

Observations concerning Estonian mineral resources management

riikka.aaltonen@tem.fi

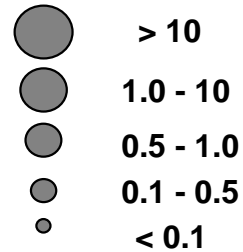


Ministry of Economic Affairs
and Employment of Finland

Mining industry in 2016

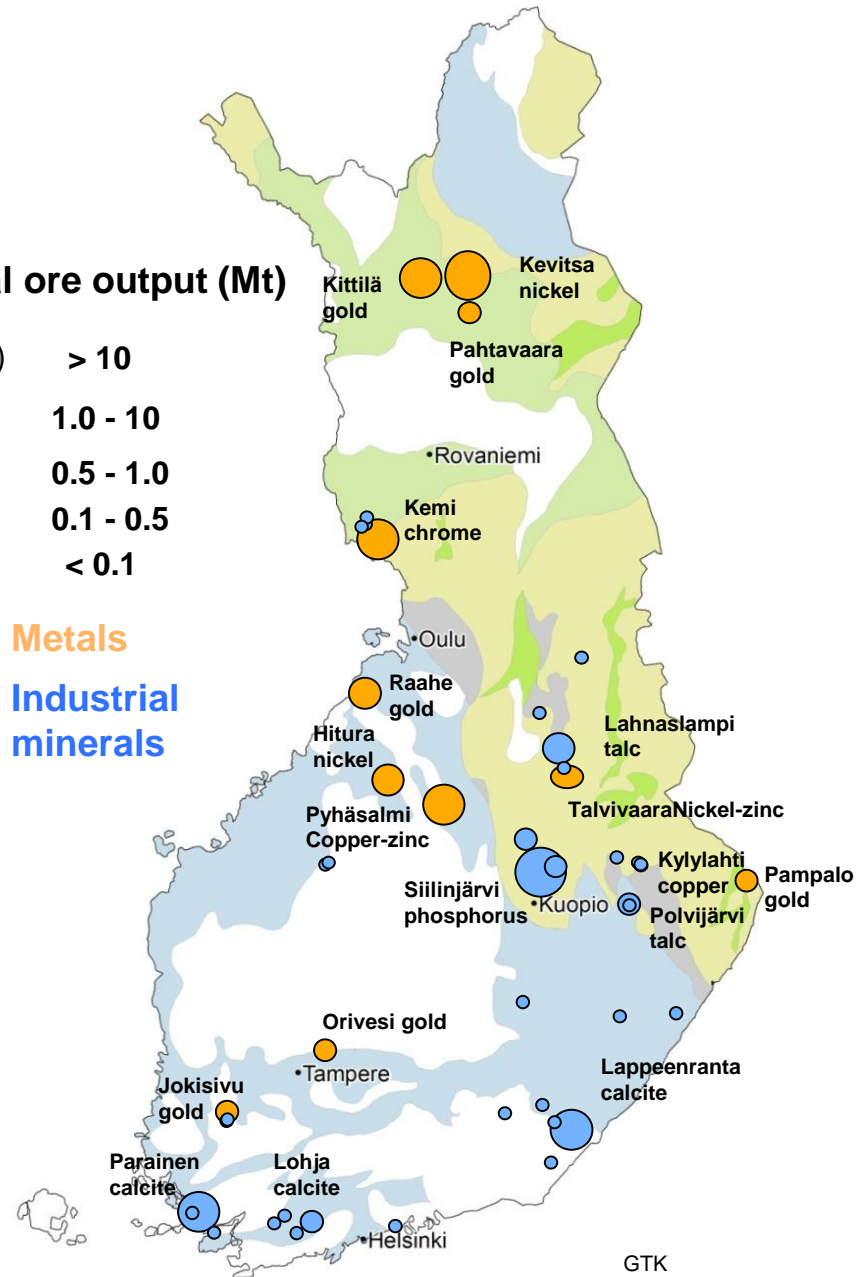
- Two projects on the way:
- Lithium mine, Kaustinen
- Silver mine, Sotkamo

Annual ore output (Mt)



