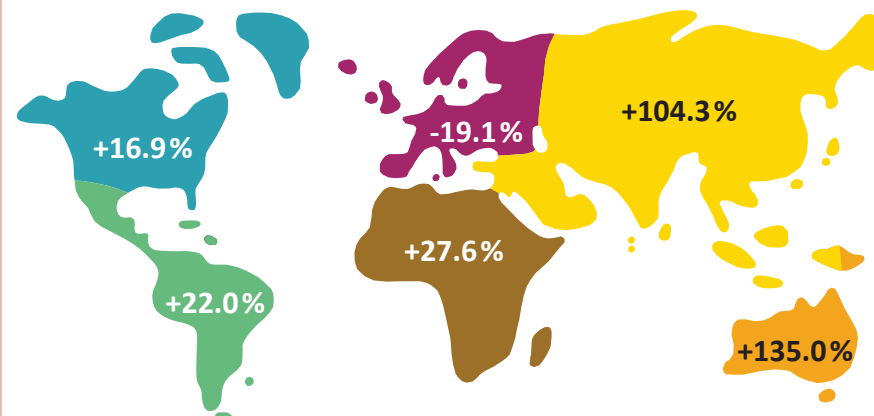
Strong increase in Lithium and Cobalt production in the last 10 years



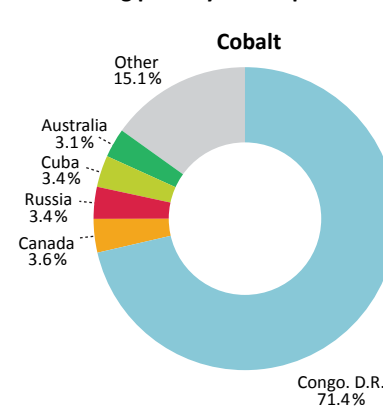
China is world's largest producer
of 32 different commodities:

- 4 Iron and Ferro-Alloy Metals: Mo, Ti, W, V
- 14 Non-Ferrous Metals: Al, Sb, As, Bi, Cd, Ga, Ge, In, Pb, Hg, REE, Te, Sn, Zn
- 1 Precious Metal: Au
- 11 Industrial Minerals: Baryte, Bentonite, Fluorspar, Graphite, Gypsum, Kaolin, Magnesite, Phosphates, Salt, Sulfur, Talc
- 2 Mineral Fuels: Steam Coal, Coking Coal

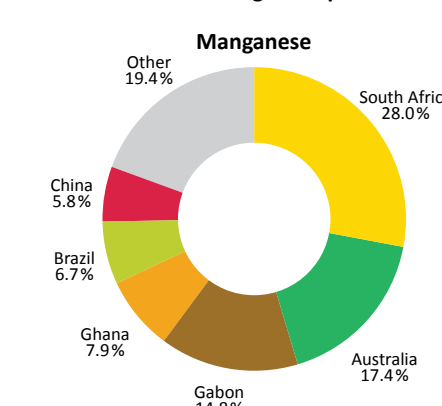
Declining production rates since 2000 only in Europe – Δ 2000 / 2018



Since decades Congo D.R. is
dominating primary Cobalt production



Largest 6 producer countries
share 80.6% of Manganese production



China leads Natural Graphite
production since the early 1990's

