

# Providing Greater Granularity for National Reporting and Correlation with UNFC-2009: Australian Case Study

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# Introductory remarks

- Mineral resources are an important component of Australia's current and future wealth and well-being
  - A strategic (long term) perspective of what is likely to be available for mining is a prerequisite for formulating sound policies on resources and land access
    - Like most other countries with a significant mining sector, Australia maintains a national inventory of its mineral stocks

# Introductory remarks

- It is necessary to map the various classification and reporting systems for mineral and energy resources to a common base to
  - Clarify similarities/differences between the systems
  - Enable comparisons between countries' inventories and better estimates of total world stocks
- This should be done by mapping the various national classifications/reporting systems in current use to UNFC-2009

# Outline of presentation

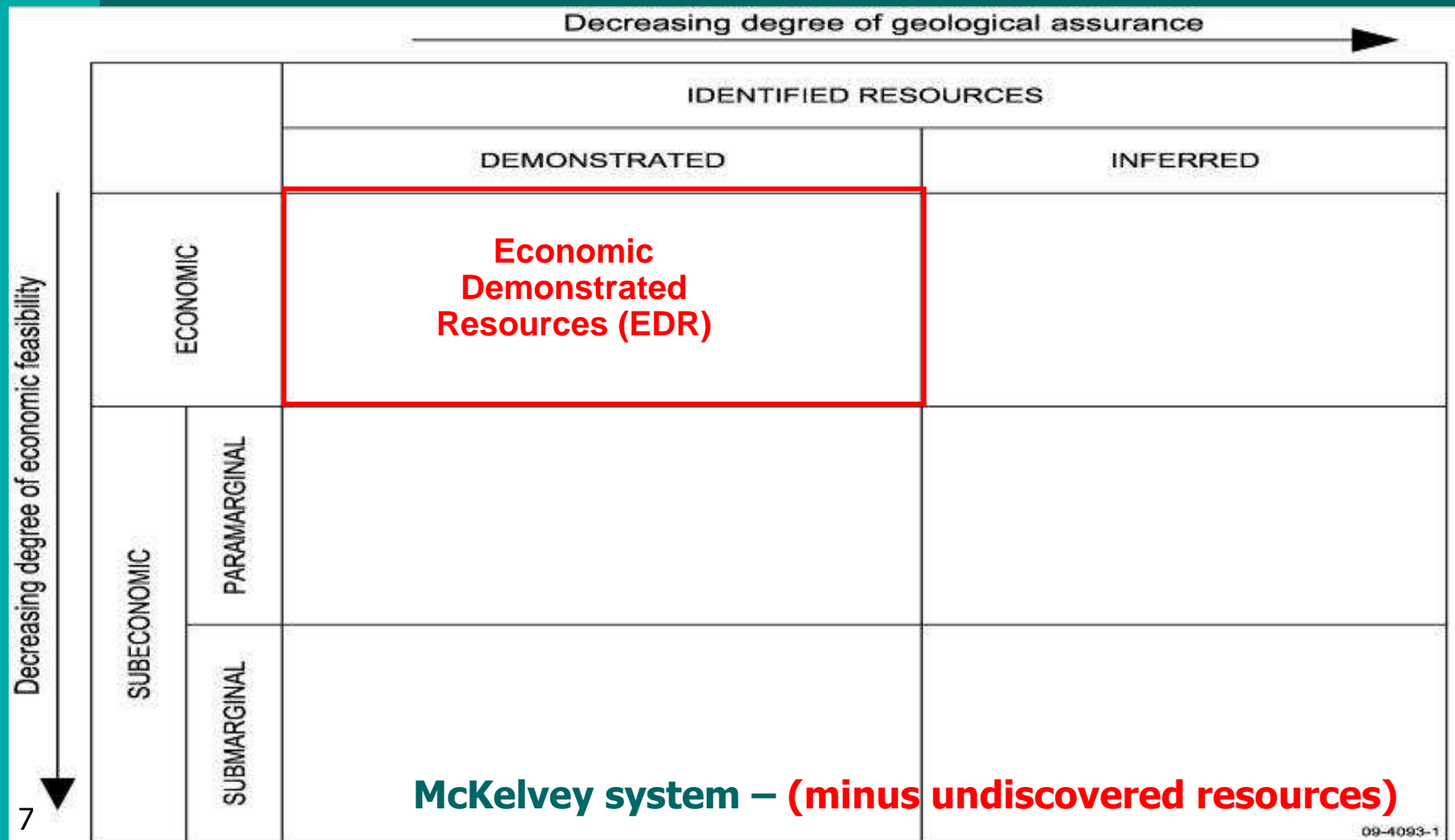
- Summarises Australia's national classification system for identified mineral resources
- Describes how data from company reports on individual mineral deposits are aggregated into larger categories for national mineral resource reporting
- Maps the Australian national mineral resources reporting system to the UNFC-2009
- Compares Australia's system with those of some other countries
- Puts a case for major mining nations map their national reporting with UNFC and consider providing information on resources likely to be available in short, medium and long time scales

