RESOURCE REPORTING

THE FIRST STEP IN SUSTAINABLE MINING

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BY

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THE OPTIONS

- "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

<u>However</u>

- Without development of Europe's resources we are condemning future generations to dependency on others to supply their needs.

ICMM and CRIRSCO

WHO ARE WE?

INTERNATIONAL COUNCIL ON MINING AND METALS

Committee for Mineral Reserves International Reporting Standards
www.crirsco.com

ICMM International Council on Mining & Metals

- ICMM is a CEO-led collaborative of 17 companies and 30 mining and commodity associations;
- It provides a means for joint action on sustainability related issues important to the mining industry
- With the objective of creating and maintaining an industry that is widely recognised as a key contributor to sustainable development

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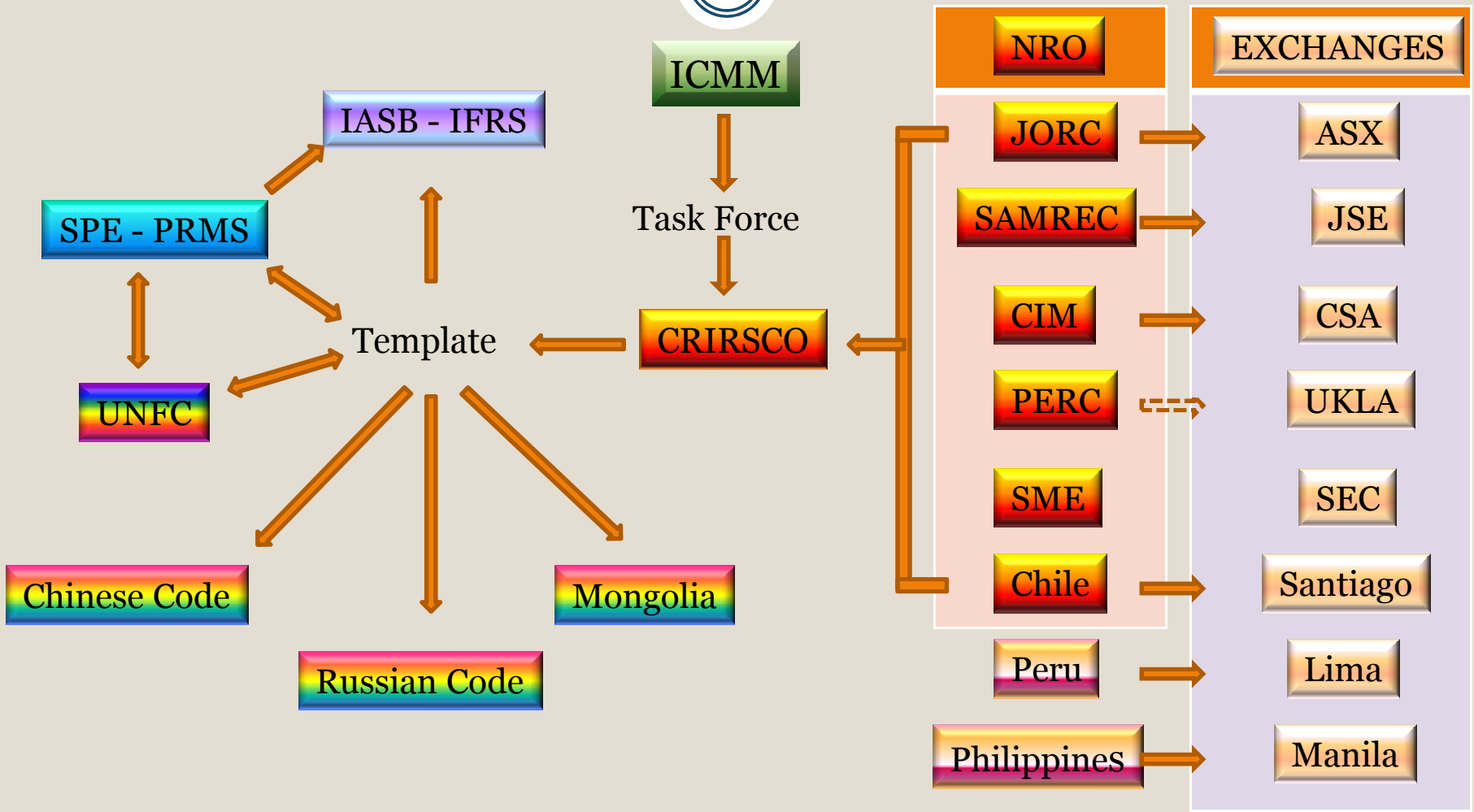
CRIRSCO

