3DEXPERIENCE for Mining
Productivity & Profitability

Rick Moignard, CEO GEOVIA

Agenda

1. GEOVIA
2. Mining Market
3. **3D**EXPERIENCE for Mining

GEOVIA a Step Towards Fulfilling our Purpose

> Dassault Systèmes provides
> business & people
> with **3D**EXPERIENCE universes
> to imagine sustainable innovations
> capable of harmonizing
> product, nature and life.

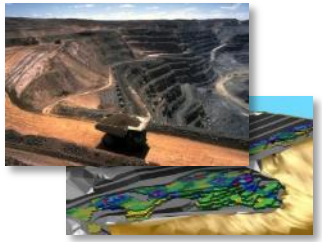
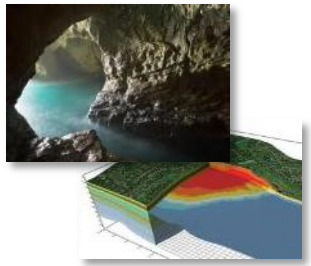
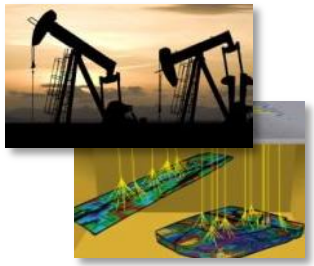
DASSAULT SYSTEMES | IF WE ask the right questions we can change the world.

GEOVIA Promise

GEOVIA | the Virtual Planet

GEOVIA will provide Business, Government and Individuals with **3D**EXPERIENCE Universes to **Model and Simulate our Planet** to improve predictability, efficiency, safety and sustainability of **Natural Resources**

GEOVIA Focus: Mining Industry Strategy

- Mining is a key vertical in the **Natural Resources** industry…
  - Mining
    
  - Water
    
  - Oil&Gas
    
  - Others
    - Agriculture
    - Forestry
    - Landscape
    - …

- …with **large** and **fast growing business**
  - Estimated annual mineral production market value > 1.8T$[1]
  - 22% Revenues CAGR[2] driven by coal & metals consumption increase

(1): In 2010, internal research based on production volumes given by USGS and public material market prices (ex: LME spot prices, Xerfi 2011 Commodity Reports…)
(2): Based on TOP 40 mining companies 03-10 revenue growth, source: PwC 2011

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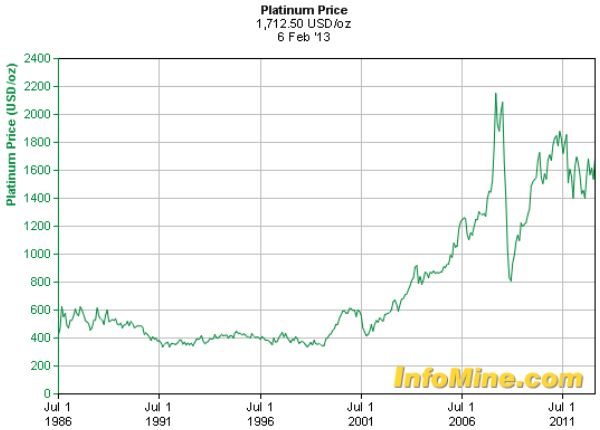
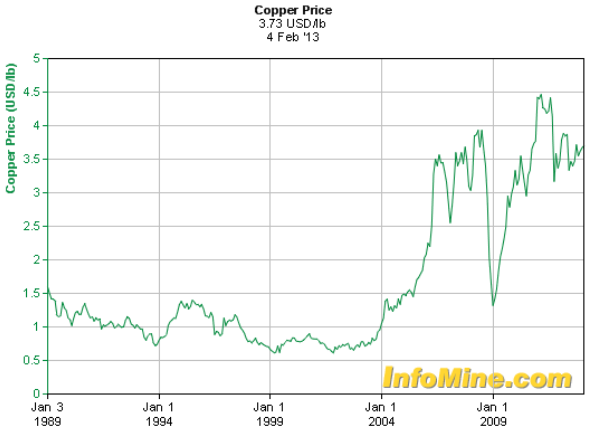
Key Facts

