

“National and International Perspectives on the Canadian Mining Industry”

at the

24th Annual Review of Activities

Department of Natural Resources and Energy

Government of New Brunswick

Fredericton, New Brunswick

November 3, 1999

by

Dr. Keith J. Brewer

Director General , Economic and Financial Analysis Branch,

Minerals and Metals Sector, Natural Resources Canada,

Ottawa, Canada

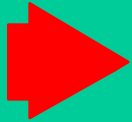


Natural Resources
Canada

Ressources naturelles
Canada

Canada

National and International Perspectives on Canadian Mining



Canada's macroeconomic situation



Competitiveness of Canadian mining



International scene



Challenges in other jurisdictions



Indicated choices, actions, policies



Natural Resources
Canada

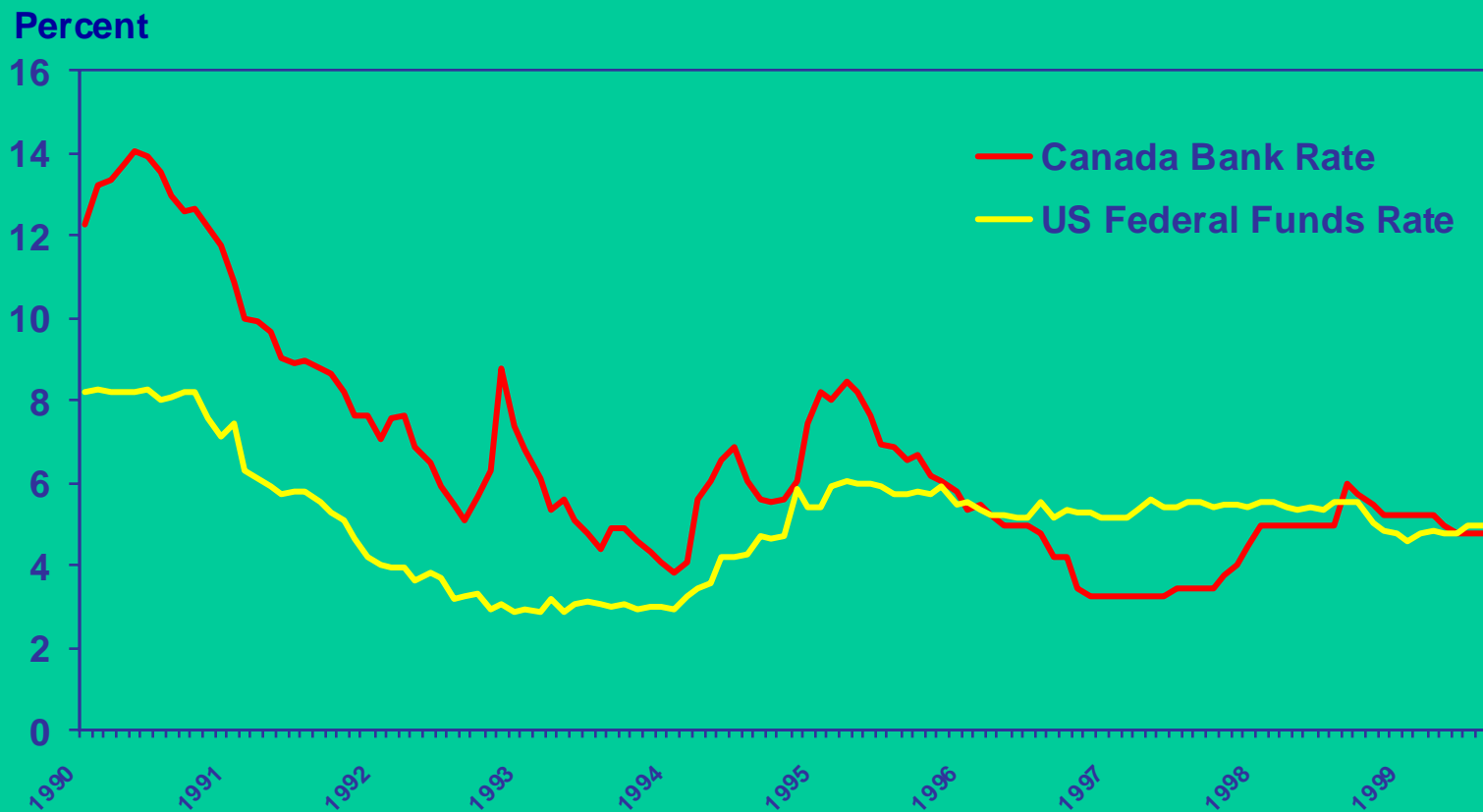
Ressources naturelles
Canada

Canada

Canada's Macroeconomic Situation

Canadian and U.S. Interest Rates

January 1990 - August 1999



Source: Bank of Canada.



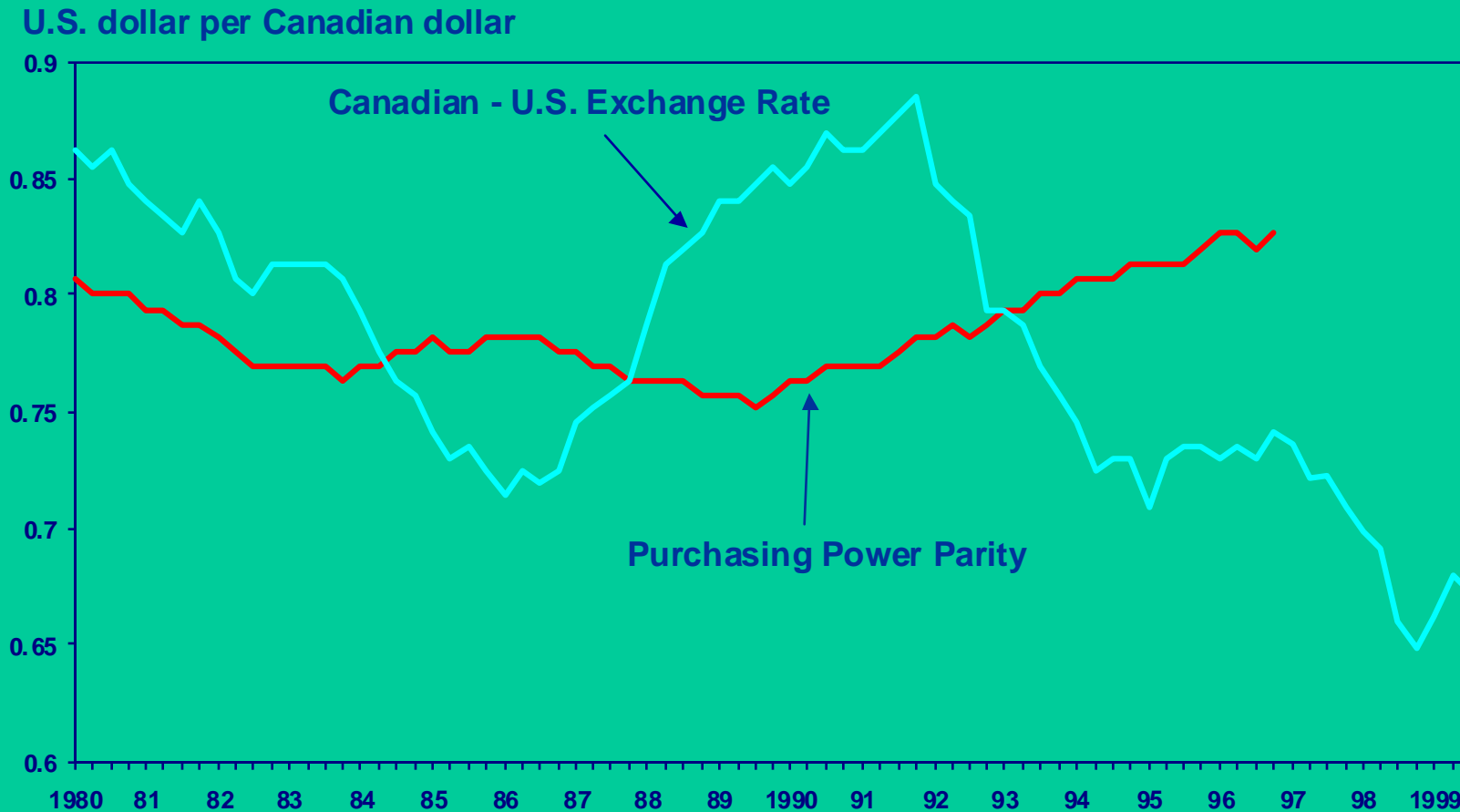
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canada's Macroeconomic Situation