ICMM
International Council on Mining & Metals



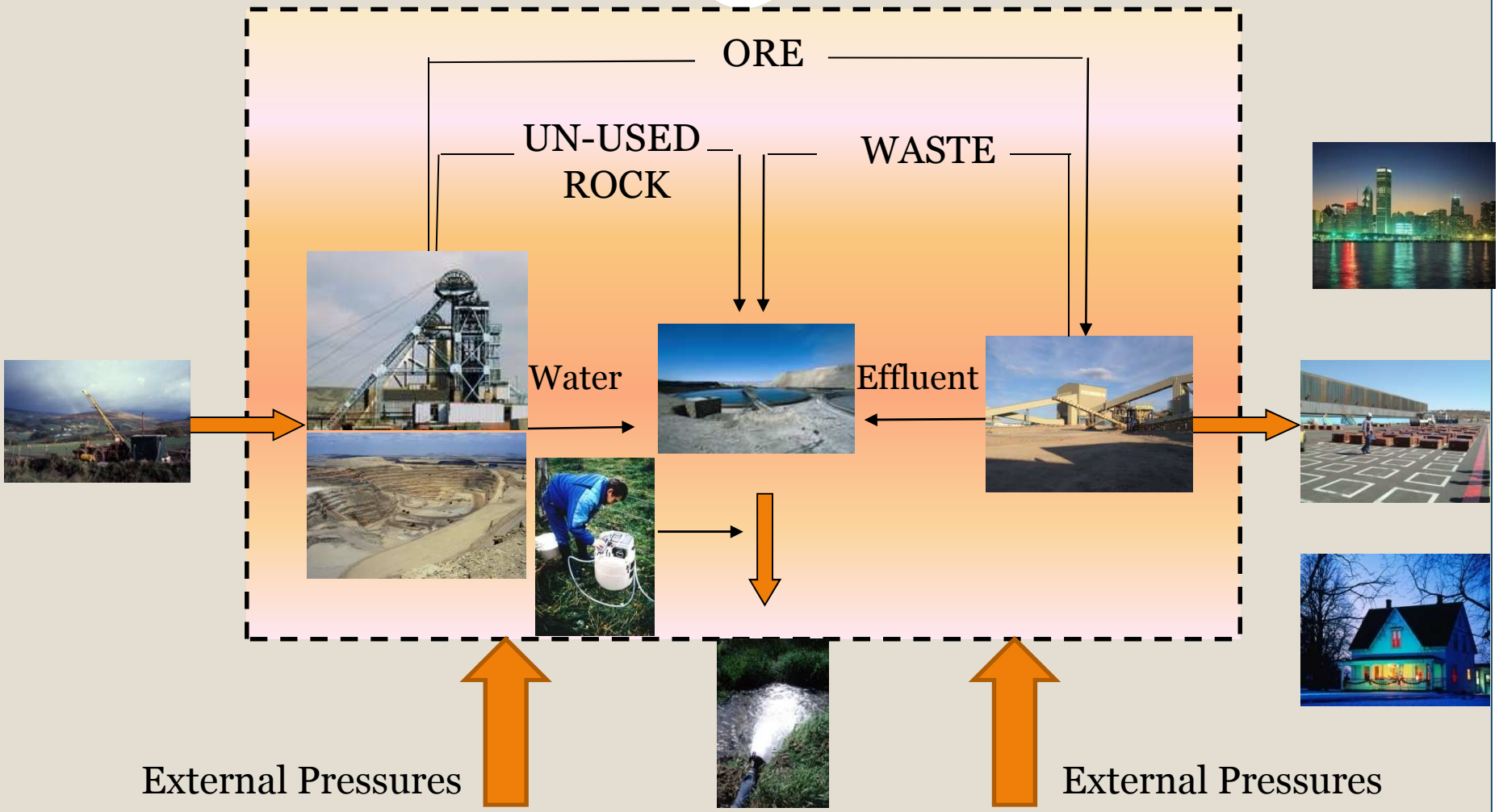
THE RESOURCE BUSINESS

THE EXPLORATION PROCESS

Concept

Budget

THE MINING BUSINESS



Adapted from diagram N. Weatherstone 2005

