

UNFC Principles

Andrej Šubelj

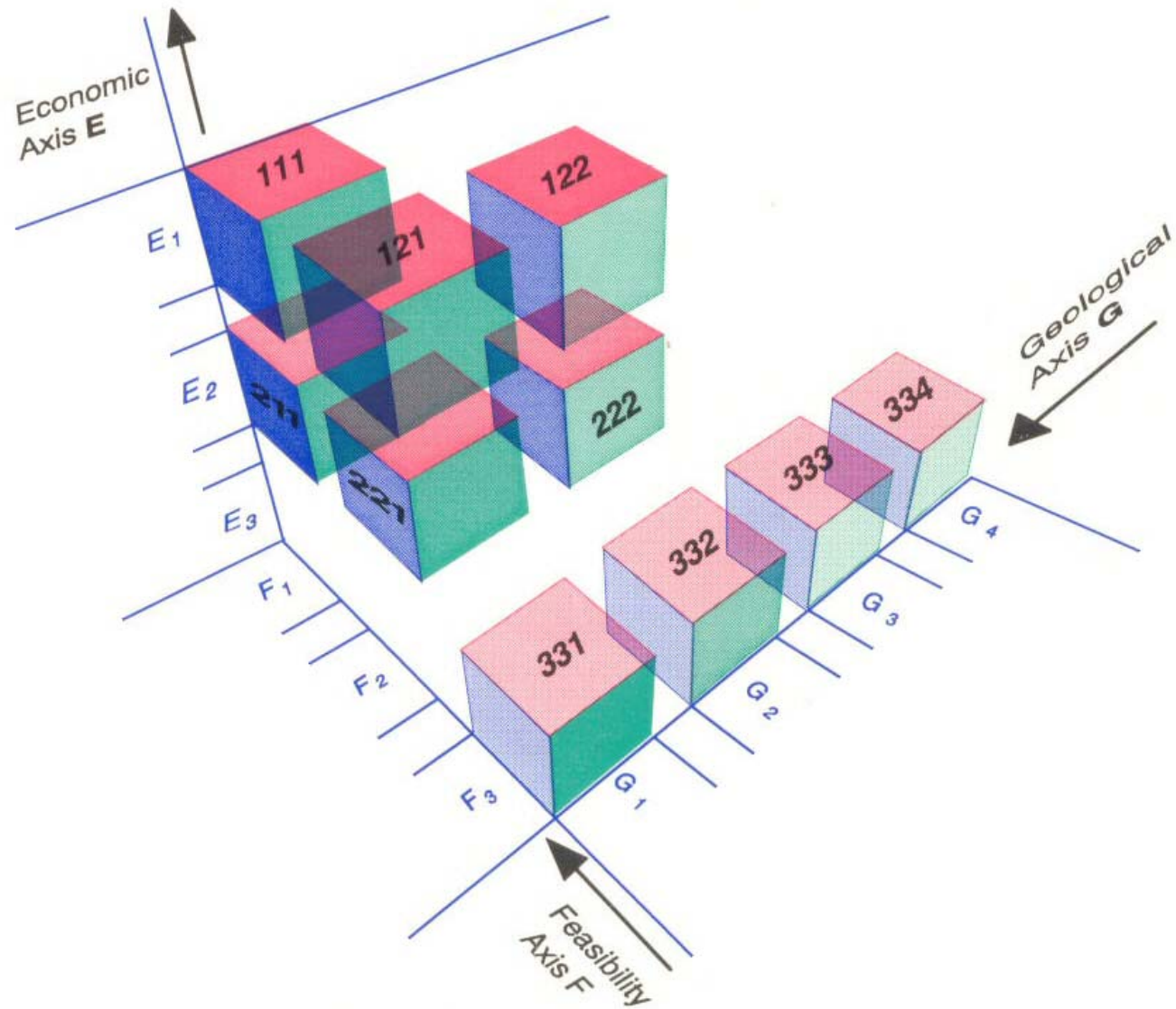
**Ad Hoc Group of Experts on Harmonization of Energy Reserves
and Resources Terminology
9-11 November 2005**