Canada - U.S. Exchange Rate and Purchasing Power Parity 1stQ 1980 to 3rdQ 1999



Source: Natural Resources Canada, Bank of Montreal



Natural Resources
Canada

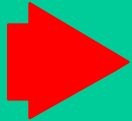
Ressources naturelles
Canada

Canada

National and International Perspectives on Canadian Mining



Canada's macroeconomic situation



Competitiveness of Canadian mining



International scene



Challenges in other jurisdictions



Indicated choices, actions, policies



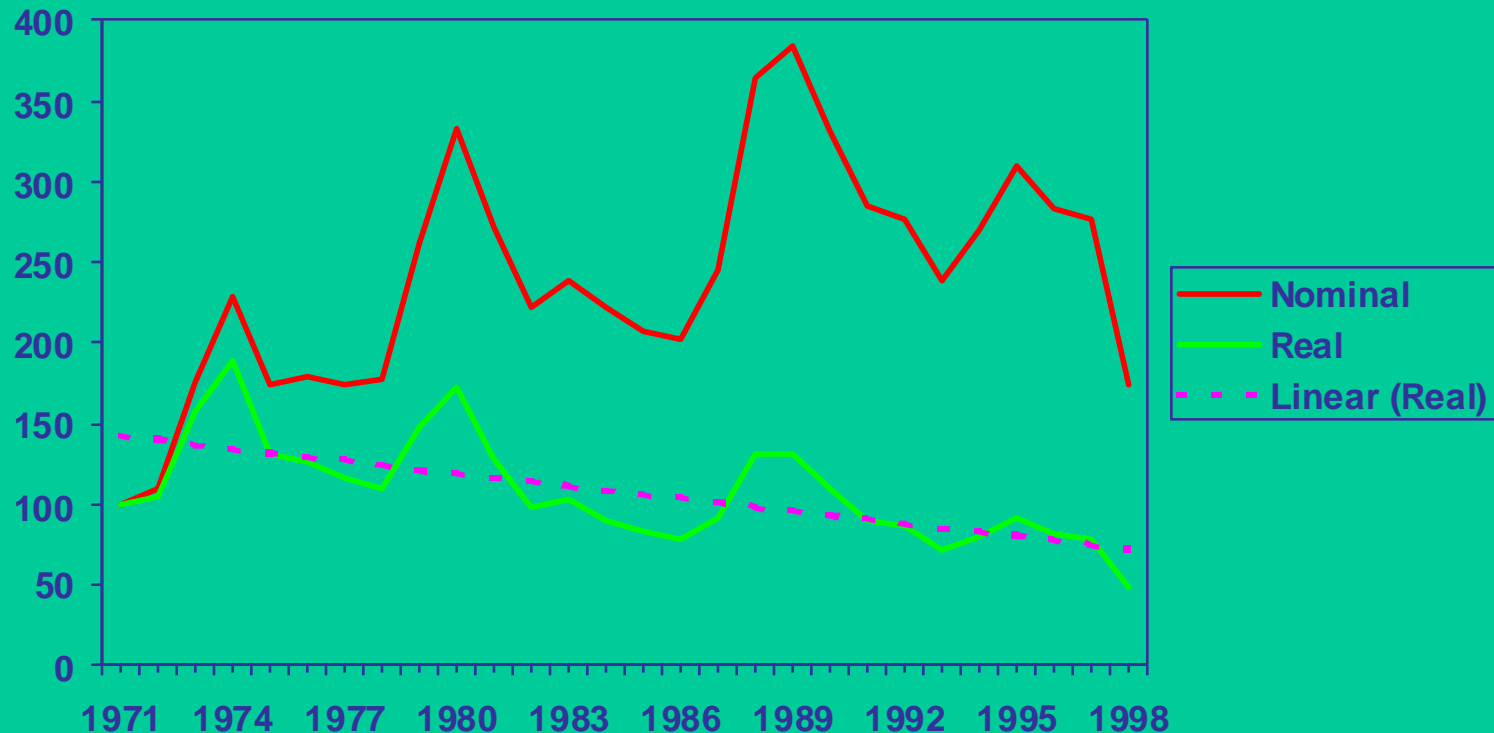
Natural Resources
Canada

Ressources naturelles
Canada

Canada

NRCan's U.S. Dollar-based Metal Price Index

Indexes: 1971 = 100



Note: The indexes include copper, lead, zinc, nickel, silver and gold, and are weighted by the relative share of Canadian production of each commodity. The real index is the nominal index adjusted by the GDP implicit price index.

Source: Natural Resources Canada.



Natural Resources
Canada

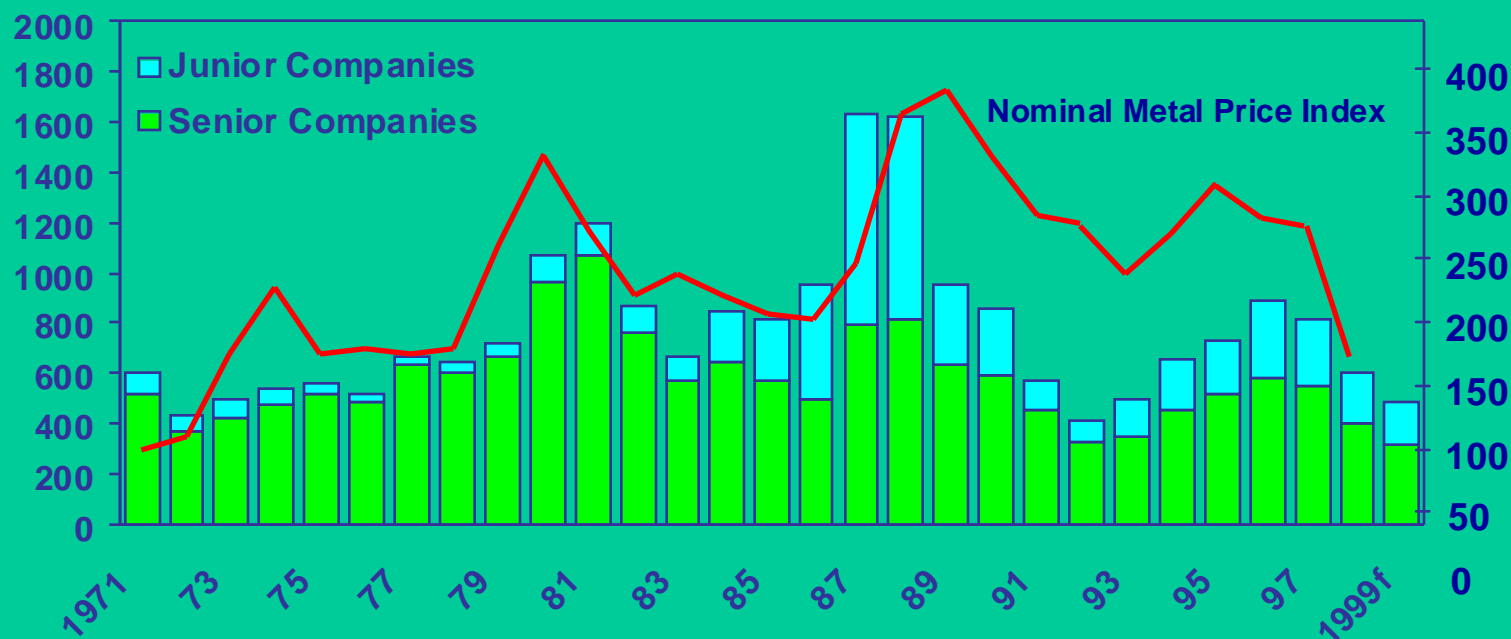
Ressources naturelles
Canada

Canada

Exploration Expenditures in Canada and the NRCan Metal Price Index, 1971-99

Millions of 1997 dollars

Index: 1971 = 100



Source: Natural Resources Canada, based on the federal-provincial survey of mining and exploration companies.
 Notes: Overhead expenditures are included. Data for 1998 are preliminary; data for 1999 are company spending intentions as compiled in January 1999. The indexes include copper, lead, zinc, nickel, silver and gold, and are weighted by the relative share of Canadian production of each commodity.

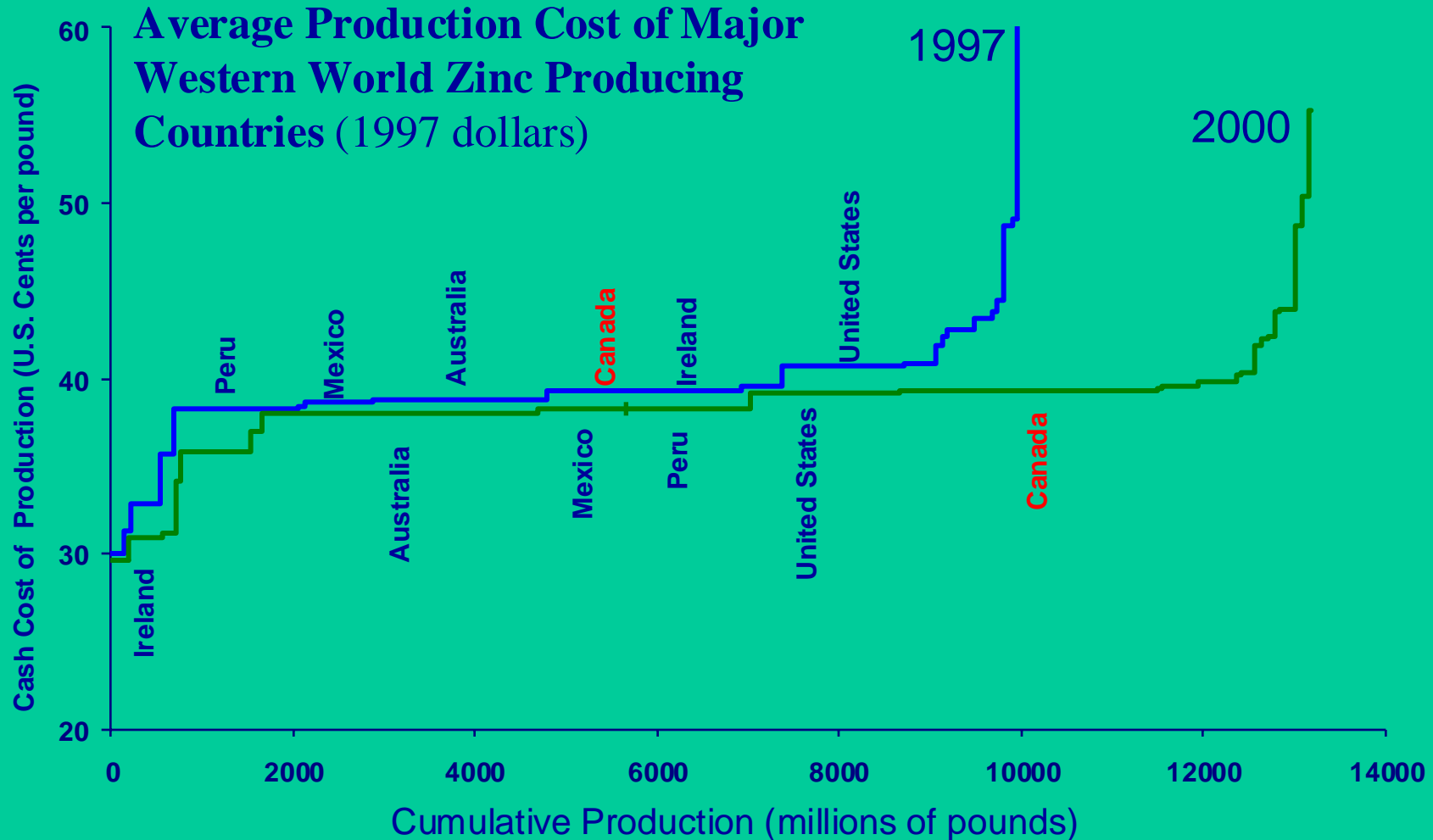


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Snapshot of Competitiveness of Canadian Mining



Source: Natural Resources Canada.

Based on data from Brook Hunt & Associates and used with express permission.

