Social Acceptance of The Mining Industry in the Nordic and European Context

Experiences from FAME and other EU Projects

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FLEXIBLE AND MOBILE ECONOMIC PROCESSING TECHNOLOGIES (FAME)

FAME Overview
- Increase the competitiveness of European mining enterprises
- Introduce private engagement and investment in the European mining sector

FAME WP6
ENVIRONMENTAL AND SOCIO-POLITICAL ASSESSMENT (ESA)

OBJECTIVES
- To provide criteria for an environmental and socio-political assessment
- To demonstrate the techno-economic feasibility
- To assess impacts/potential risks from the developed technologies and products
- To reduce the impact of the developed technologies on environment, health and safety (EHS)
- To develop an Environmental Management Plan
- To secure acceptance of the FAME project by the public
- To prepare for the authorization and future implementation of the developed processes
MINING IN EUROPE

The Nordics has emerged as the “hot spot” of mining in Europe...

The Fennoscandian shield is one of EUs most important mining regions

Represents:
- 90% of iron ore production
- 80% of Gold
- 33% of Lead
- 21% of Zinc (Ireland 48%)
- 20% of Silver (Poland 73%)
- 10% of Copper (Poland 60%)

2008 EU-27 Statistics

HEALTH AND SAFETY – WORKING CONDITIONS

Control room – Beneficiation plant (Boliden)

Control room – RC of wheel loaders, and underground transport (LKAB)
COMMUNITY INVOLVEMENT INITIATIVES

- Music festival in open pit mine, Nordkalk, Parainen, Finland
  (Source: SITRA Sustainable Mining Report 2011)

- Building trust with Sami communities, Semisjaur-Njarg village, Arvidsjaur, Sweden
  (Source: Boliden Sustainability Report)

- Sponsoring of female basketball team Northland Resources, Pajala, Sweden
  (Source: Northland Resources)

- Open door day at Kittilä gold mine, Agnico Eagle, Kittilä, Finland
  (Source: SITRA Sustainable Mining Report 2011)

- Kiruna city transformation resulting from iron ore mining in northern Sweden
  (Source: Stadsflytten.nu)

- Water sampling at Aitik mine
  (Source: Luleå University of Technology)

- Land stability and particulate emission monitoring, Gällivare/Malmberget, Sweden
  (Source: LKAB Sustainability report)
KIRUNA CITY TRANSFORMATION, SWEDEN

MINING IN SENSITIVE AREAS

Golden eagle and moor frog in Finland
Keliber lithium project in Finland
(Source: Keliber)

Tailings pond in natural park
British flourspar in Derbyshire, UK
(Source: BFL)
NATIONAL INTERESTS

- Term/system used in Sweden and Finland
- Area, location or individual object (or activity) considered important and where long-term protection is needed
- Can be related to cultural heritage, areas of strategic or economic national importance, environmental protection, etc
- Swedish national interests
  - Communications and infrastructure
  - Fishing and reindeer herding
  - Energy supply (e.g. windpower)
  - Mineral resources
  - Cultural environments
  - Outdoor life

- Trade-off between exploitation interests and conservation interests
- What happens if two or more interests are mutually conflicting?

THE MINERAL INDUSTRY

Open pit copper mine in northern Sweden
(Source: SGU)

REINDEER HERDING

Reindeer herding in Northern Sweden
(Source: Jan Rosenkrantz)

SWEDISH NATIONAL INTERESTS

THE MINERAL INDUSTRY

Open pit copper mine in northern Sweden
(Source: SGU)

INDIGENOUS PEOPLES RIGHTS

Sami demonstrating against mining projects
(Sources: Sapmi, Arjeplogsnytt)

Environentalists blocking road at Kallak project
(Source: Internationalen 2013)
**SWEDISH NATIONAL INTERESTS AND LAND USE**

- Forest: 53%
- National parks & protected land: 10.4%
- Reindeer herding area: 30%
- Developed land: 3%
- Grassland: 7%
- Water: 9%
- Open bogs: 8%
- Rock, mountains: 12%
- Farmed land: 8%
- Wind farms: 0.2%
- Mining concessions: 0.04% (1.3% of developed land)
- Golf courses: 0.06%

European Environmental Agency: Land use – State and Impacts (Sweden) 2010

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**INDUSTRY PERSPECTIVE**

- Long and expensive permitting procedures, often involving many different government bodies
- Stricter requirements by financial institutions on Equator principle compliance
- Strong focus on resource efficient production, energy saving, water conservation, etc
- Mining and metals industry becoming ever more important in green transition and circular economy
- Handling of process rejects and other waste fractions, as well as remediation measures has emerged to one if the most important mine activities