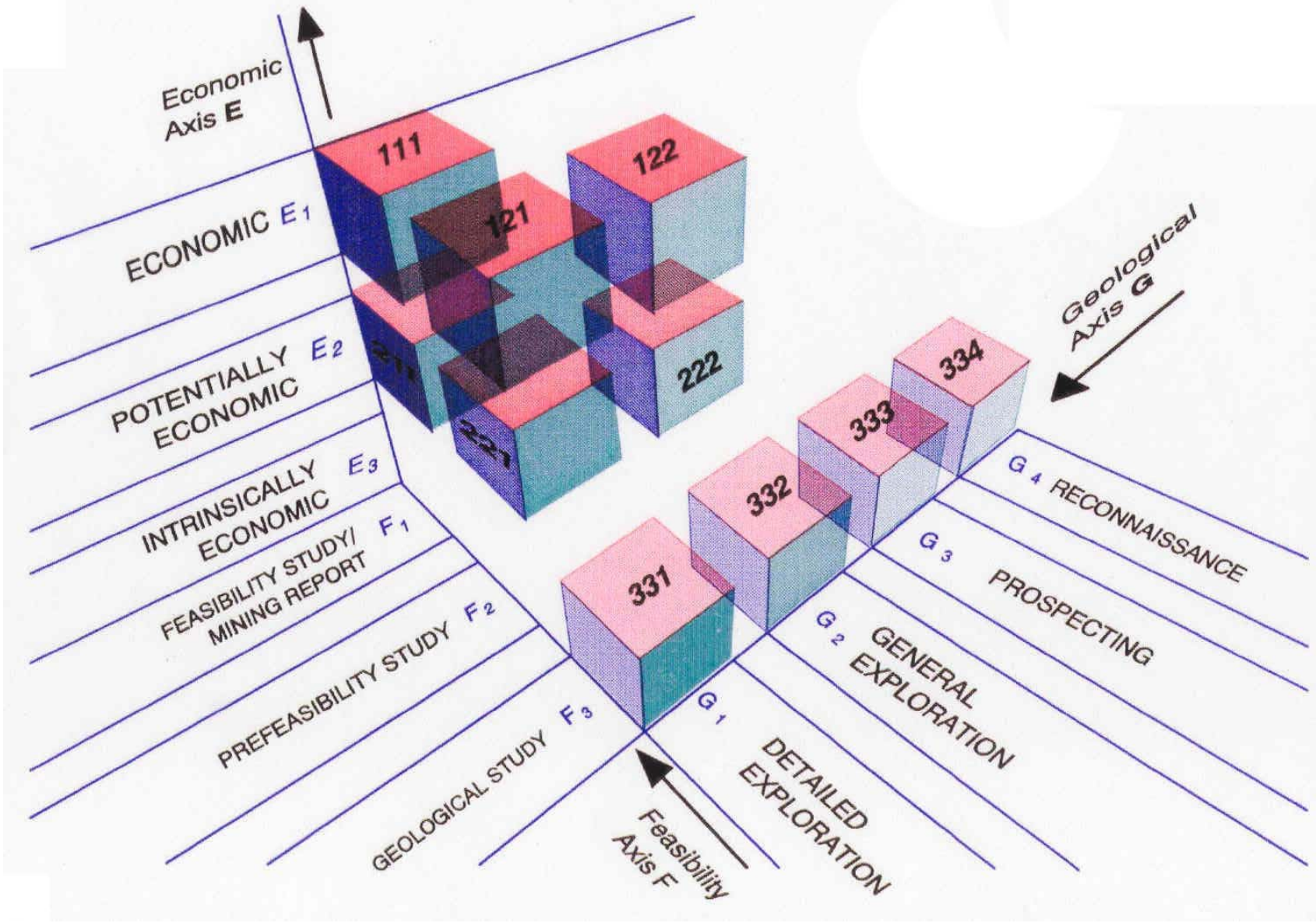
UN Millenium Development Goals

... by 2015 all 189 UN Member States have pledged to:

8. Develop a global partnership for development

*Develop further an open trading and financial system that is **rule based, predictable and non discriminatory.** Includes commitment to good governance, development and poverty reduction – nationally and internationally.*





Mineral resource

**is used to denote all solid,
liquid, or gaseous geologic
materials exploitable for use
to the benefit of the mankind**

Mineral reserves

are measured quantities of minerals and metals which can be exploited profitably with currently available technology in present economic conditions