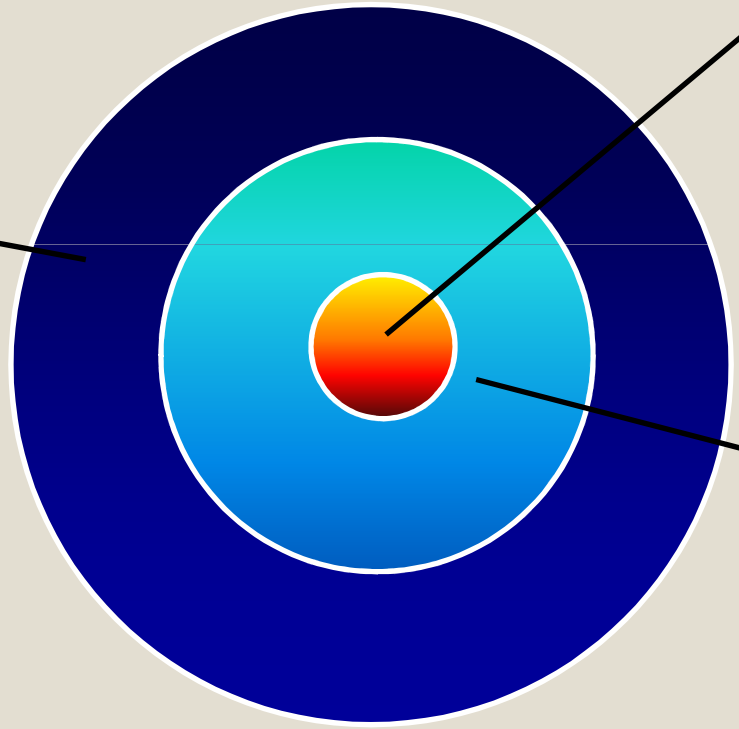
ESTIMATION INFLUENCES

PROJECT TEAM

Geology, Mining, Processing, Environmental, Social, Economic

EXTERNAL

Financial institutions, Public Consultation, Local and Regional Government, Industry Regulations, NGO's