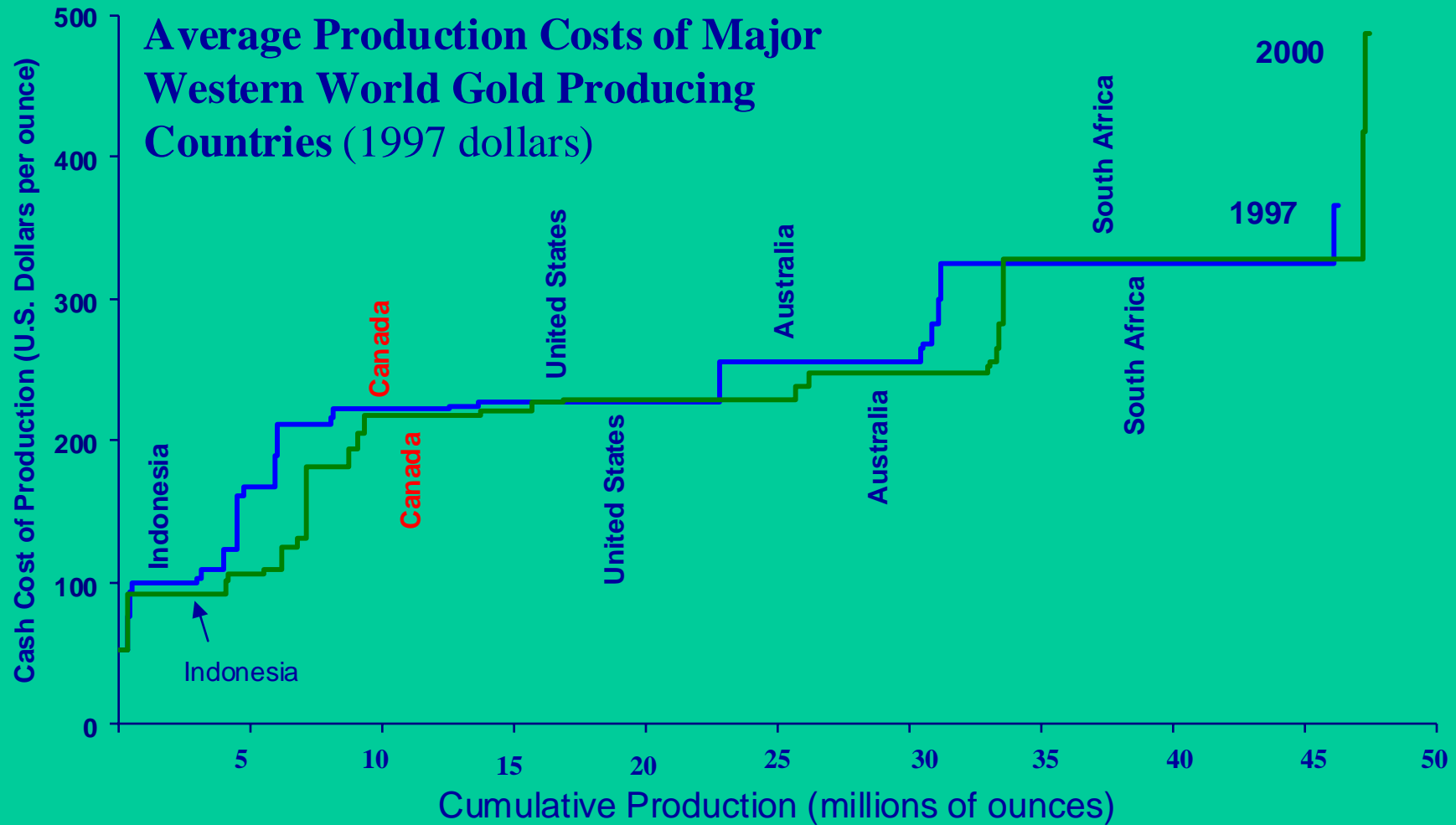


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Snapshot of Competitiveness of Canadian Mining



Source: Natural Resources Canada.

Based on data from Brook Hunt & Associates and used with express permission.



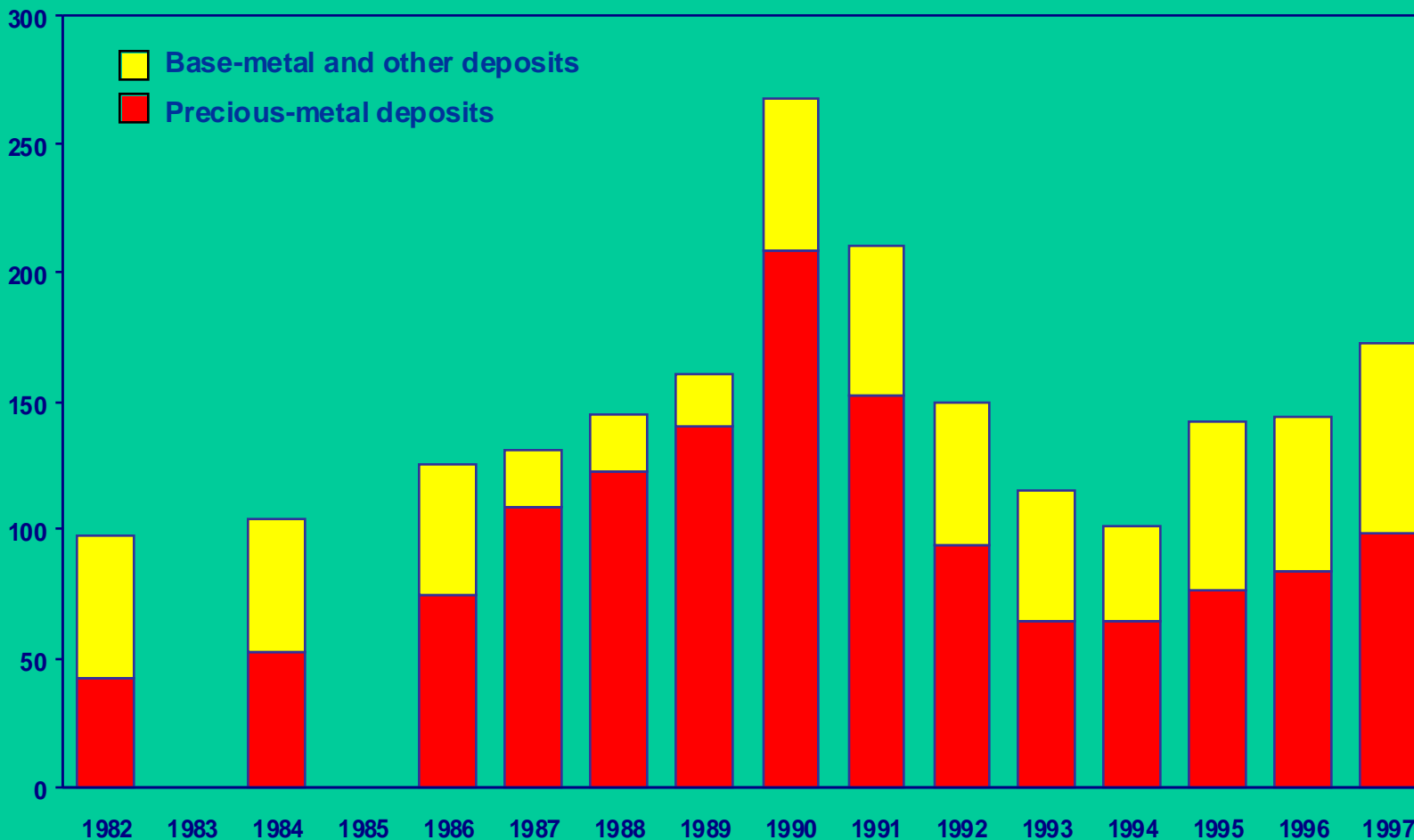
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Mineral Deposits Undergoing Active Appraisal in Canada as at January 1 of Each Year, 1982-97

Number of deposits



Source: Natural Resources Canada, based on company reports.

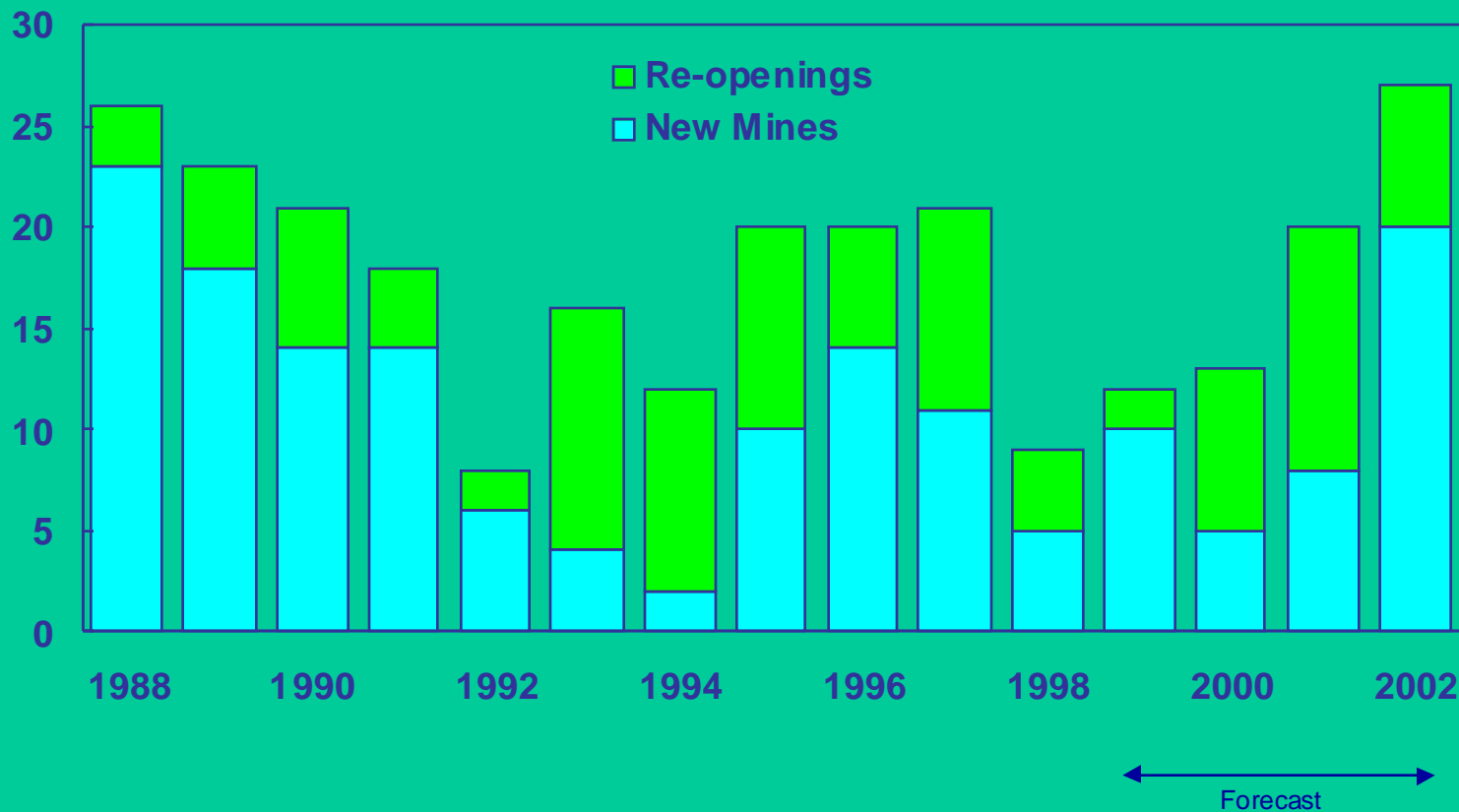


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Mine Openings in Canada 1988-2002



Source: Natural Resources Canada, based on company reports, August 1999.