# Estimating and reporting national mineral inventories: McKelvey system

In 1975, Australia adopted the McKelvey system  
 - [USBM]/USGS

Cumulative Production	IDENTIFIED RESOURCES			UNDISCOVERED RESOURCES	
	Demonstrated		Inferred	Probability Range	
	Measured	Indicated		Hypothetical	Speculative
ECONOMIC	Reserves		Inferred Reserves		
MARGINALLY ECONOMIC	Marginal Reserves		Inferred Marginal Reserves		
SUBECONOMIC	Demonstrated Subeconomic Resources		Inferred Subeconomic Resources		
Other Occurrences	Includes nonconventional and low-grade materials				

# Estimating and reporting national mineral inventories: Australia's system



# From company reports to national inventory

- Not feasible for a government agency to conduct individual resource assessments for all mineral deposits because of:
  - Constraints on staffing levels and decreasing expertise/experience
  - Lack of access to sensitive data on economic viability of deposits
- Therefore national reporting needs to be based on company reporting on individual deposits

# Commercial mineral resource reporting in Australia

- Companies listed on the ASX are required to report publicly on Ore Reserves and Mineral Resources under their control, using the Joint Ore Reserves Committee (JORC) Code
  - CRIRSCO template is international equivalent of JORC Code
  - Reserves provide commercial (relatively short term) view of what is to be mined
  - Resources have “reasonable prospects for economic extraction”
  - JORC Code compatible with the Australian national system