CORPORATE – INTERNAL

Policy, Tax, Legal, Suppliers, Contractors, Consultants, Marketing

ROLE OF RESOURCE ESTIMATOR

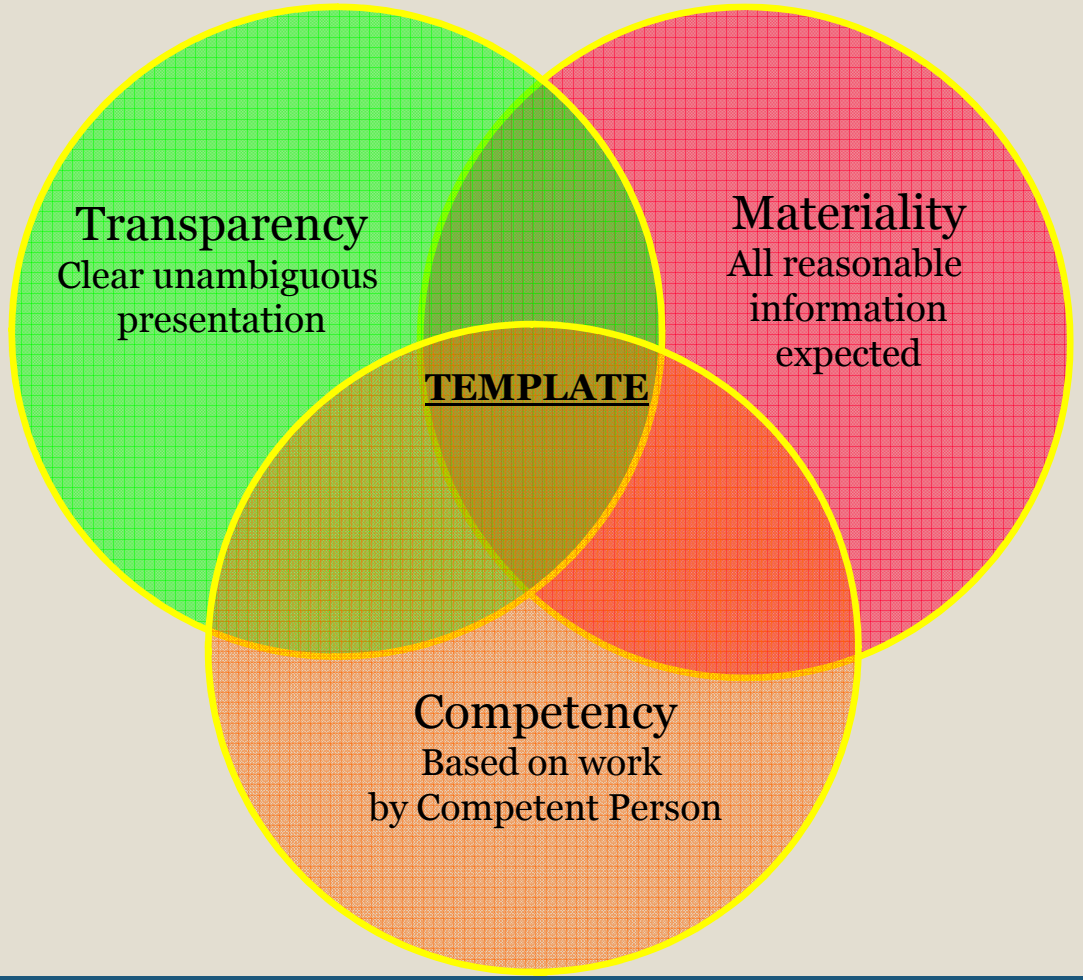
PERC CODE

THE COMPETENT PERSON

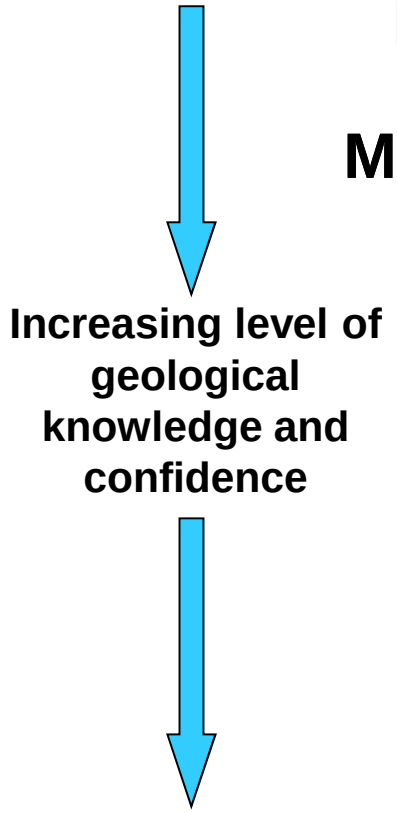
Rules of Conduct and Guidelines

- Duty To:
  - The Public and Society;
  - The Profession, Employers and Clients;
  - Professional Bodies, Colleagues and Associates;
  - The Environment, Health and Safety

CRIRSCO STYLE CODES



Relationship between Exploration Results, Mineral Resources & Mineral Reserves



Exploration Results

MINERAL RESOURCES **MINERAL RESERVES**

Inferred

Indicated **Probable**

Measured **Proved**

Consideration of mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors (the "Modifying Factors").