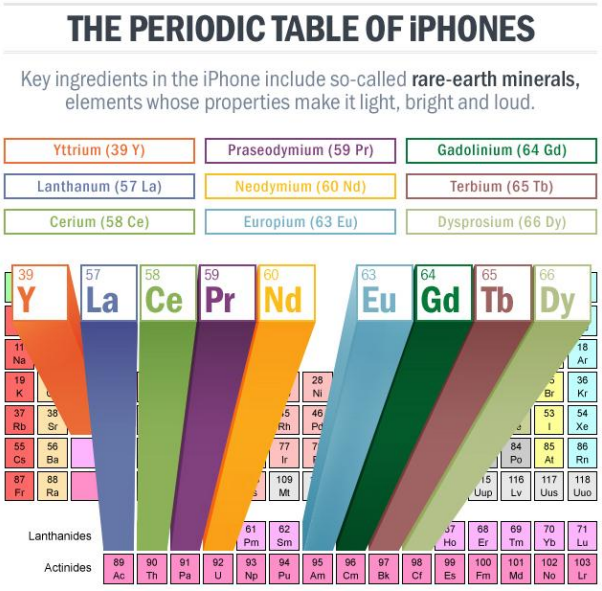
- **Metal prices** remain at historically **high levels**
- Mining, a **long-term business** → recent trends not the starting points for future projections
- Given increasing difficulty & expense in opening up new mine supply, **outlook for metal prices still favourable**





Population Growth & Urbanisation Increases Demand

- Population growth and urbanisation both push metal demand higher and entrench the **key role of metals as a foundation for modern society**



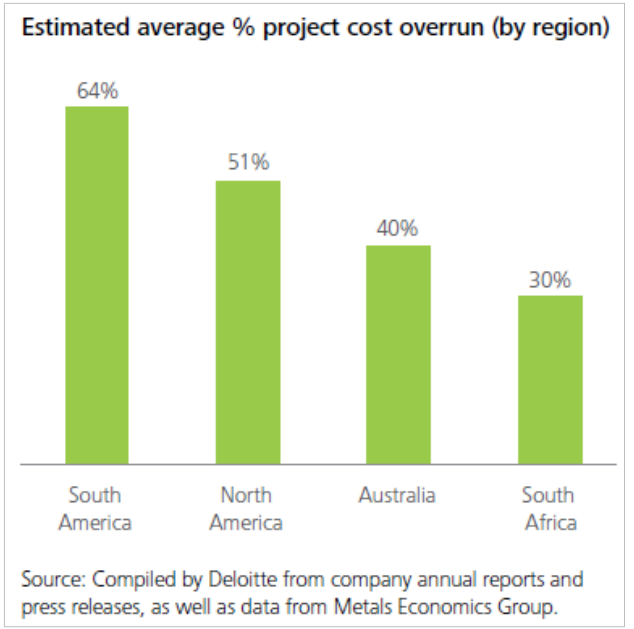
Source: **CNET, September 26, 2012**

- The Toyota Prius™ plug-in-hybrid requires approximately 50 pounds of rare earth metals for its motor and battery
- New hybrid cars use twice as much copper as cars powered by gasoline alone
- A multitude of petroleum products are used in hybrid cars

Source: **Society for Mining, Metallurgy & Exploration**

Why are Capital Costs so High?

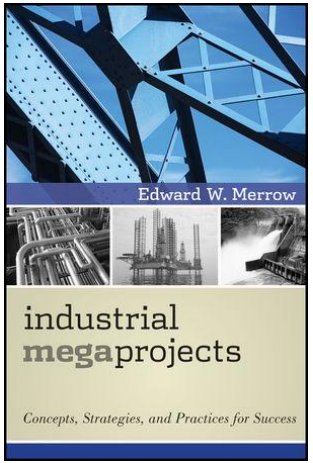
- New mines are located **further away from markets**, and in areas of extreme weather conditions (high up in the Andes, in the jungles of Central Africa, in Arctic Canada)
- **Ore grades** continue to decline
- Shallow deposits are being replaced by **deeper deposits**
- Mineralogy of deposits under development are **more complex and costly to process**
- **Permitting process** is getting longer – environmental, social and cultural standards
- **Lead time from discovery to the start of a mine** is getting longer → Now difficult to manage this process in less than 10 years
- These factors are **increasing capital costs** and raising the floor for future metal prices