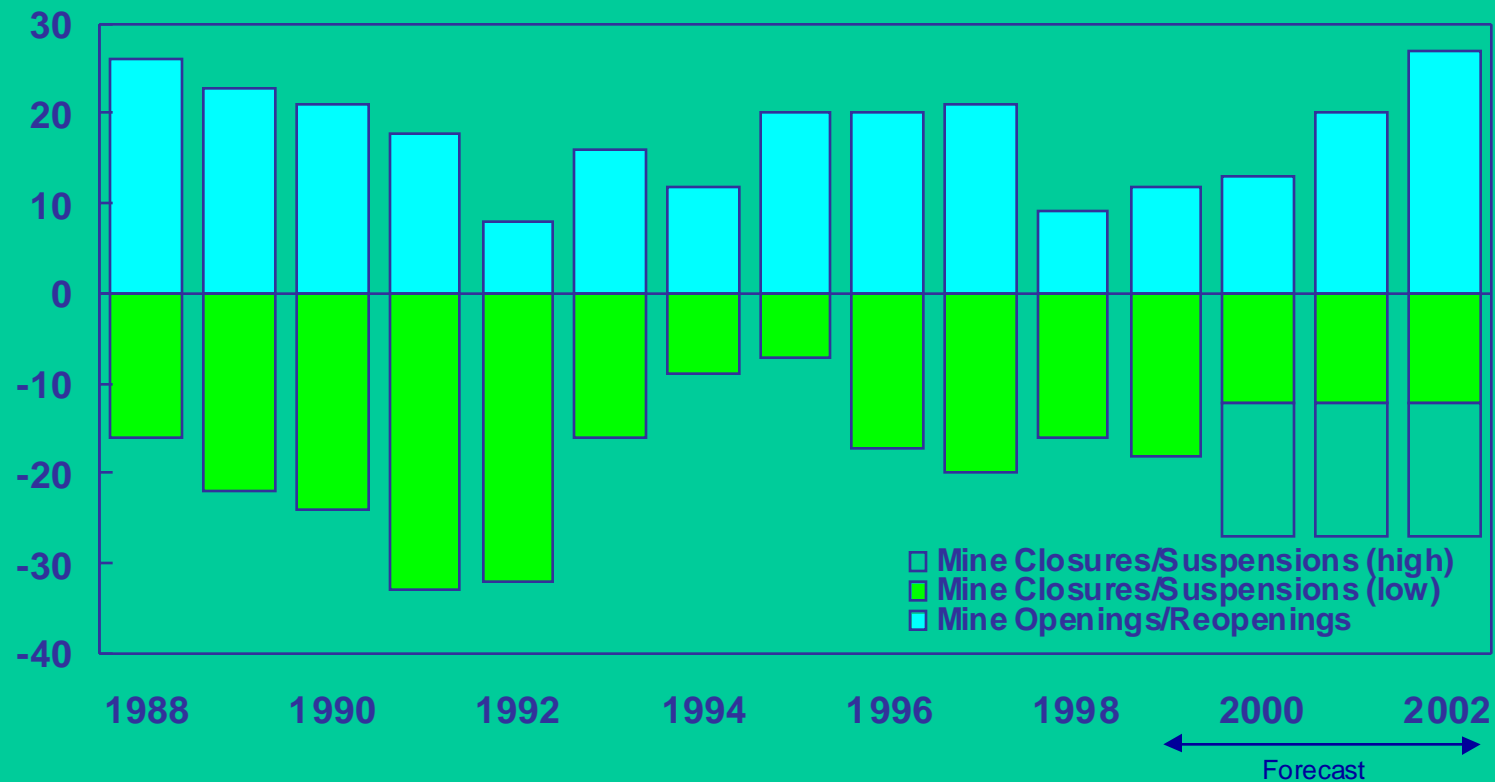


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Mine Openings and Closures in Canada 1988-2002



Source: Natural Resources Canada, based on company reports, August 1999.



Natural Resources
Canada

Ressources naturelles
Canada

Canada

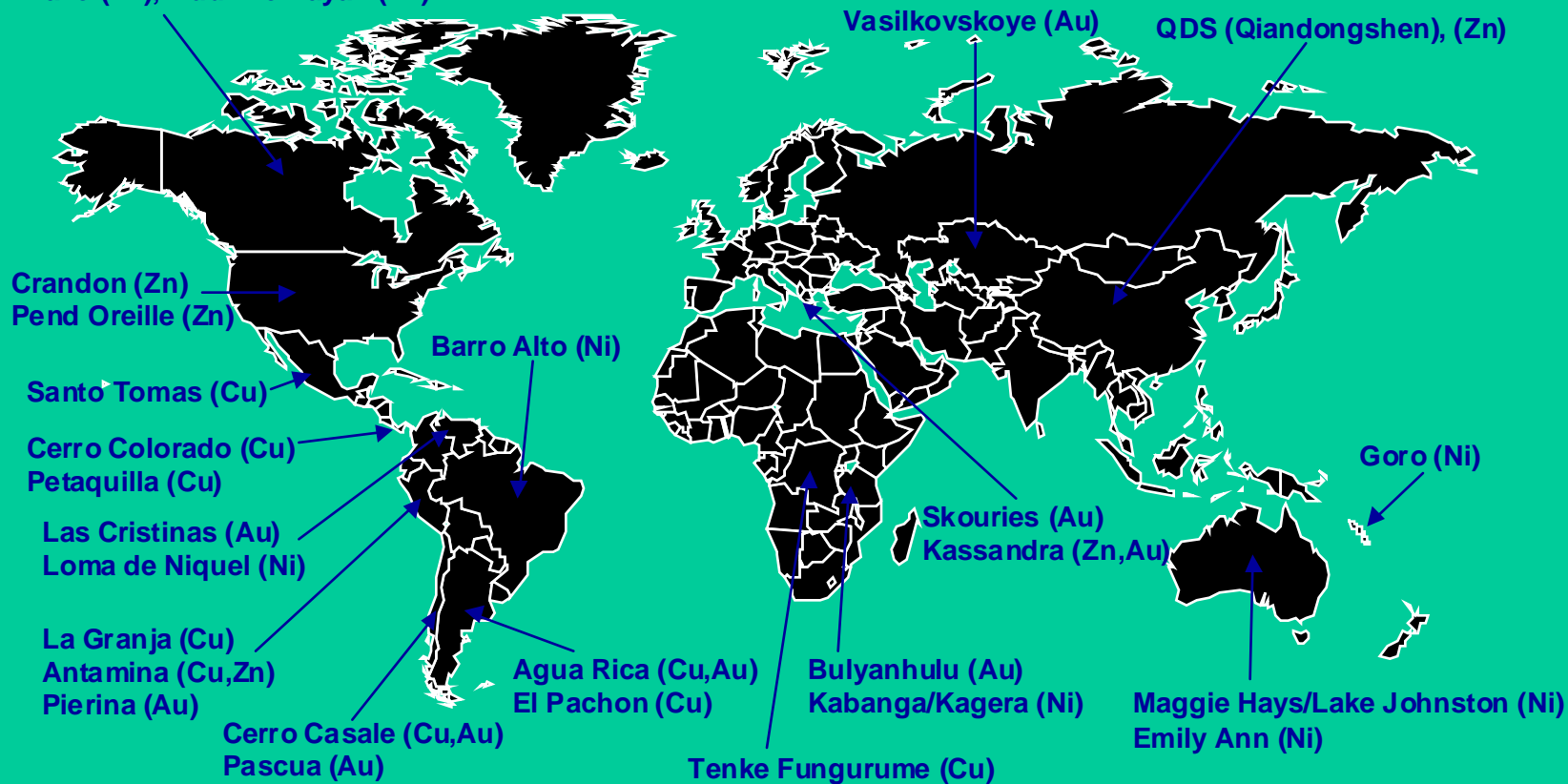
National and International Perspectives on Canadian Mining

- 🍁 Canada's macroeconomic situation
- 🍁 Competitiveness of Canadian mining
- ▶️ 🍁 **International scene**
- 🍁 Challenges in other jurisdictions
- 🍁 Indicated choices, actions, policies



Canadian Participation in Major Development Projects Worldwide

Prosperity (Cu,Au); Voisey's Bay (Ni);
Izok Lake (Zn); Kudz Ze Kayah (Zn)



Sources: AME Mineral Economics; Natural Resources Canada.

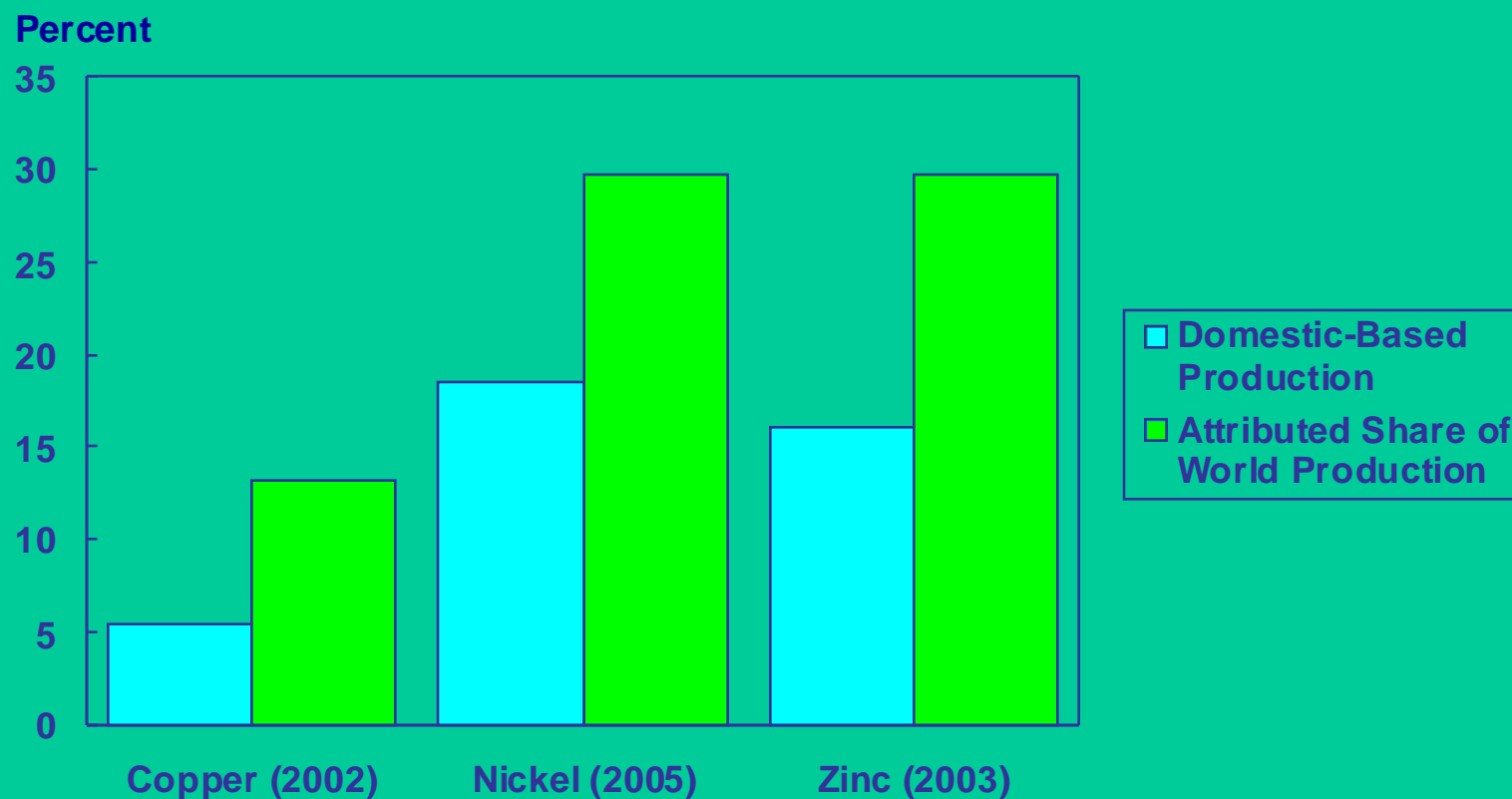


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canada's Share of Western World Metal Production, Forecast



Source: Natural Resources Canada, based on data from AME Mineral Economics, 1998.