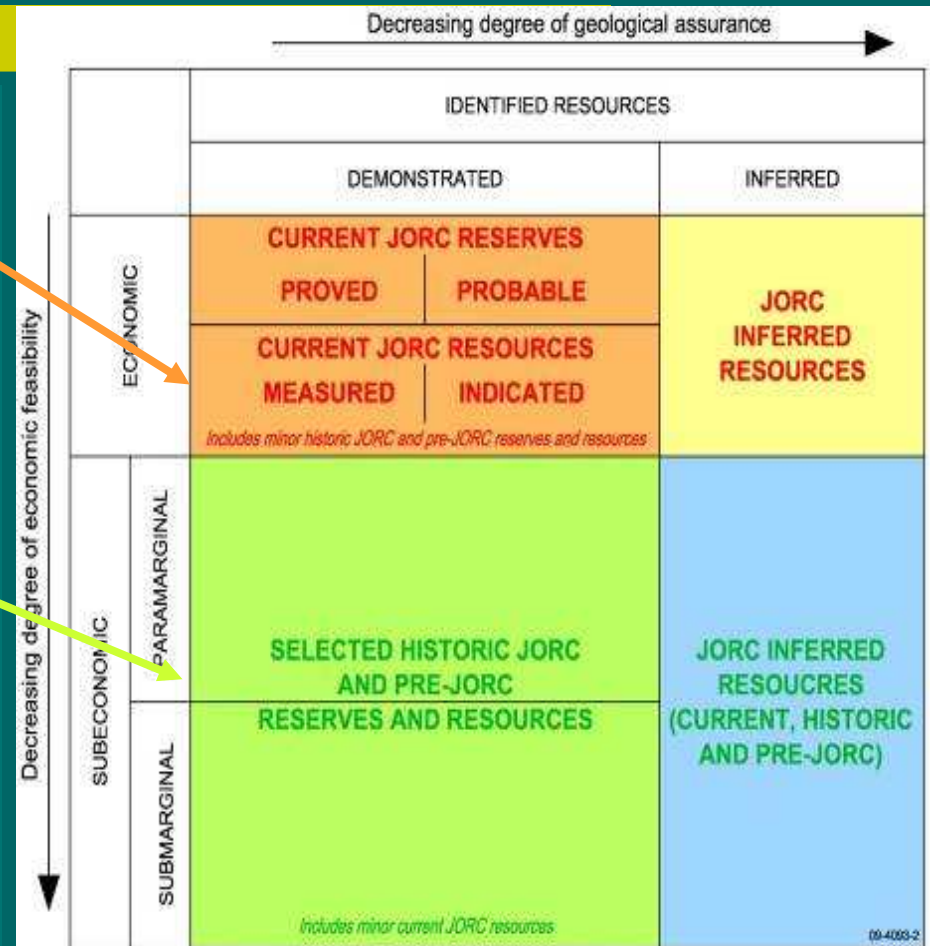


# From company reports to national inventory

- Several JORC categories are aggregated into the key national reporting category: EDR
  - To provide a long term longer perspectives of what is likely to be available for mining
  - Tonnages of contained metals are added up for national totals
    - Cannot add grades and tonnages from different deposits