Metals

Industrial minerals



GTK

Mining in Finland 2008-2016

| | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|---------------------------------------|---------------------|------|------|------|------|------|------|------|------|
| The number of mines (reported mining) | 42 | 45 | 40 | 46 | 50 | 52 | 51 | 47 | 45 |
| Investments (M€) | 242 M€. (+54 %) | 157 | 190 | 200 | 320 | 555 | 297 | 150 | 578 |
| Mining of ore (Mt) | 43,7 Mt (+33 %) | 32,9 | 29,5 | 36,5 | 34,8 | 33,2 | 33,9 | 24,1 | 22,2 |
| Mining, total volume (Mt) | 117,2 Mt (+31 %) | 89,2 | 74,8 | 79,4 | 68,4 | 72,0 | 71,5 | 55,4 | 38,8 |

Exploration in Finland 2007-2016 (31.12.2016)

| | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 |
|--|-----------------------------|-------------------------------|-------------------------------|--------------------------------|-------|------|------|------|------|------|
| Investments, m€ | 40,7 +18 % | 34,5 (-12 %) | 39,1 (-26 %) | 52,8 (- 40 %) | 86,8 | 81,0 | 60,8 | 50,5 | 60,1 | 54,3 |
| Companies | 40 | 42 | 41 | 38 | 45 | 52 | 49 | 42 | 45 | 38 |
| • Reservation notifications | 68 | 50 | 61 | 64 | 197 | 178 | 138 | 123 | 98 | 160 |
| • Exploration applications | 98 | 70 | 120 | 125 | 250 | | | | | |
| Area of exploration permits, km ² | 1700 | 1930 | 1850 | 1400 | 1310 | 1080 | 890 | 960 | 1100 | |
| Area of applications, km ² | 2160 | 1980 | 3900 | 5450 | 8210 | 4620 | 2700 | | | |
| Drilling, km | 178 +37% | 130 | 142 | 179 -51 % | 366 | 369 | 363 | 271 | 340 | 223 |
| • Grassroot | •20 | • 23 | • 26 | • 32 | • 36 | | | | | |
| • Greenfield | •57 | • 51 | • 46 | • 51 | • 103 | | | | | |
| • Brownfield | •101 | • 56 | • 70 | • 95 | • 227 | | | | | |

General observations 1/2

- Estonia has high material consumption per capita – as has Finland
- How to use the waste? Wrong place and quality
- Legislation from EU-directives, coherence
- Specific permitting, in Finland aim "one-stop-shop" (Netherlands model) ongoing
- Environmental incentives to industry: research co-operation, materials efficiency, new business – might be more effective than just taxes
- Oil shale mining going underground, public acceptance better?
- Oil shale: environmental key issue
- Oil shale: from energy to more added value products?

- Self-reporting, results online for public?
- Restoration – guarantee in permits in case of bankruptcy?

General observations 2/2

- Mining has huge impact, in so many aspects
 - Environmental: air, water, land use, waste generation ...
 - Social
 - Economic, energy supply, supply security
- Big steps made in developing mining towards sustainability
- Regulation is complicated, maybe even for industry and administration
- New technology and new ways of working
- More collaboration between industry-research?



SWOT analysis

Strengths

- Good ore potential, **geological knowledge**
- Skilled work force
- Companies developing mining technology
- Mining related research, companies have co-operation with universities
- Mining safety

Weaknesses

- Lengthy permitting processes
- Infrastructure lacking in some cases
- **Anti-mining attitudes**
- Inflexible labourmarket
- The number of separate authorities involved
- Difficulty to attract international specialists

Opportunities

- **Development of clusters/ecosystems**
- Investments in infrastructure
- **Development of value chain**
- New ore deposits
- Contact person to ease authority contacts

Threats

- **Unpredictable political decisions**
- Raw materials prices
- Energy price
- Dysfunctional permitting processes and lacking infrastructure stops mining investments



Conclusions

- **Clear strategies and objectives, coherence of strategies**
- **Processes and responsibilities are clearly described**
- **Development plan – education, research, ecosystems**
- **Taxes – incentives**

A faint, light blue watermark of a lion's head is centered in the background. The lion is facing left, wearing a crown with three circular jewels. It has a large, flowing mane and is holding a sword in its right paw. The watermark is semi-transparent and blends with the dark blue background.

**Thank you for
your attention!**