Pasi Eilu (Geological Survey of Finland), 20 January 2023

Commodity	**Manganese (Mn)**	**Data source**
Significance for the EU (2023)	*Critical; Strategic if battery grade*	
Uses of the commodity	Main uses: *Steel (about 90 %)* Minor uses: *Aluminium-manganese and copper-manganese alloys, dry-cell and lithium batteries, pigments, catalysts, fertilizers* Major future uses: *Steel; battery use increasing rapidly but remaining minor relative to Mn demand in steel*	Eynard et al. (2020)
Resources and potential in Nordic countries	*Known resources: more than 4,700,000 t, of which almost half is in the Talvivaara deposit in Finland; the rest in iron ores in Finland and Sweden.* *Resource potential:* *Finland: 3.4 Mt Mn. Major potential is Talvivaara-type Ni-Zn ores, some in BIF* *Greenland: No records of Mn occurrences* *Iceland: unknown* *Norway: Only insignificant Mn occurrences are known from Norway* *Sweden:1.03 Mt Mn. Main potential is in iron deposits.*	Eilu et al. (2021, 2022)
Anthropogenic resources and potential in Nordic countries	*Scrap steel, steel plant slags(?), black schist mine tailings (Terrafame Sotkamo mine)*	
Main deposit types in Nordic countries	*Black schists, BIF*	Eilu et al. (2022)
Main global deposit types	*SEDEX, manganiferous BIF, supergene, hydrothermal vein, Mn nodules*	Eynard et al. (2020)
Global production (2022)	*20,000,000 t in Mn content of mined ore. Total smelter production not known (Chinese Mn-alloy production considered very large; however, volume of Mn alloys unknown)*	Idoine et al. (2022), USGS (2023)
Nordic production (2021, 2022)	*No current mine production in the Nordic countries, whereas Sweden has historic extraction. Norway: 270,000 t ferro-manganese, 230,000 t silico-manganese, both from imported manganese ore.*	
Main producing countries (2022)	*Mine production: South Africa 36 %, Gabon 23 %, Australia 16.5 %, China 5 %, Ghana 4.7 %, India 2.4 %, Ukraine 2 %* *Mn-alloy production: apparently dominated by China, other major producers include Ukraine, Japan, South Korea, Norway*	Idoine et al. (2022), USGS (2023)
Technological challenges in production	*Fairly established, but energy-hungry technologies*	Eynard et al. (2020)

Recycling	Present: *Recycled as scrap steel >50 %. Other recycling minor.* Future: *Probably also recycled from batteries*	Eynard et al. (2020)

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