# Mapping Australia's national resource classification system to JORC Code

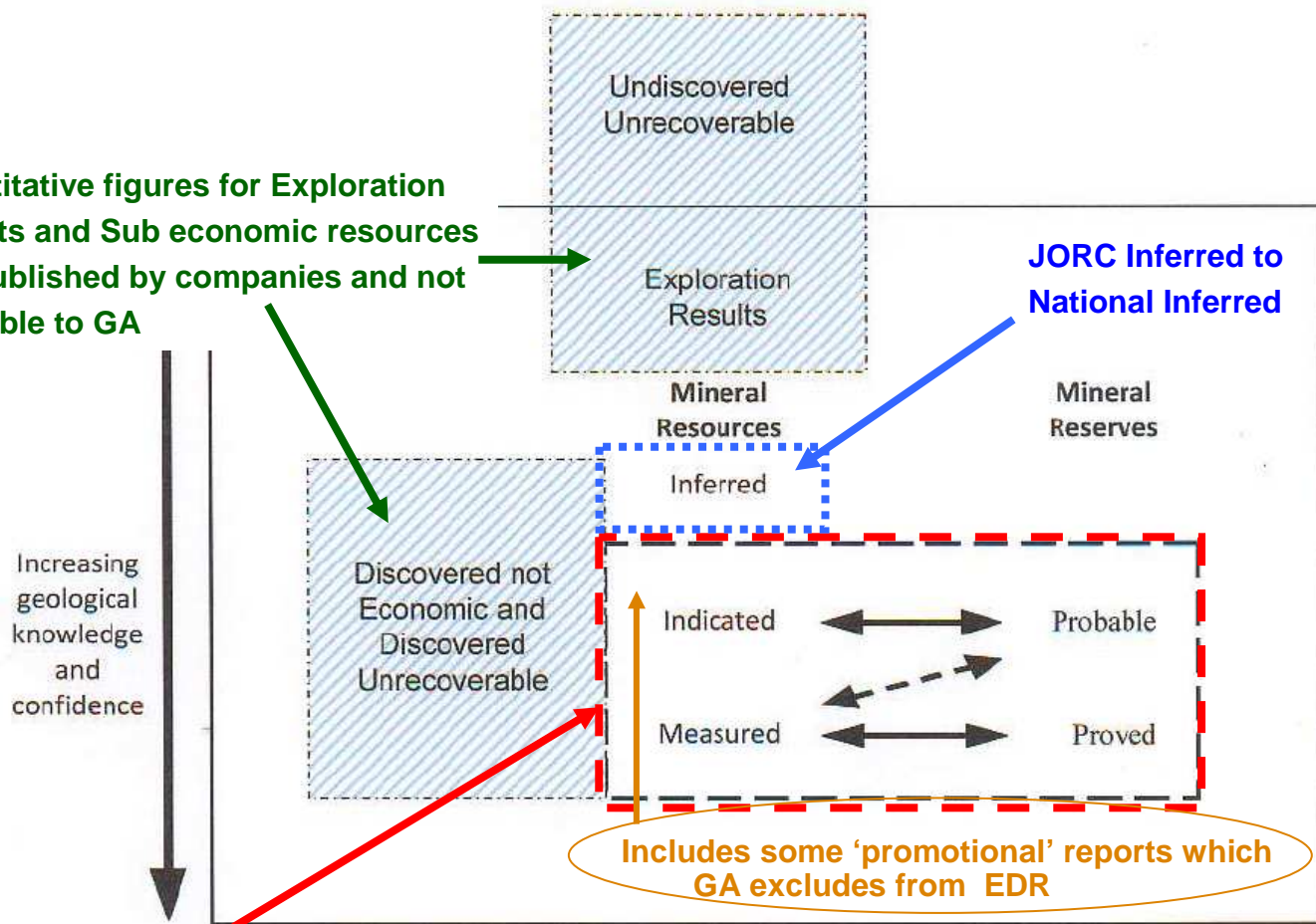
- **EDR** = 'Proved Reserves' + 'Probable Reserves' + 'Measured Resources' + 'Indicated Resources'
  - 'Subeconomic' Resources mainly from old reports but include some from current company reports



 Economic Demonstrated Resources (EDR)

# Company reports to national inventory

Quantitative figures for Exploration Results and Sub economic resources not published by companies and not available to GA



Most JORC Indicated & Measured Resources and Probable & Proved Reserves go to National EDR – some to Sub Economic

# EDR = Key indicator

- **EDR** considered to provide a reasonable and objective indication of what is **likely to be available for mining in the long term**
  - If anything → conservative estimate
    - Does not consider undiscovered resources
  - Adding different JORC categories is not considered a problem in this context
    - Reserves and Resources both “economic”
    - National inventory estimation is not a precise science
    - The relative economic quality of deposits is important in determining when and whether they will be mined
- In addition to EDR, Geoscience Australia also reports national **Reserves** and **Inferred Resources**

# UNFC as universal template

- The United Nations Framework Classification (UNFC 2009) is a universal template to which all other systems can be mapped
  - Industry, financial, national and international resource reporting systems are being/should be mapped to UNFC
    - To clarify the similarities and differences between systems in use around the world
- Many countries already have mandated commercial reporting systems
  - These countries will not adopt the UNFC
  - Other countries may choose to use the UNFC