Majority of Megaprojects Fail

- "Data from more than 300 global megaprojects shows that **65% of industrial projects** with budgets larger that $1 billion in 2010 **failed to meet business objectives**."
  - 47 (15%) of the 318 global megaprojects were minerals and metals projects
  - Minerals and metals megaprojects failed about 70% of the time and had poor operability and very high cost growth -

    Minerals and metals project failures tended to be slow and have significant schedule slippage as well

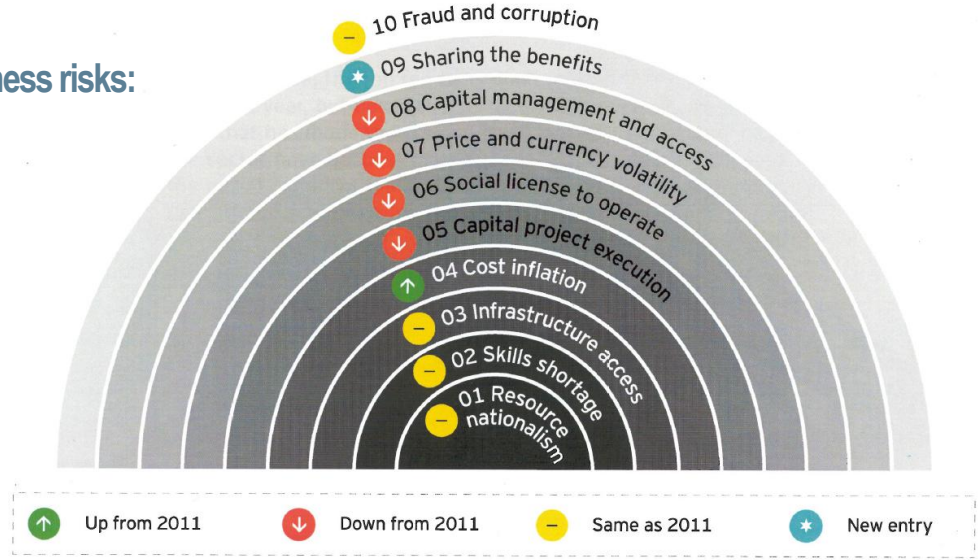


Source: **Industrial Megaprojects, Edward W. Merrow, 2011**

Commodities and Mining Industry Outlook

Business risks for mining companies becoming more complex over the past 12 months → fast changing operational environment because of the softening commodity prices and capacity constraints in terms of skills and infrastructure

Top 10 business risks:

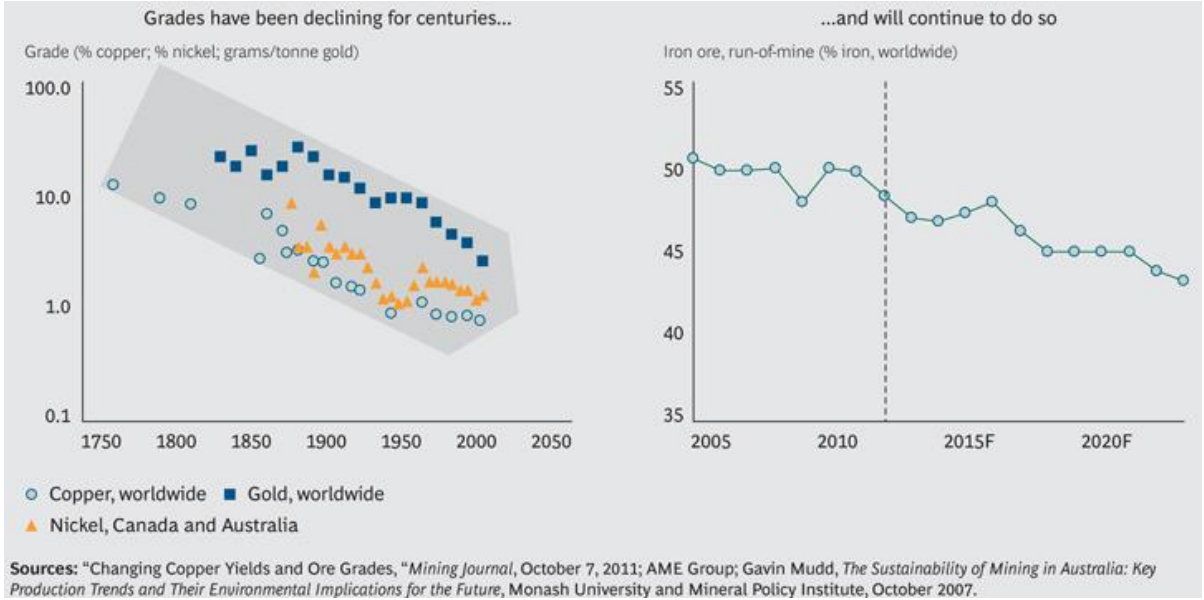


The risks closest to the center of the radar are those that pose the greatest challenges to the mining and metals sector in 2012 and into 2013.

Source: Business risks facing mining and metals 2012-2013, Ernst & Young

Operating Costs Escalate

- Projects have become more expensive as ores become more difficult to mine and the processing more expensive (due to declining grades)
- According to Metals Economics Group research of the copper industry, the post-definitive estimate (DE)



costs of 20 major projects rose by 20% to 140% without a corresponding lift in reserves

CEO Departures, Inefficiencies, Soaring Costs…

Miner Rio Tinto Ousts CEO as Bad Bets Cost Billions
17 January 2013, *The Wall Street Journal*

AngloGold Falls to 5-Month Low as CEO Leaves: Johannesburg Mover 8 January 2013, *Bloomberg News*

Mining blamed for productivity slowdown
17 December 2012, *TheAge.com.au*

Newmont Mining CEO steps down
4 December 2012, *Australian Mining*

BHP Billiton casts eye wide for CEO to succeed
30 November 2012, *World News*

New Kinross CEO vows to cut costs 9 August 2012, *Mining Markets*

Kinross Gold Fires CEO Tye Burt, Replaces With Rollinson 2 August 2012, *Bloomberg*

Barrick to shift focus back to gold after ousting CEO 7 June 2012, *Financial Post*

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The Revolution of Mining Industry Software

Mining productivity decades behind other industries: Anglo boss

10 January 2013
Australian Mining

Mark Cutifani
CEO, Anglo American

"In the mining industry, we're some 20 to 30 years behind other more progressive sectors in terms of productivity and business practices."

"We've got to go beyond [just having good mineral deposits] and make sure that we're working our assets, the engine room, as hard as we can."

- **"To go beyond…"** mining companies must look to technology as an enabler
  - The **3D**EXPERIENCE Solution: Rather than ramping up production (more trucks, shovels, mills, etc.) at all cost, mining companies must take a strategic approach using end-to-end software applications to increase productivity and profitability of their ore deposits

GEOVIA Targeted Mining Industry Experience

An **interactive, virtual** environment that enables mining companies to make informed, real time decisions to **maximise the value** of their major asset, their ore body, from early **exploration through delivery** to their end customers while ensuring **compliance** with geological, logistical, operational, governmental, and environmental constraints.

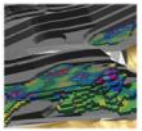
GEOVIA **3D**EXPERIENCE Portfolio Vision

GEOVIA Has The Leading Mining Portfolio

EXPLORATION | EVALUATION | PLANNING | ENGINEERING | MINE PRODUCTION MANAGEMENT

GEOLOGY AND MINE PLANNING

GEMCOM SURPAC™



Gemcom Surpac is the world's most popular geology and mine planning software. It delivers efficiency and accuracy through ease-of-use, powerful 3D graphics and workflow automation.

GEMCOM GEMS™

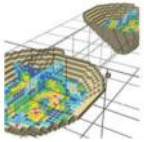
Gemcom GEMS provides collaborative geology and mine planning capabilities that support cross-functional teams involved in exploration, modelling, mine design, long-term planning and production scheduling.

GEMCOM MINEX™

Gemcom Minex provides the best geology and mine planning tools for coal and other stratified deposits, ensuring resources are evaluated accurately and mined efficiently.

STRATEGIC MINE PLANNING

GEMCOM WHITTLE™



Gemcom Whittle is the world's most trusted strategic mine planning software used to determine and optimise the economics of open pit mining projects.

SCHEDULING

GEMCOM MINESCHED™

Gemcom MineSched provides long- and short-term scheduling for surface and underground mines of all sizes and types, improving productivity and profits beyond what's possible in manual scheduling.