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**EQUATOR PRINCIPLES**

1. Review and Categorisation
2. Environmental and Social Assessment
3. Applicable Environmental and Social Standards
4. Environmental and Social Management System and Equator Principles Action Plan
5. Stakeholder Engagement
6. Grievance Mechanism
7. Independent Review
8. Covenants
9. Independent Monitoring and Reporting
10. Reporting and Transparency
THE SMART MINE OF THE FUTURE (SMIFU)

Processing
- More efficient comminution
- Process optimisation
- Water conservation and re-use

Waste handling
- Safer and better residue handling
- Waste-to-products ("zero-waste mining")
- Zero discharge policy
- Remediation and protective actions at end of life

Beneficiation Plant

Transport
- Energy efficient logistics

Industry/Society

Local community
- Municipal heating (if applicable)

Pre-concentration
- Leave more waste underground
- Minimise "unnecessary" transport
- Avoid production of fine tailings

Zero-entry production (RC and robotics)
- Improved workforce safety

Mining

Partly adapted from http://www.rocktechcentre.se/core-business/smifu/

ENERGY SAVINGS IN LOGISTICS

IORE Locomotive on Malmbanan with energy feedback system

Record feedback 6200kWh of 8400kWh used (2012)
74% energy saving!
FINDING THE BEST PRACTICE...

• Can we find a systematic approach to evaluate the most sustainable practice in mine residue handling...
• ...taking into account site-specific conditions
• ...involving all 3 dimensions of sustainability?


LAYMAN EDUCATION ON MINERALS AND METALS PRODUCTION

“Class of 2015” – COBALT Course Pilot

Introducing non-technical stakeholders (authorities, NGOs etc) to technical, environmental and social aspects of mineral and metals production, possibilities and constraints of recycling and circular economy...
CONCLUSIONS – WHAT HAVE WE LEARNT

CIVIL SOCIETY AND LOCAL COMMUNITIES

• Groups or persons with negative attitudes rarely change their mind as result of debate/dialogue (Lindahl et al. 2016), neither on local projects nor in general
  • Negative attitudes often arise as result of fear, overestimating risks and impacts, or past negative experiences
  • Negative attitudes can, however, also be legitimate

• Continuous efforts needed to educate wider society on general issues related to raw material management, including possibilities and constraints of the circular economy, urban mining, ... (COBALT/LAYTERM)

• Multiplier organisations (WWF, Friends of the Earth, ...) play a key role for successful outreach

CONCLUSIONS – WHAT HAVE WE LEARNT

INDUSTRY AND BUSINESSES

• Focus on responsibly carrying out operations, implementing best practices (technical, environmental, health and safety)

• Informative and honest interaction with local communities, inclusiveness in decisions – create and maintain trust (CSR, SLO, FPIC, etc...)

• Wider society perspectives mainly handled by branch organisations

• Huge variation between successful/catastrophic handling of community/civil society communication – must be possible to share best practices/experiences between companies?

• Social acceptance promoted by industry being part of green transition/circular economy (value chain integration, business model development, etc.)
CONCLUSIONS – WHAT HAVE WE LEARNT

ACADEMIA
- Modification of technical education
  - Include communication skills (e.g. negotiation, dialogue), social and environmental aspects (1st and 2nd cycle studies)
  - Partly vice versa for other fields
- Dedicated educations with more emphasis towards “soft skills” – “Mining MBA”, “Master in Mineral Resources Management”, etc.
- Lifelong learning initiatives - Offer single courses in “soft skills” to professionals active in industry
- Should take its role as independent source for public information and outreach
  - Layman courses on raw materials (LAYTERM)
  - Facilitator or participant in events (e.g. stakeholder dialogue meetings)
  - Etc...

BEAUTY IS IN THE EYE OF THE BEHOLDER

Machu Picchu
- Constructed around 1440
- World Heritage since 1983
- Visited by 400,000 tourists p.a.
- Area 38,000 ha

Source: The Innovation Diaries

LKAB Kiruna, Sweden
- Operational since 1890s
- Largest iron ore mine in Europe and World's largest underground iron ore mine
- Visited by 25,000 p.a. (visitors mine at 300m)
- Area 3,600 ha (approx)

Source: Johan Ylitalo