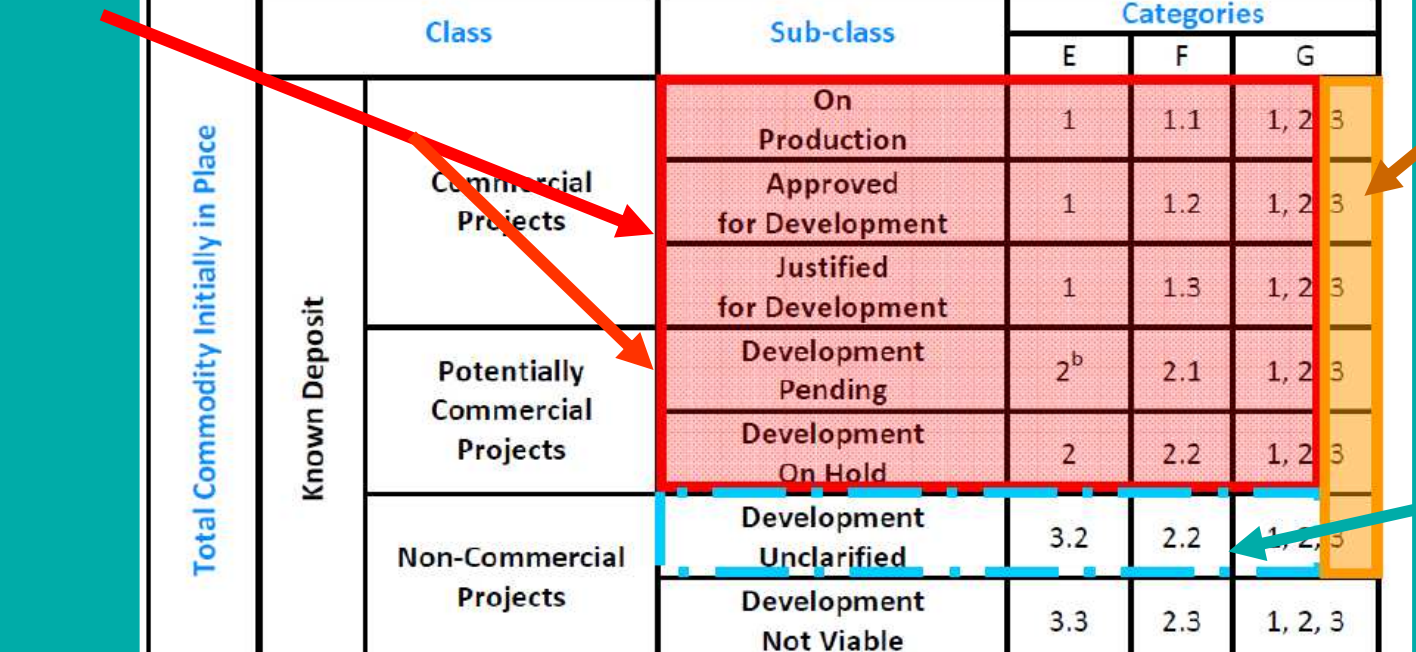
# Correlation of Australia's national system with UNFC-2009

UNFC Classes Defined by Categories and Sub-categories						
	Extracted	Sales Production				
		Non-sales Production				
Total Commodity Initially in Place	Class	Sub-class	Categories			
			E	F	G	
Known Deposit	Commercial Projects	On Production	1	1.1	1, 2, 3	
		Approved for Development	1	1.2	1, 2, 3	
		Justified for Development	1	1.3	1, 2, 3	
	Potentially Commercial Projects	Development Pending	2 <sup>b</sup>	2.1	1, 2, 3	
		Development On Hold	2	2.2	1, 2, 3	
	Non-Commercial Projects	Development Unclassified	3.2	2.2	1, 2, 3	
		Development Not Viable	3.3	2.3	1, 2, 3	

EDR

Inferred

Subeconomic



# What do some other countries report?

- USGS publishes “Reserves”
  - Comparable with EDR for many commodities
    - = UNFC classes: “Commercial projects” + “Possibly Commercial Projects”
    - With the notable exception of Cu (comparable with JORC Reserves)
- Canada publishes Reserves (JORC equivalent) in operating mines
  - = UNFC Sub-class: “Commercial projects on Production”
    - Very short term perspective on national resources
  - Except for U (equivalent to EDR)