MINERAL RESOURCE

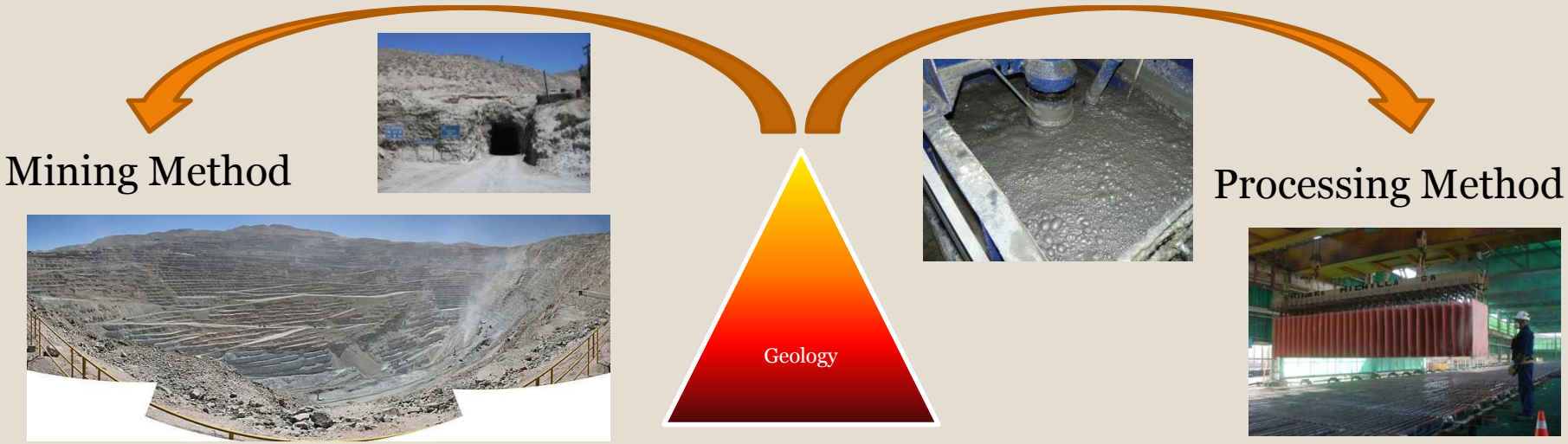
A *Mineral Resource* is an **estimate** of tonnage and grade for a mineralised body, based on sampling of that body.

The estimate represents a realistic inventory that, under assumed and justifiable technical and economic conditions, might, in whole or in part, have **reasonable prospects for eventual economic extraction**.

Portions of a deposit that do not have reasonable prospects for eventual economic extraction are **NOT** Mineral Resources

RESOURCE ESTIMATION

- Geological Contacts
  - Lithological: Formation, Textural, Alteration, Metamorphic
  - Structural: Post- or Pre-mineral
- Geometallurgical Contacts: Density, Mineralogy, Metallurgy
- Grade Cut-off Contacts: Grade Continuity and Distribution



Geological Model: Continuity, Mineralogy, Grade

MINERAL RESERVE

Economically mineable part of a Measured and/or Indicated Mineral Resource, **including additional material and losses** which may occur **when the material is mined**

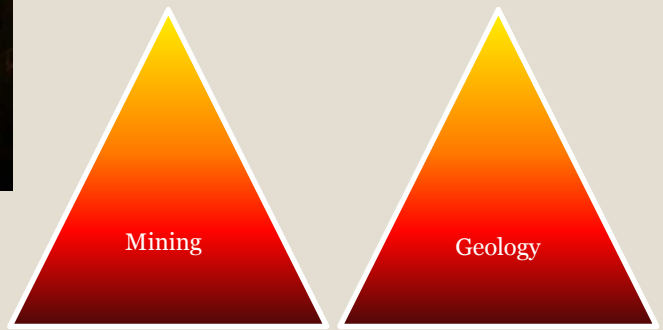
Appropriately detailed technical/economic studies have been carried out which take into account **realistically assumed** mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors (the "**Modifying Factors**")