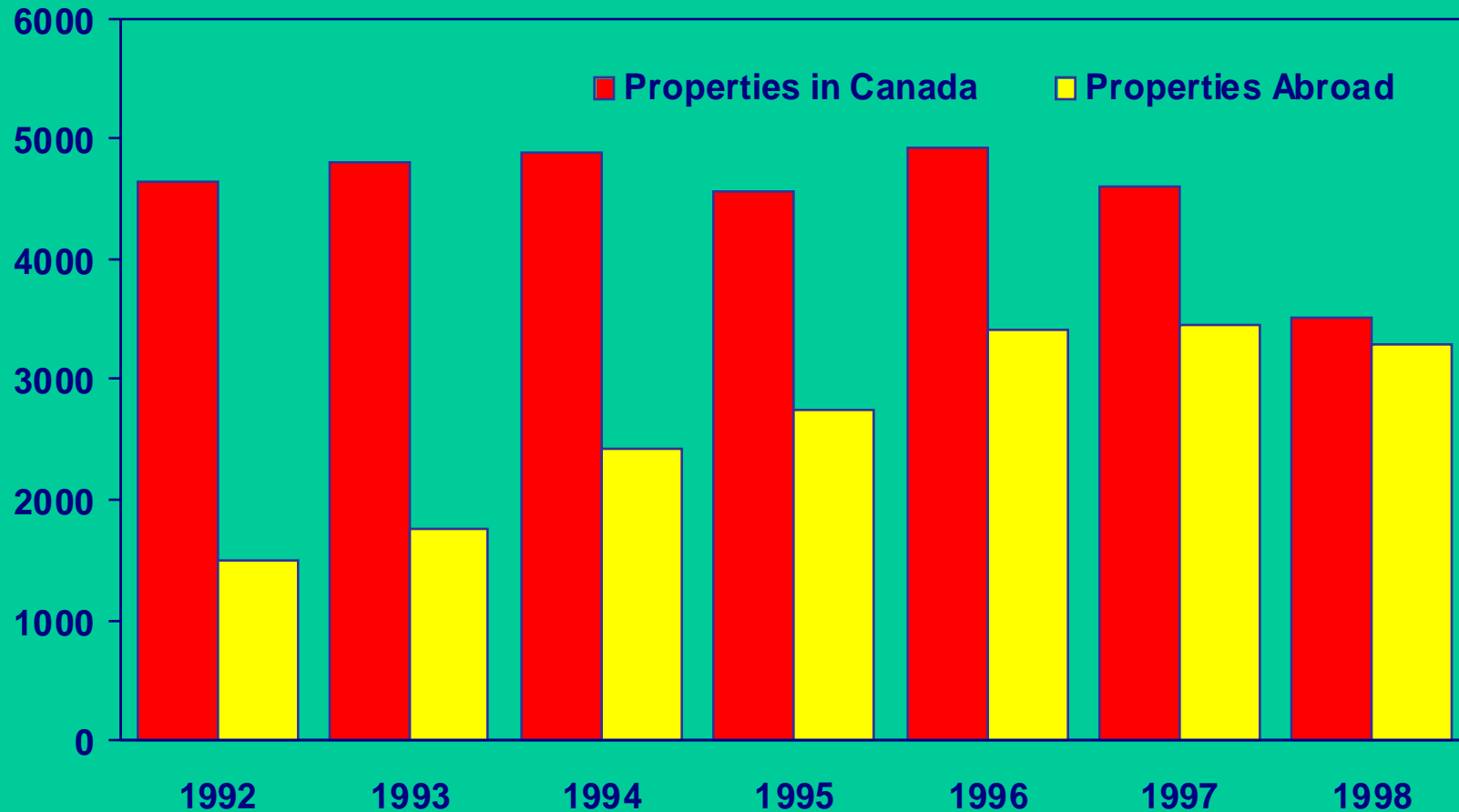


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Mineral Property Portfolio of Companies Listed on Canadian Stock Exchanges 1992-98



Sources: Natural Resources Canada, MIN-MET CANADA database.



Natural Resources
Canada

Ressources naturelles
Canada

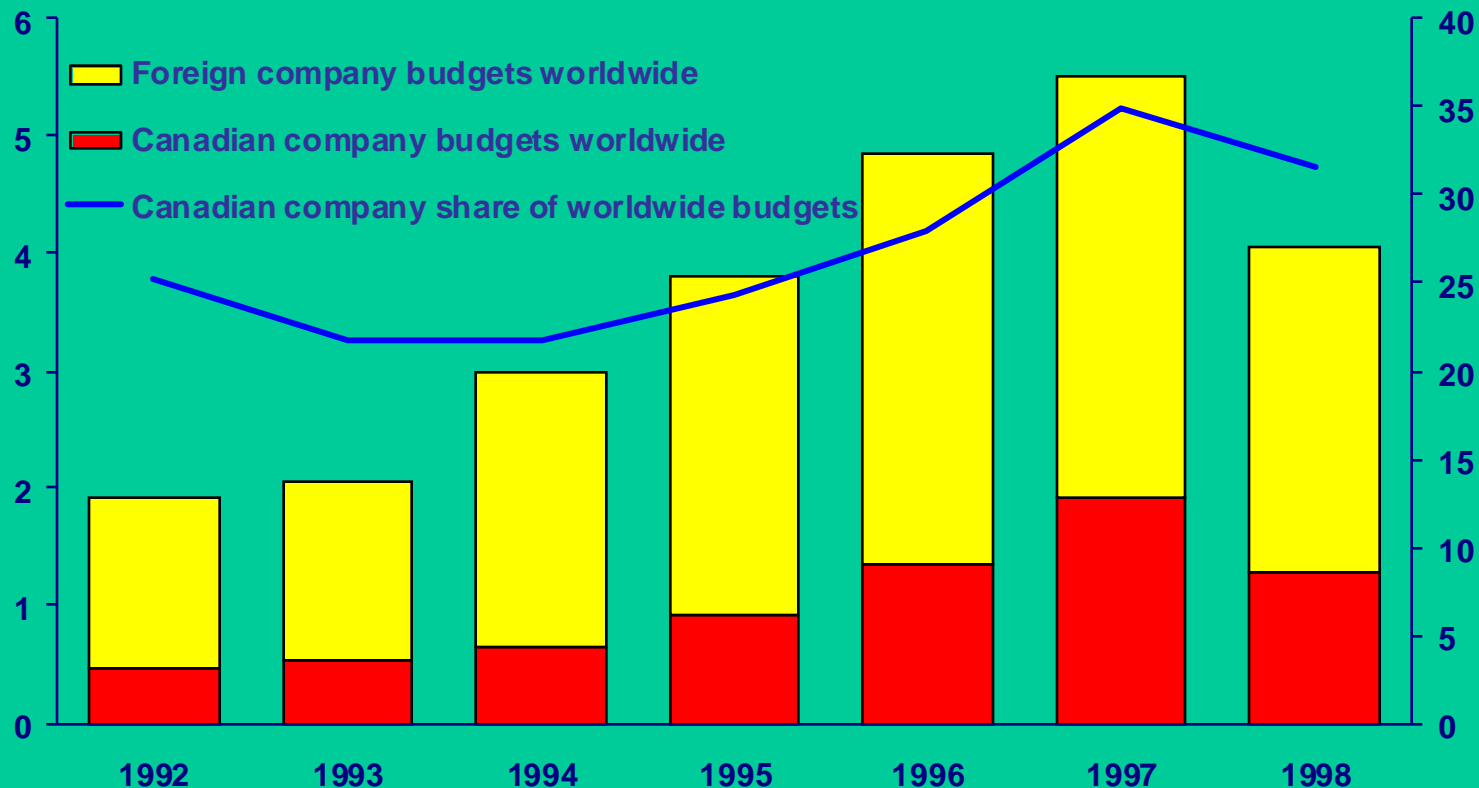
Canada

Canadian Mining's Domestic and International Presence - Exploration in Canada and Abroad

Exploration Budgets of the World's Larger Companies by Country of Origin (Base Metals, Precious Metals and Diamonds)

Constant 1997 dollars, billions

Percent



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group.