# Correlation of Australia's uranium resources with UNFC-2009

RAR  
 $\leq$ US\$80/kg U

RAR US\$80  
 - 130/kg U

RAR >US\$130/kg U

UNFC Classes Defined by Categories and Sub-categories						
	Extracted	Sales Production				
		Non-sales Production				
Total Commodity Initially in Place	Class	Sub-class	Categories			
			E	F	G	
Known Deposit	Commercial Projects	On Production	1	1.1	1, 2, 3	
		Approved for Development	1	1.2	1, 2, 3	
		Justified for Development	1	1.3	1, 2, 3	
	Potentially Commercial Projects	Development Pending	2 <sup>b</sup>	2.1	1, 2, 3	
		Development On Hold	2	2.2	1, 2, 3	
	Non-Commercial Projects	Development Unclarified	3.2	2.2	1, 2, 3	
		Development Not Viable	3.3	2.3	1, 2, 3	

Inferred  
 $\leq$  US\$80/kg U

Inferred  
 US\$80 –  
 130/kg U

IR > US\$130  
 /kg U



# Criticism by some small company representatives

- Small companies are seeking tax breaks
- Have criticised EDR and EDR/Production as “misleading”
  - Provides Government with unrealistically optimistic information
  - Believe resources being run down in reality
    - Not holding/increasing as per national inventory
  - State that there is no filtering out of “promotional” reports in national reporting
    - Concerning as these are not permitted under JORC
    - We do put these into sub-economic

# Greater granularity of national reporting

- Australia is trialling further subdivision of EDR to:
  - Provide information on what is likely to be available in short, **intermediate** and long time frames
    - Useful additional information for all interested parties
  - The sub-divisions of EDR being trialled reflect different levels of **assurance of production**
  - Facilitate international comparisons

# Greater granularity of national reporting

- “EDR 1” = Proven and Probable Ore Reserves (as defined under the JORC Code) [Note that Geoscience Australia already publishes this category in *Australia’s Identified Mineral Resources* as JORC Reserves]
- “EDR 2” = Measured and Indicated Mineral Resources in existing mines and undeveloped deposits which have had a positive feasibility study
- “EDR 3” = Measured and Indicated Mineral Resources in deposits where their grade and tonnage characteristics are judged to be similar to deposits being mined elsewhere, but no positive feasibility study