Requirements for good classification system

- covers all aspects**
- covers all needs**
- translation interface**
- as simple as possible**

Need for unification

two initiatives

- Joint Ore Reserves Committee

CMMI – now CRIRSCO

- Countries in transition

UN ECE

Who needs Classification

- **governments (inventory, SEC)**
- **financial institutions**
- **companies**
- **accounting organizations**
- **international organizations
(WEC, IAEA, OPEC, IASB, CESR)**

Existing Classification Systems

belong to:

- **international organisations**
- **states**
- **companies**

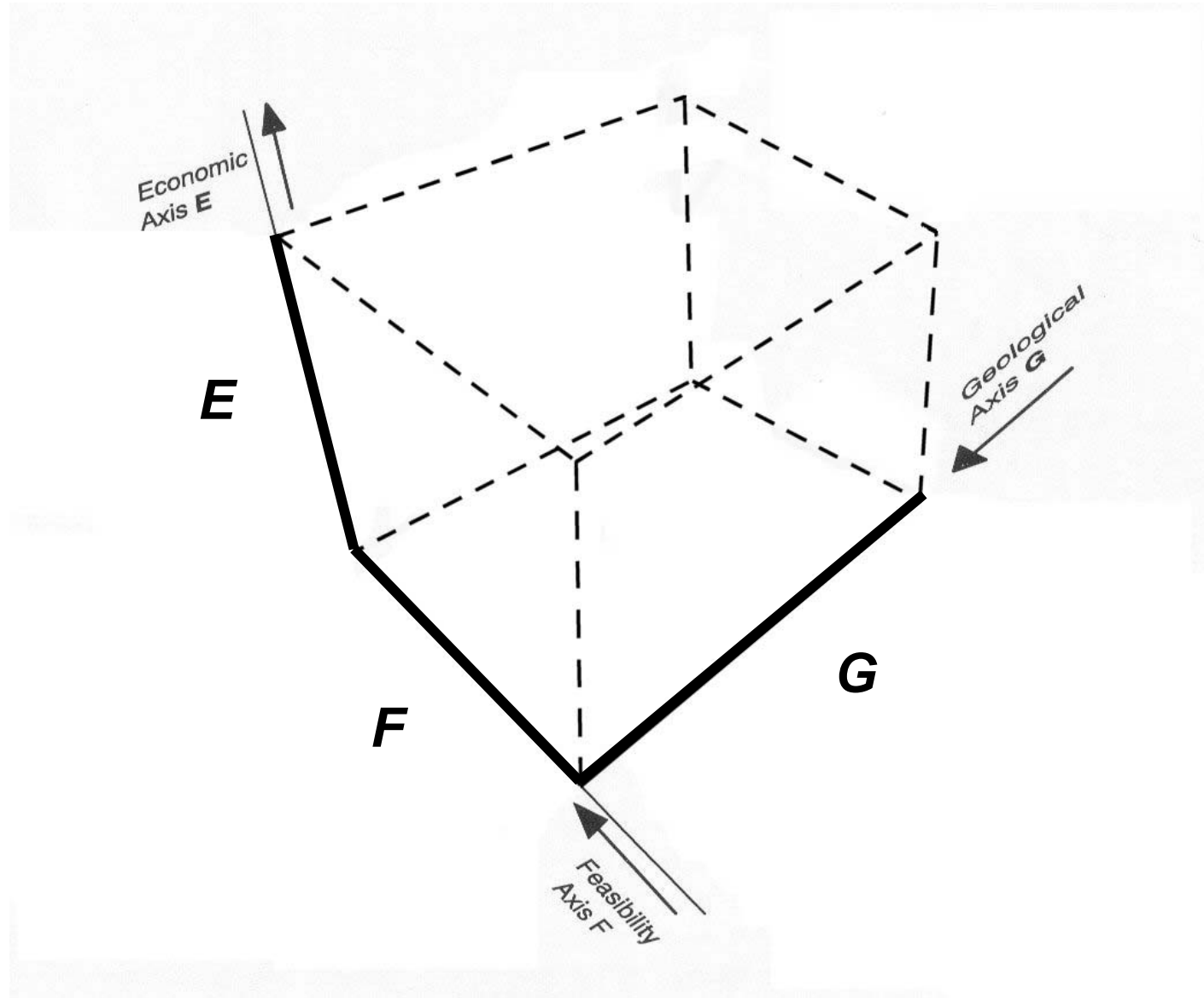
History of Classification systems

- **Beginning of 20th Ct.: president Hoover**
- **1915 Witwatersrand Basin**
- **1920 Shinkolobwe Congo**
- **1928 Soviet Union**
- **1943 USA**
- **1950 Eastern Systems**
- **1960 decline in military use of U**
- **1973,86 McKelvey, 1981 Canada,
1978/79 UN, 1981 Fettweis**
- **1997 UNFC**
- **1999 JORC**
- **2001 harmonisation of solid minerals,
oil, gas and uranium classifications**