BLOCK CAVING

GEMCOM PCBC™

Gemcom PCBC is used by virtually every major mining company involved in block caving, who rely on its comprehensive functionality to assist with feasibility studies, design and production management.

MINE PRODUCTION MANAGEMENT

GEMCOM INSITE™

Gemcom InSite records and evaluates data for service, support and production activities from the mine through to saleable product, enabling rapid return on investment.

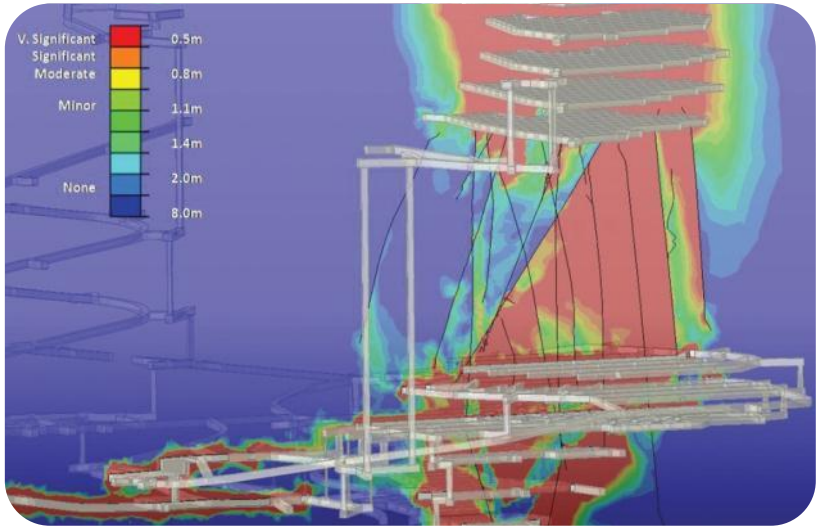
SECURE REMOTE COLLABORATION

GEMCOM HUB™

Gemcom Hub provides secure remote collaboration that organises, centralises and enables the reliable sharing of exploration, planning, and production data over low-bandwidth connections.

SIMULIA in Mining – Current

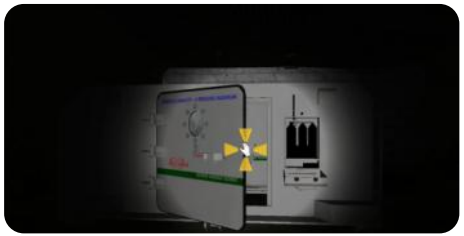
- Coffey Mining
  - Rock mechanics analysis for open pit slope stability
  - Rock mechanics in underground
- Mining customer
  - Subsidence prediction



Courtesy Coffey Mining

3DVIA in Mining – Current

- National Institute of Occupational Safety and Health (US NIOSH) → used to create safety training interactive “game”
- University of New South Wales → created underground coal safety training for students and industry to prepare them for underground operations
- Both created a training environment in an immersive cave for hyper-realistic safety training



NIOSH interactive underground safety training.

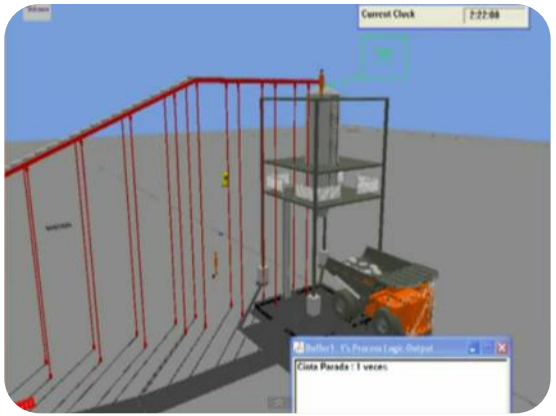
UNSW safety training for underground coal operations.

Offshore oil platform emergency safety operation simulation.

3DVIA Perspectives, saving a life first aid simulation.

DELMIA in Mining – Current

- Glencore Copper Processing Optimization
  - Reduce the copper content in tails from 0.757% to 0.500% or lower
  - Identify best parameter combination(s) that will reduce copper in tails to 0.500% copper
  - **Annual Savings (Est.): $1M** (variable based on copper price)



DELMIA QUEST for mining process flow