**Total EDR = sum of EDR1 + EDR2 + EDR3**

# EDR subdivisions mapped to UNFC-2009

→ Short, intermediate and long term national perspectives

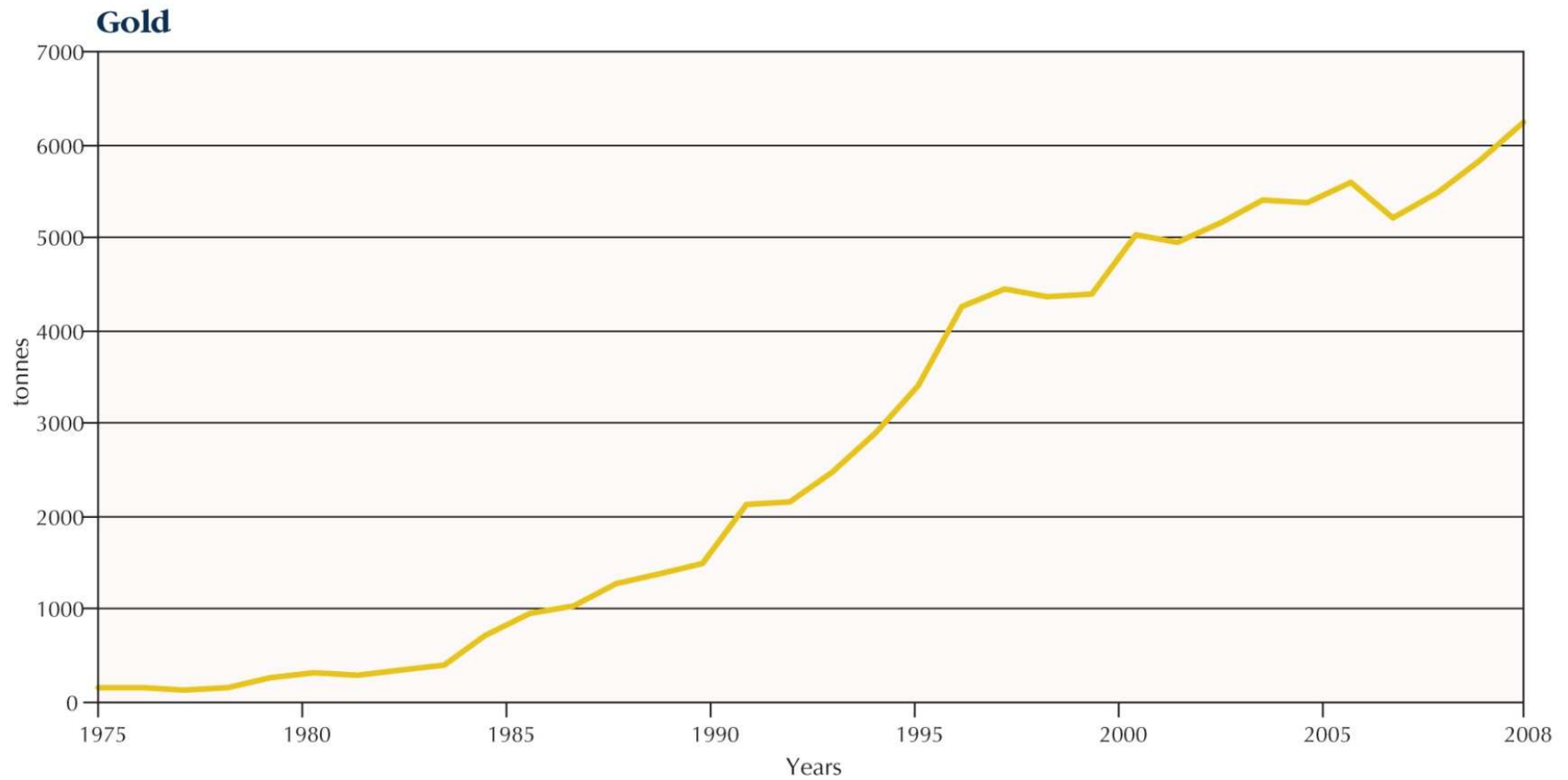
UNFC Classes defined by categories and sub-categories							
Total commodity initially in place	Extracted	Sales Production					
		Non-sales Production					
	Class	Sub-class	Categories				
			E	F	G		
Known Deposit	Commercial Projects	On Production	1	1.1	1	2	3
		Approved for Development	EDR 1 1	1.2	1	2	3
		Justified for Development	1	1.3	1	2	3
	Potentially Commercial Projects	Development Pending	EDR 2 2	2.1	1	2	3
		Development On Hold	EDR 3 2	2.2	1	2	3
	Non-Commercial Projects	Development Unclarified	3.2	2.2	1	2	3
		Development Not Viable	3.3	2.3	1	2	3
Additional quantities in place			3.3	2.3	1	2	3
Potential Deposit	Exploration Projects	[No sub-classes defined]	3.2	3			4

Inferred Resources

**Questions?**



# Gold EDR



# [Imperfect] indicators of longevity : Resources to Production ratios: **EDR** vs **Reserves**

(= Snapshots in time: Decrease with production and increase with addition of new resources)

Commodity	1998	2003	2009
Bauxite	70	90	38
Black coal	180	110	40
Brown coal	630	440	31
Copper	40	50	24
Diamond	3	5	5
Gold	15	20	12
Iron Ore	100	60	20
Lead	30	30	15
Manganese ore*			35
Mineral sands			
ilmenite	70	85	20
rutile	75	90	18
zircon	60	50	11
Nickel	65	120	36
Silver	30	25	14
Uranium	105	80	57
Zinc	30	25	15

# Gold production and resource life

Planned new production:  
ODX, Boddington,  
Telfer, Cadia