These assessments demonstrate **at the time of reporting** that **extraction could reasonably be justified**

MODIFYING FACTORS

Environmental Impact
Skills Required
Etc

Processing
Through
Put



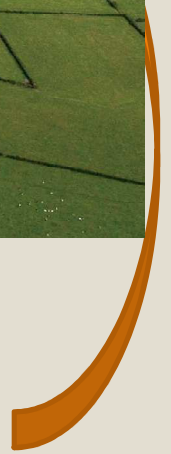
Mining
Method, Dilution, Output

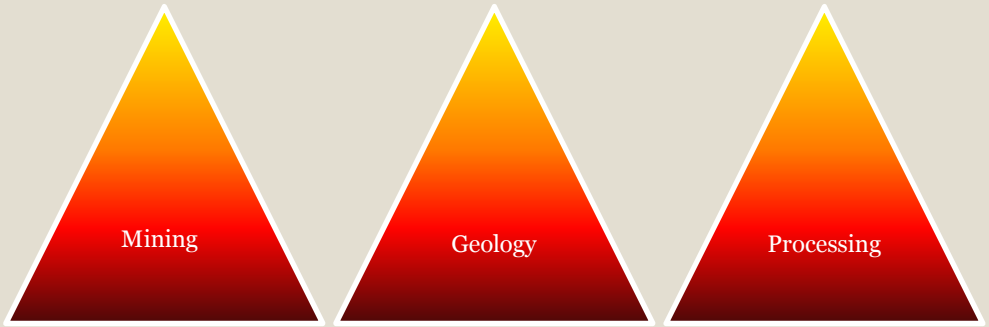
Geological Model: Continuity, Mineralogy, Grade

MODIFYING FACTORS

Disposal

EXTERNAL ISSUES





Mining
Method, Dilution, Output

Processing
Method, Recovery

Geological Model: Continuity, Mineralogy, Grade

MODIFYING FACTORS
EXTERNAL ISSUES

Economic
Capital and Operating Cost

Marketing
Product, Production Rate, Transport

Social
Employment, Training, Community

Environment
Emissions, noise, waste

Government
Regulations, Infrastructure

Legal
Title, Permitting

Mining
Method, Dilution, Output

Processing
Method, Recovery

Geological Model: Continuity, Mineralogy, Grade

THE BUSINESS CASE

MINERAL EXPLORATION INVESTMENT

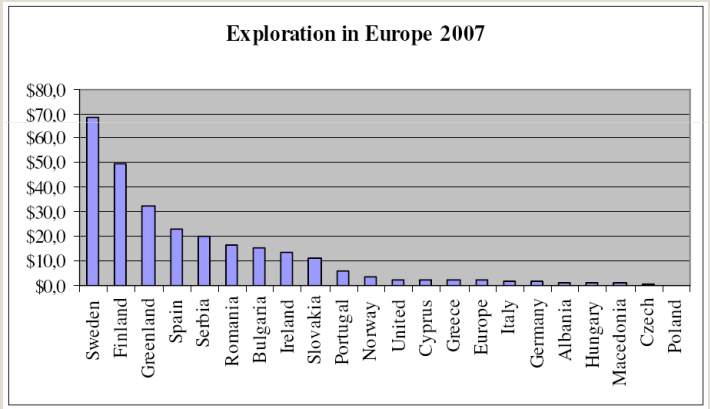
EUROPE

Copper – Zinc Consumption: 20 – 25%

Mine Production: 5%

Exploration Expenditure: 2.5%

Ref: Boliden 2008



Total Exploration Budget 2007 253 M$ (2.5% of worldwide expenditure)