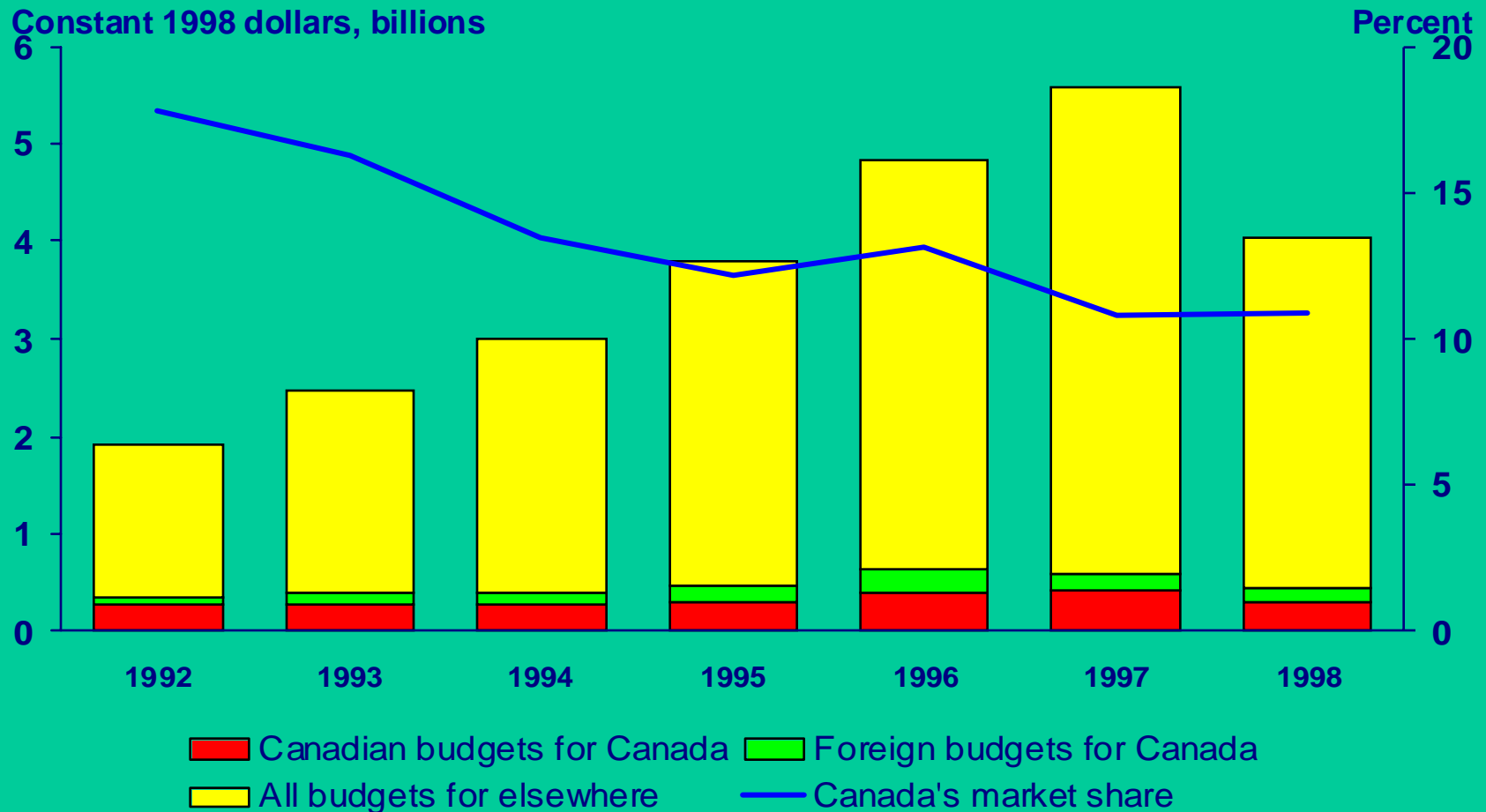
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canadian Mining's Domestic and International Presence - Exploration in Canada and Abroad

Exploration Budgets of the World's Larger Companies by Destination (Base Metals, Precious Metals and Diamonds)



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group



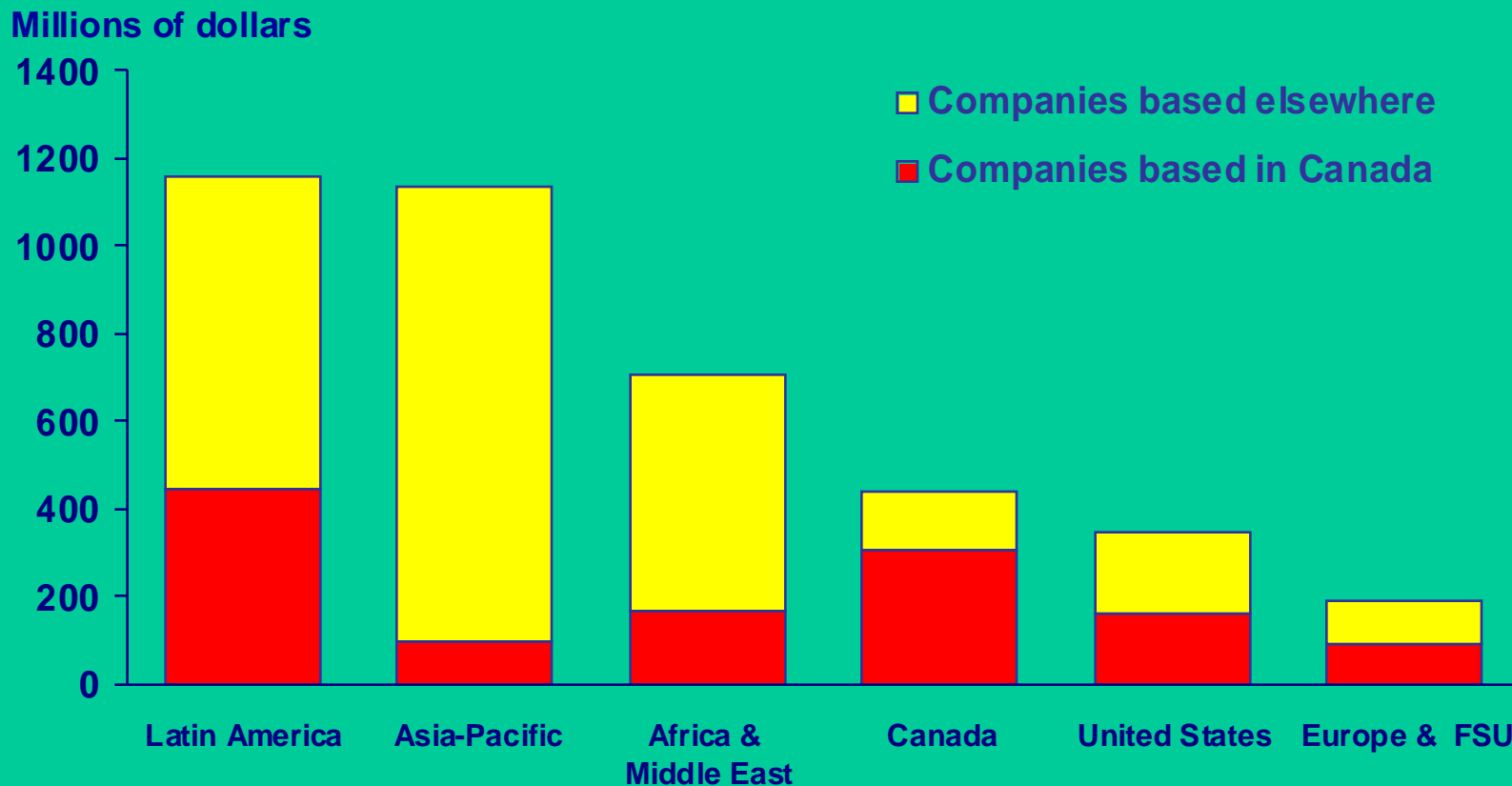
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canadian Mining's Domestic and International Presence - Exploration in Canada and Abroad

Exploration Budgets of World's Larger Companies for Selected Regions, 1998 (Base Metals, Precious Metals and Diamonds)



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group.



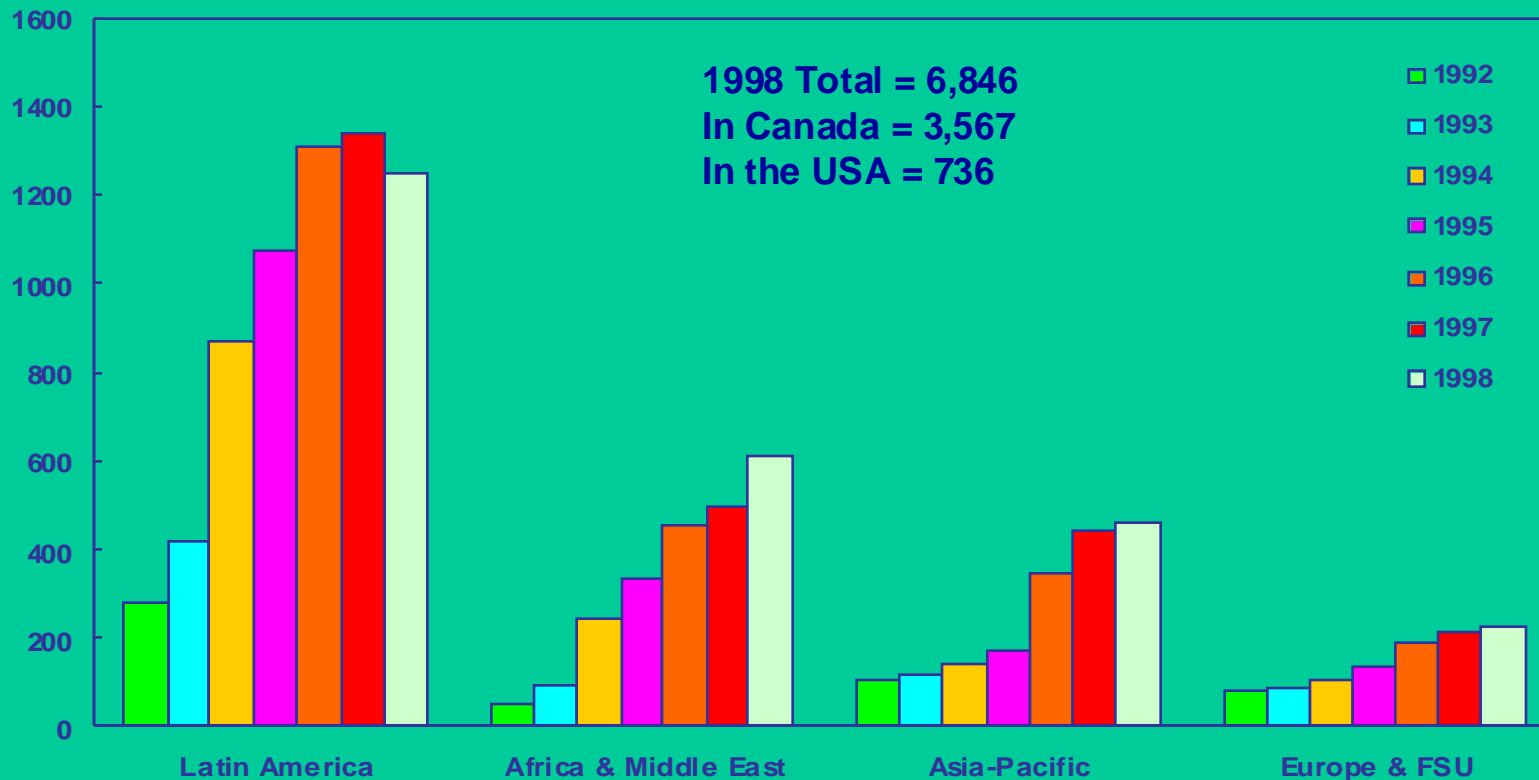
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canadian Mineral Property Portfolio Worldwide, by Region, 1992-98

No. of Properties



Notes: Data is for base metals, precious metals and diamonds.

Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group.



