REGULATORY POLICY FOR SUSTAINABLE NATURAL RESOURCES DEVELOPMENT

Joint Meeting of the
NATIONAL RESEARCH COUNCIL
BOARD ON EARTH SCIENCES AND RESOURCES
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A GRAND CHALLENGE:
Sustainable Natural Resources Development on a Small Planet

Sustainable Development:
...meeting the needs of the present without compromising the ability of future generations to meet their own needs. (UN, 1987)

What regulatory policies encourage sustainable mineral resource development?

What regulatory policies encourage sustainable availability of mineral resources?
LIFE CYCLE ANALYSIS

RESOURCE DEVELOPMENT

Exploration
Extraction (Mining)
Reclamation

METALS

Primary Product
Fabrication
Recycle
Tertiary Product

SUSTAINABLE RESOURCE DEVELOPMENT

LAW

SCIENCE

PRIORITY
SUSTAINABILITY OBJECTIVES

**LAW**
- Protect air, land and water quality
- Preserve view-sheds
- Do not endanger wildlife
- Assure reclamation
- Maximize recovery
- Protect worker health/safety
- Protect community health/safety
- Generate revenues to cover community impacts
- Provide good-paying jobs
- Create economic prosperity
- Do not replicate legacy mining abuses
- Demonstrate responsible corporate governance

**SCIENCE**
- Establish sustainable mineral priorities
- Increase minerals and mineral products recycling
- Expand resource accounting to include recycling, material flows analysis, and lifecycle cost

**POLICY**

RECYCLING EXAMPLES

**ELECTRONICS**
- 1 Mt Circuit Boards
  - 80 – 1500 g Gold
  - 160 -210 kg Copper
- HP – Noranda Partnership
- 1400 t PC/e-scrap monthly
  - 10X precious metals in primary ores
- Est. 75% PCs not recycled
  - 135,000 t to landfills/yr

(www.usgs.gov)

**CELL PHONES**
- 1Mt Cell Phones
  - 140 kg Copper
  - 3.14 kg Silver
  - 300 g Gold
  - 130 g Palladium
  - 3 g Platinum
  (Falconbridge, 2005)
- 14,000 Mt cell phones retired/yr
- Less than 1% recycled

(www.usgs.gov)
Incorporate Science in the Policy-Making Process

*Include* a range of respected scientists.

*Undertake* a peer review of scientific findings whenever and wherever possible to ensure that all issues are addressed appropriately.

*Make decisions* based on the best information available.

*Identify* the importance of factors other than science that may affect the decision.

*Educate* the public about the science used.

*Monitor* outcomes.

(EnLibra, Oquirrh Institute)

**NEXT STEPS**

**LAW**
- Include stakeholders upfront
- Reduce emissions
- Improve efficiencies
- Offset impacts
- Fund reclamation during mining
- Zero-tolerance safety policy
- Responsible community partner
- Responsible business practices
- Leadership
- Demonstrate responsible corporate governance

**SCIENECE**
- Facilitate mining and manufacturing recycling partnerships
- Follow-up on BESR/CER studies regarding material flows analysis and critical minerals
- Identify technology and business challenges and solutions
- Improve communications

**POLICY**

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