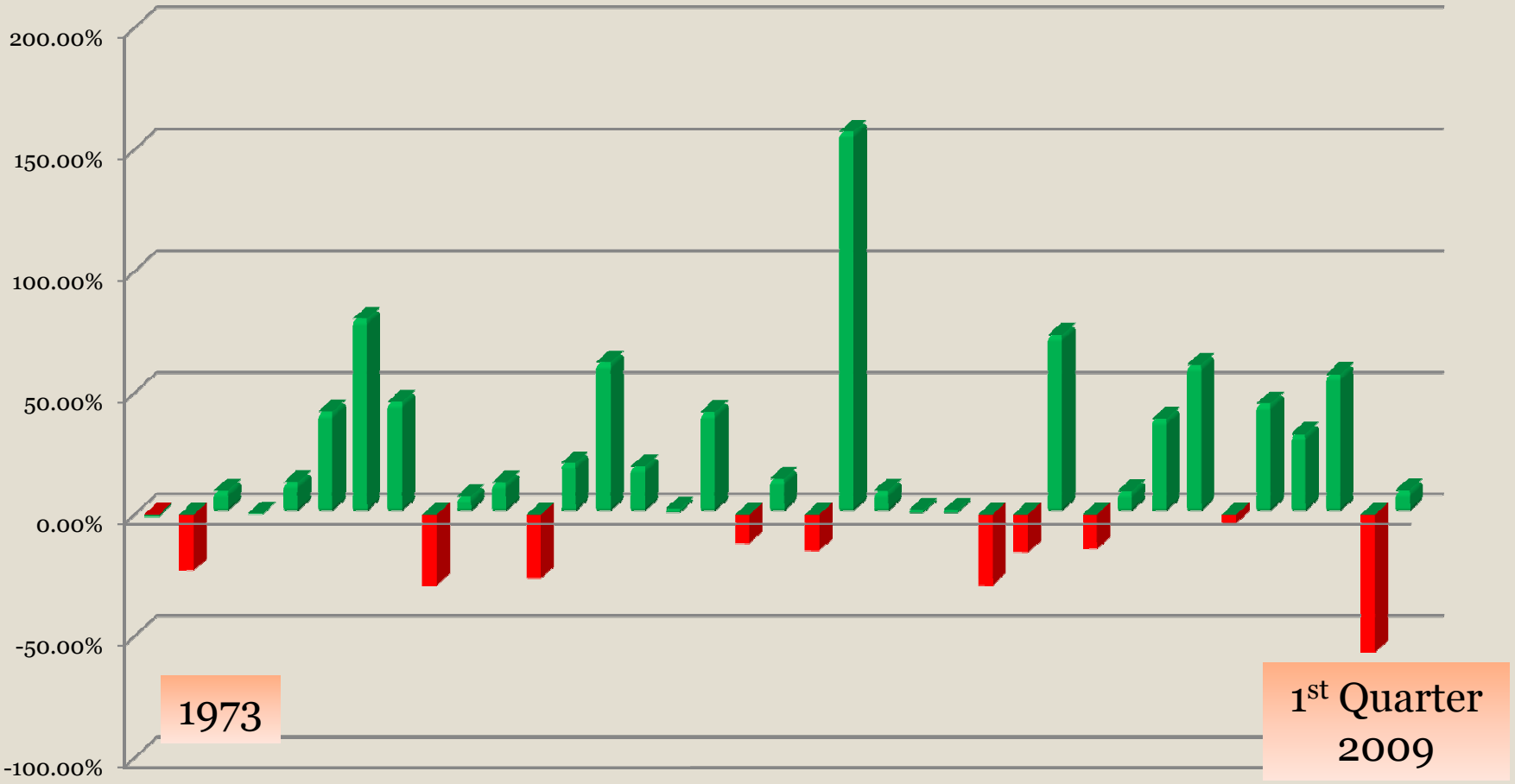
Source: Fraser Institute

Source: Metals Economics Group

THE BUSINESS CASE

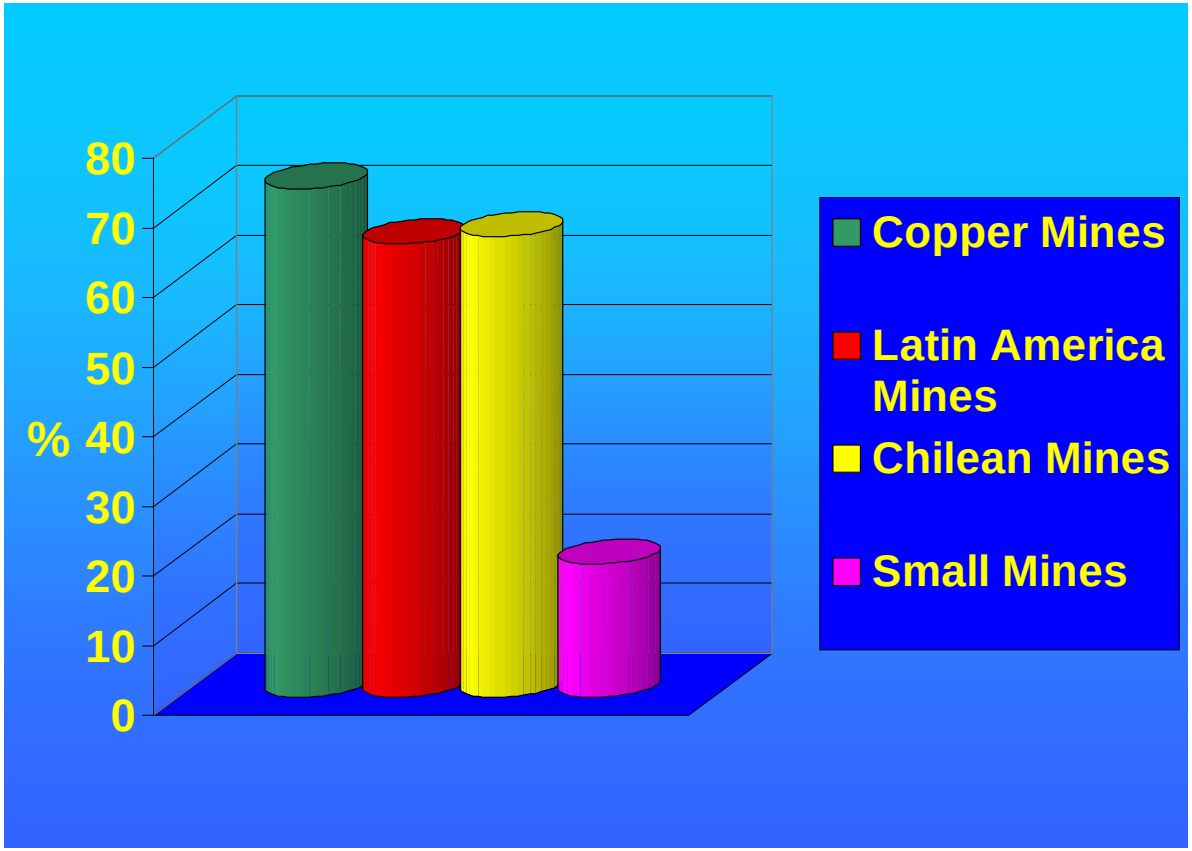
- The Equator Principles
  - Review & Categorization of Environment – Social Impact;
  - Social & Environmental Standards;
  - Action Plan & Management System of Impacts, Risks and Mitigating Actions;
  - Consultation & Disclosure;
  - Grievance Mechanism;
  - Independent Review;
  - Covenants to Comply, Report and Decommission;
  - Independent Environment and/or Social Expert;
  - Annual Reporting
- Applies to about 80% of world-wide project financing greater than US $10M

ANNUAL SHAREHOLDER RETURN



Source: Datastream World Index

PROJECT SUCCESSES



Ref: Champigny (1999)

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CONCLUSION KEY POINTS

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SUSTAINABLE DEVELOPMENT IN MINING REQUIRES

- REALISTIC AND RELIABLE MINERAL RESERVE ESTIMATES
- TO GENERATE ECONOMIC BENEFITS;
- TO JUSTIFY INCREASINGLY EXPENSIVE INVESTMENTS
- TO MANAGE RISKS AND EXPECTATIONS
- TRANSPARENT COMMUNICATION

FURTHER INFORMATION

Thank You

- ICMM

  www.icmm.com
- CRIRSCO

  www.crirsco.com
- PERC

  www.percreserves.com