Natural Resources
Canada

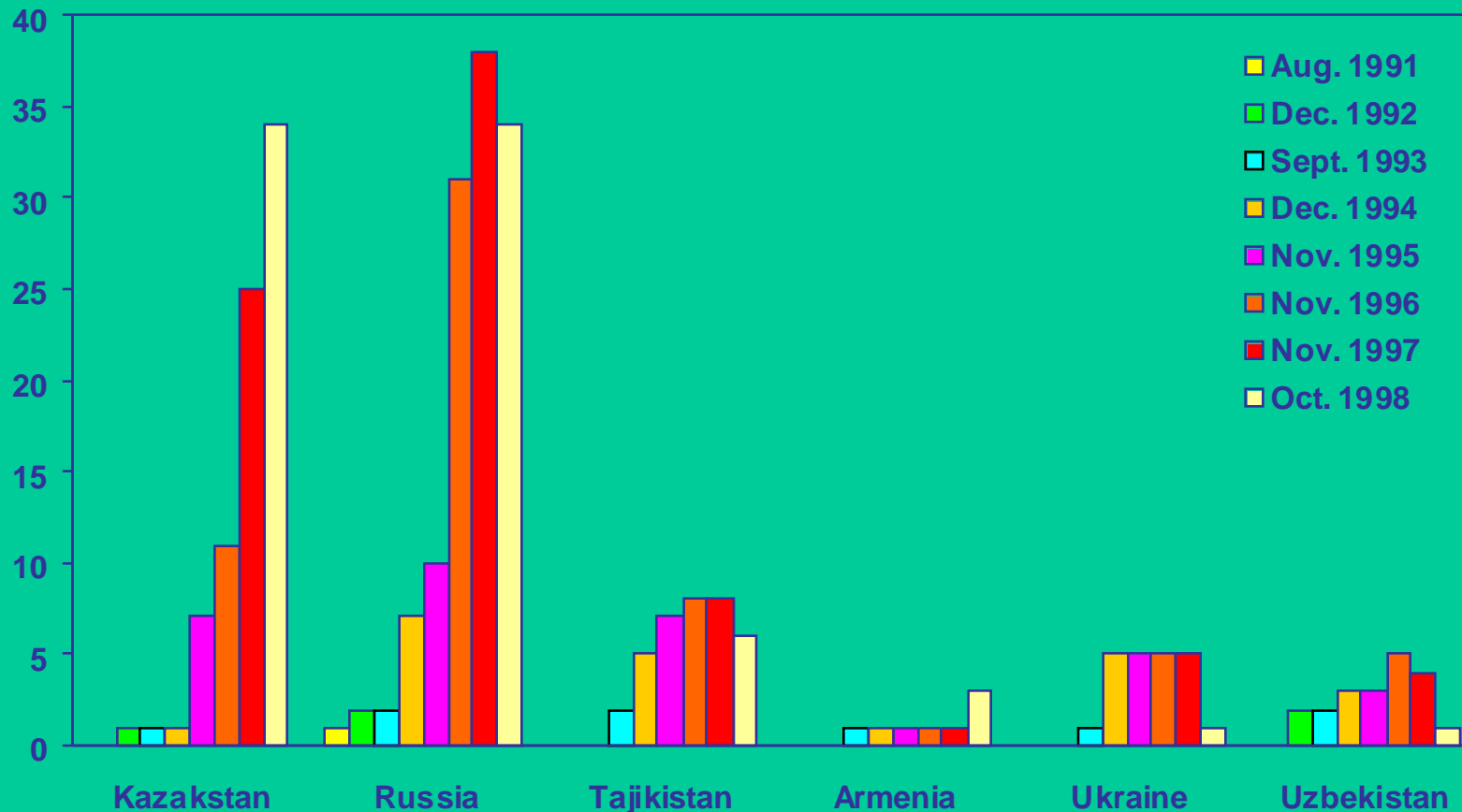
Ressources naturelles
Canada

Canada

Canadian Mineral Property Portfolio in the Former Soviet Union, By Country, 1991-98

Companies of all Sizes Listed on Canadian Stock Exchanges

No. of Properties



Notes: Data is for base metals, precious metals and diamonds.

Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group.



Natural Resources
Canada

Ressources naturelles
Canada

Canada

National and International Perspectives on Canadian Mining



Canada's macroeconomic situation



Competitiveness of Canadian mining



International scene



Challenges in other jurisdictions



Indicated choices, actions, policies



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Regulations, Procedures and Information

- Division of jurisdictional authority
- Uniform procedures and transparency
- Availability of information



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Taxation and Ownership

- Taxation
- Ownership of deposits



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Analyzing Tax Choices

- Analyze the tax burden effects on a low- and a high-profitable project operating under one of the following hypothetical models

Model	Profit Tax	Gross Mining Royalty	Export Tax
Case 1	40%	0%	0%
Case 2	35%	2%	0%
Case 3	35%	5%	0%
Case 4	25%	2%	10%
Case 5	25%	0%	0%



Average Effective Tax Rates (10% IRR)

Average Effective Tax Rate (AETR, 10% IRR project)
(PT - profit tax rate, GR - gross royalty rate, ET - export tax rate)



Source: Natural Resources Canada.



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Marketing and Exporting Concerns, and Investment Issues

- Gold pricing issue
- Payments in convertible currency
- Currency regulations
- Joint-venture partners
- Due diligence
- Adherence to contracts
- Dispute settlement



National and International Perspectives on Canadian Mining



Canada's macroeconomic situation



Competitiveness of Canadian mining



International scene



Challenges in other jurisdictions



Indicated choices, actions, policies

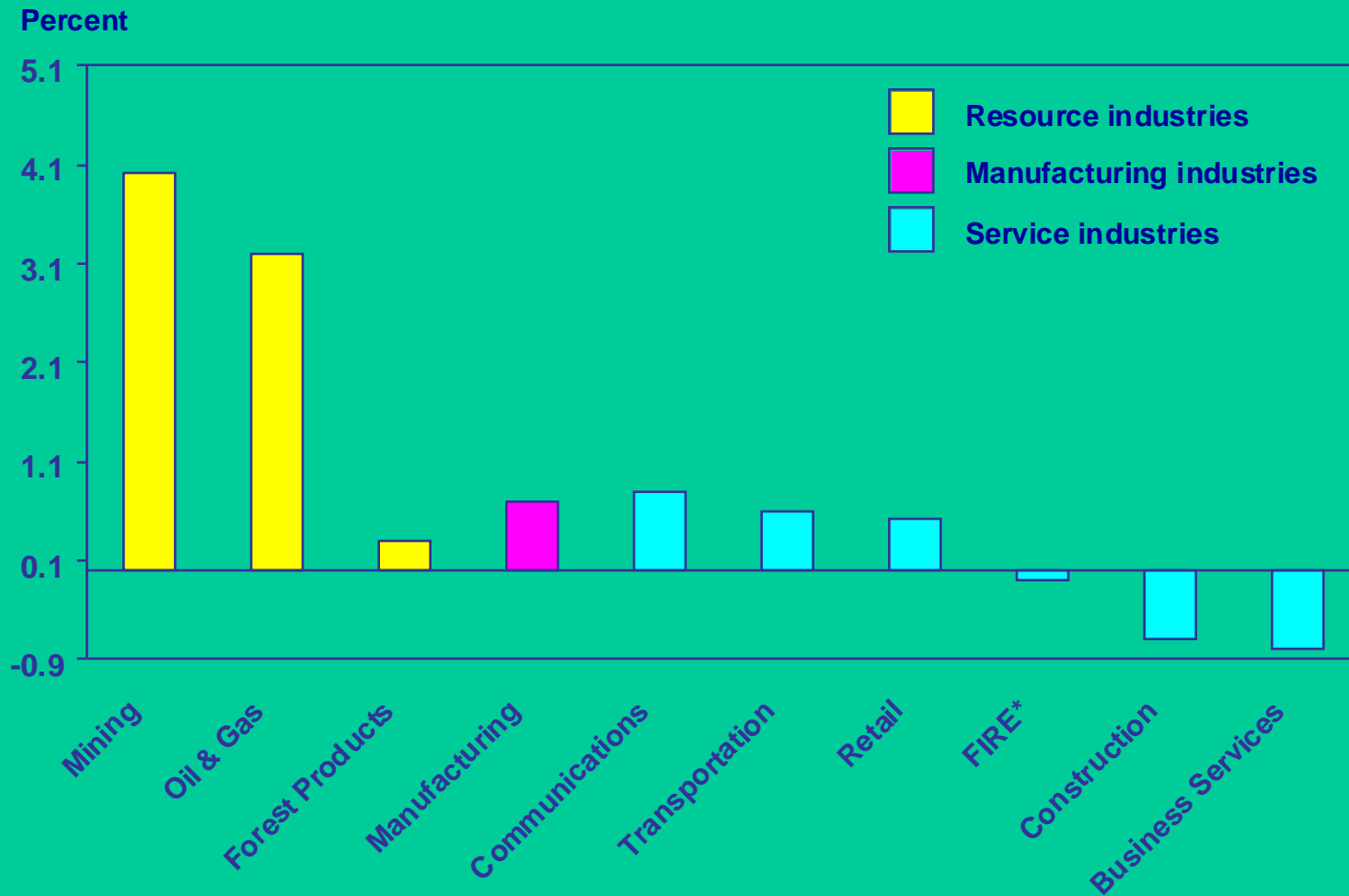


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Average Annual Rate of TFP¹ Growth in Canada, 1984-95



Notes: ¹ = Total Factor Productivity; * = Finance, insurance and real estate.

Source: Statistics Canada



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Mining: A Knowledge-Based Industry

- Canada has the highest percentage of university graduates in the world.
- Nine of the top 20 engineering schools in North America are in Canada.
- Over 85% of the mining work force uses advanced technology, including electronics, advanced materials, and telecommunications.
- As a percentage of total employees, the mineral industry has 50% more personnel with doctorate degrees than the manufacturing sector as a whole.
- More than one in four professionals engaged in R&D in this industry has a doctorate degree.



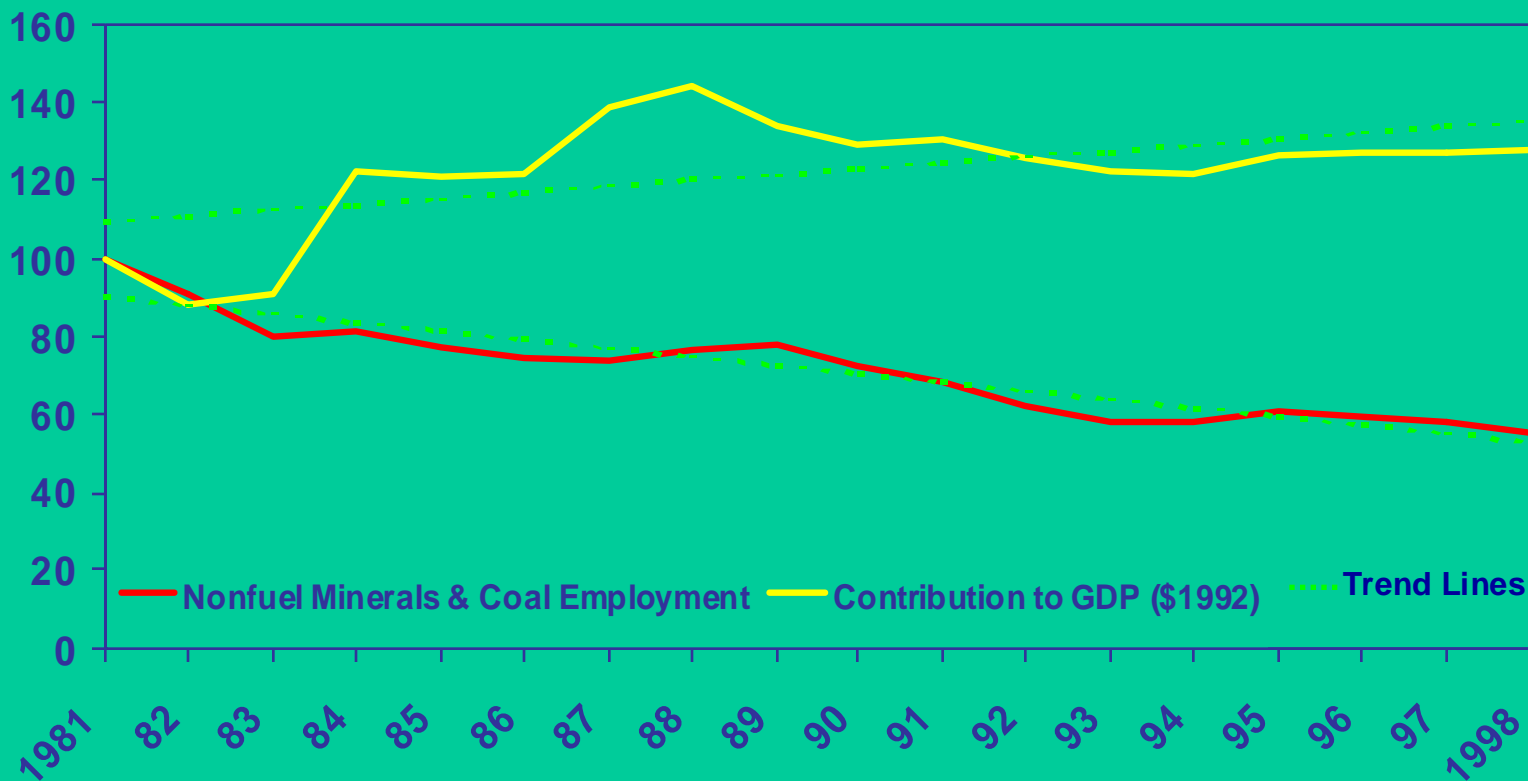
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Employment and Output in Canada's Mining Industry, 1981-98

Index: 1981 = 100



Notes: Mining's (Stage I) contribution to GDP (\$1992) at factor cost.

Source: Natural Resources Canada.



Natural Resources
Canada

Ressources naturelles
Canada

Canada

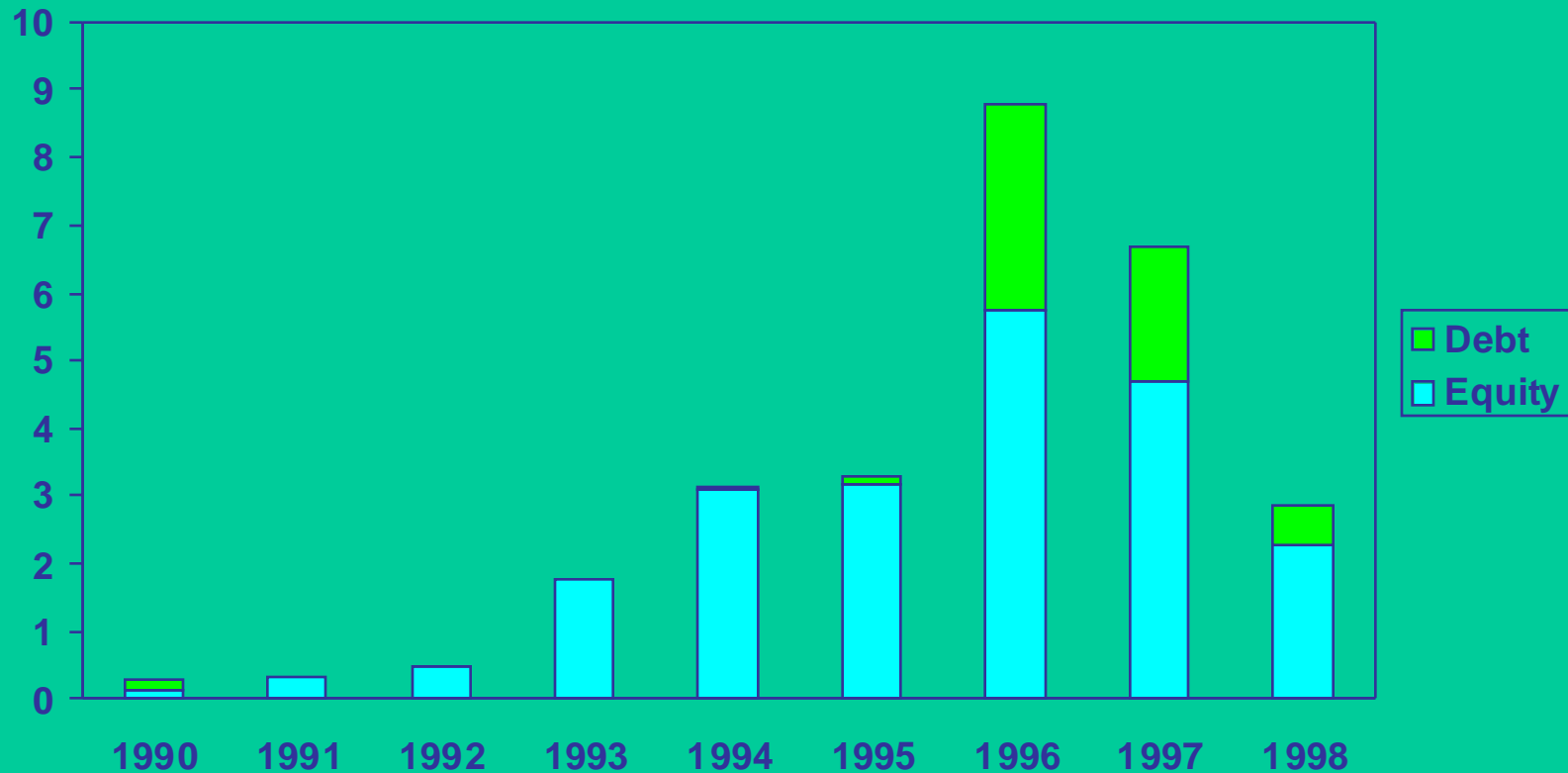
Canada's Mining and Minerals Expertise

- Exploration Financing
- Investment Analysis
- Due Diligence
- Legal Services
- Geophysics
- Geology
- Geochemistry
- Mapping
- Remote Sensing
- Drilling
- Communications
- Analytical Laboratories
- Feasibility Studies
- Engineering
- Project Management
- Mine Construction
- Parts and Equipment
- Mineral Processing
- Refining
- Smelting
- Automation and Software
- Environmental Management



Debt and Equity Raised in Canada for Exploration and Mine Development, 1990-98

Billions of dollars



Source: Natural Resources Canada, Investment Dealers Association of Canada (1990-95) and Natural Resources Canada, Financial Post Data Group (1996-98).



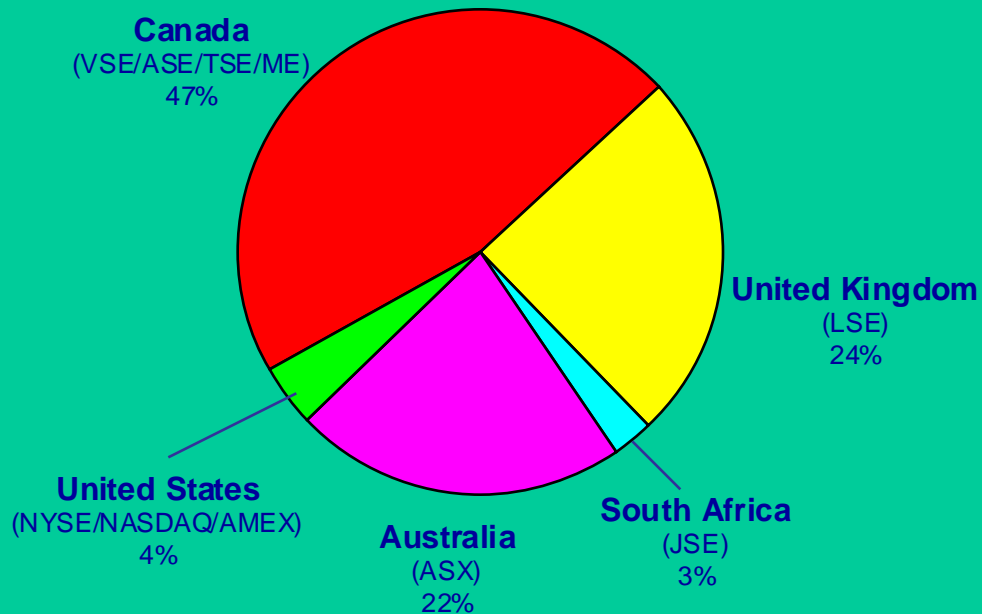
Natural Resources
Canada

Ressources naturelles
Canada

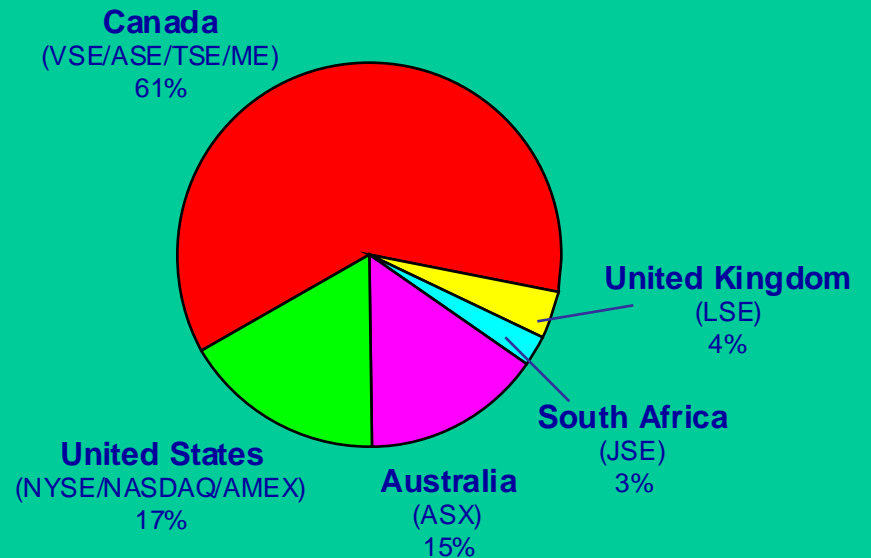
Canada

Sources of Equity Financing for Worldwide Mineral Exploration and Mine Development

1997
\$10 Billion



1998
\$3.8 Billion



Sources: Toronto Stock Exchange, Natural Resources Canada, Securities Data Co., FP Data Co., Gamah.



Natural Resources
Canada

Ressources naturelles
Canada

Canada

END



Natural Resources
Canada

Ressources naturelles
Canada

Canada