Eksploitability

$\text{Ekspl} = f(\text{geol,tech,leg,env,}\dots,\text{mpr})$

$\text{Ekspl} = f(\text{G,F,E})$



Two general groups of classification systems

- **so called “eastern”**
- **“western” – JORC**

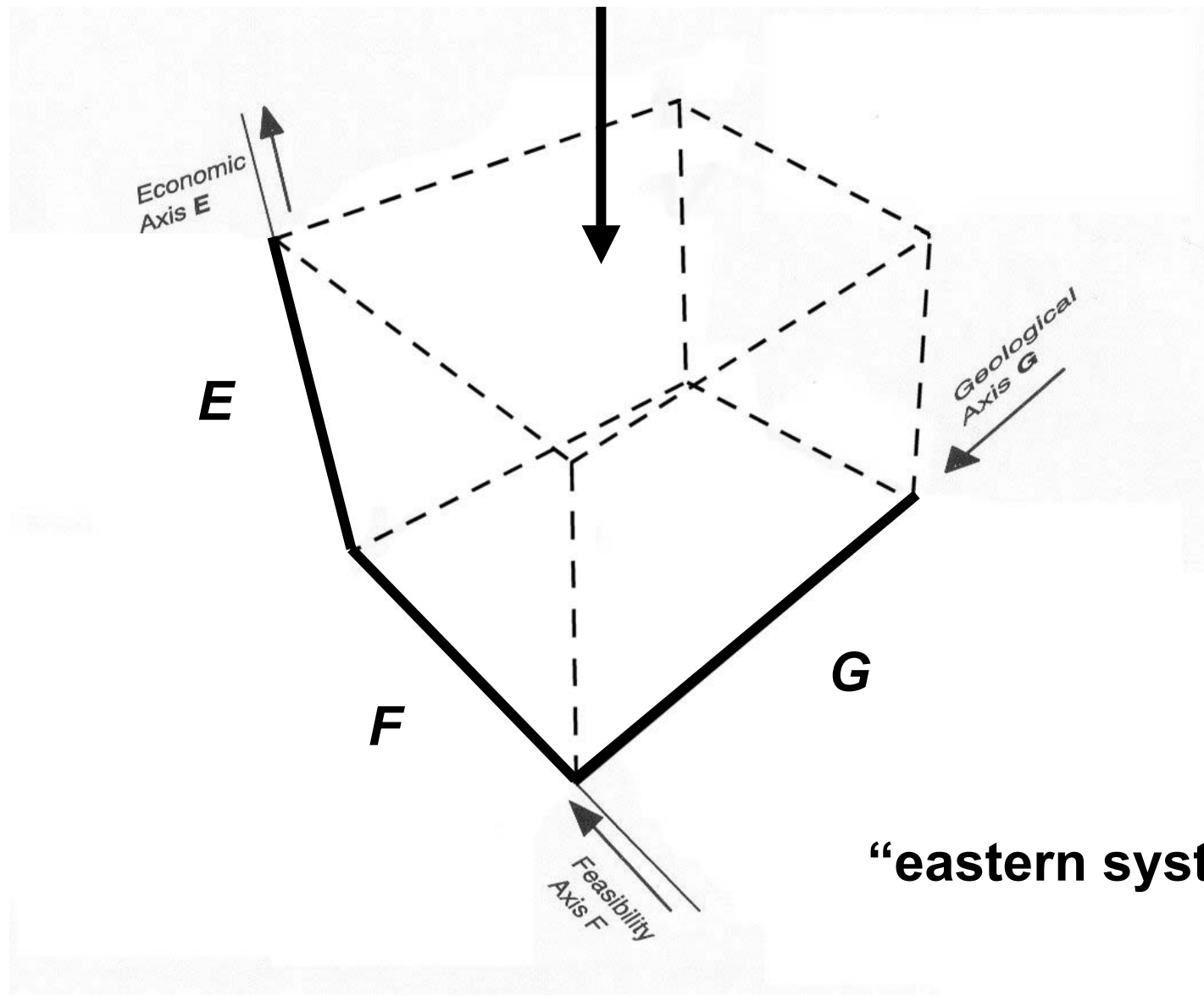
G

F

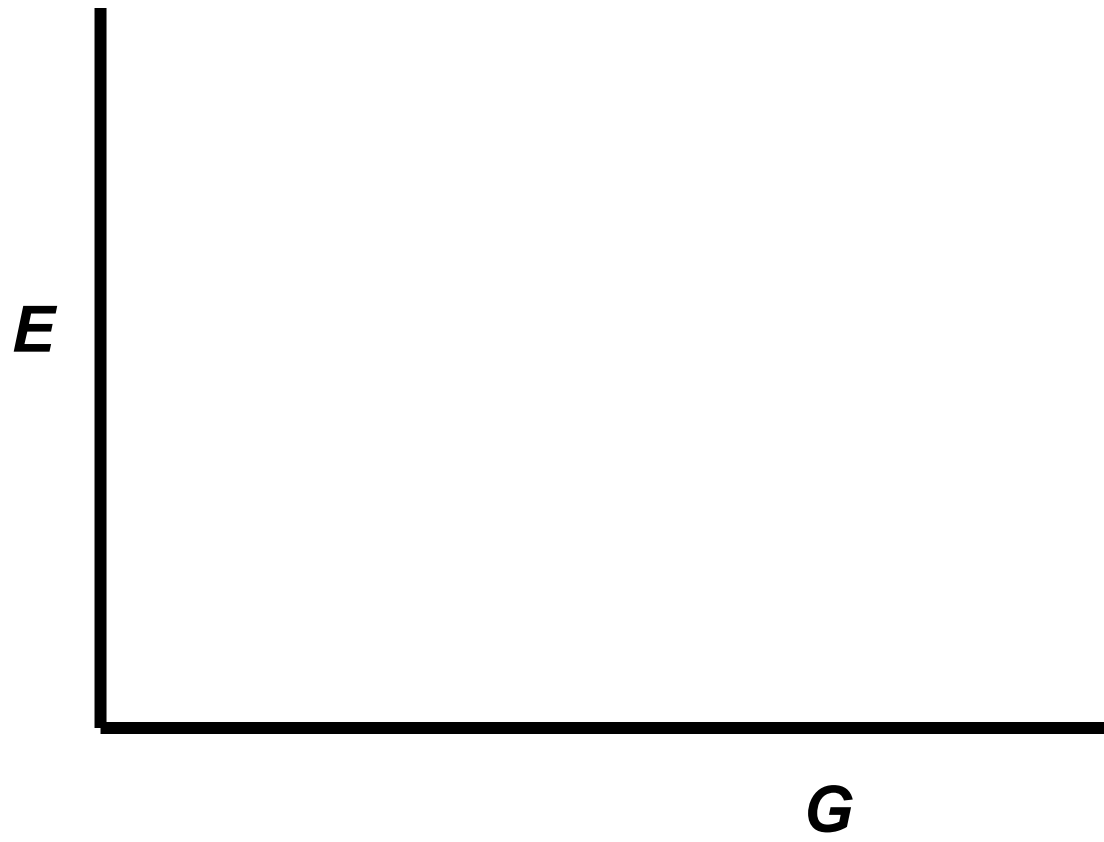
“eastern” systems

Soviet Union

		TOTAL RESOURCES					
		Degree of knowledge (certainty) and categories					
NATIONAL ECONOMIC CATEGORIES	RESERVES				PROGNOSTIC RESOURCES		
	Exploration		Preliminary estimation		P ₁	P ₂	P ₃
Balance reserves	A	B	C ₁	C ₁	Resources in explored areas, exploration areas and found by prospecting	Resources in areas with known deposits	Resources in areas with no known deposits
Out of balance reserves	a	b	C ₁	C ₂			



“western” systems

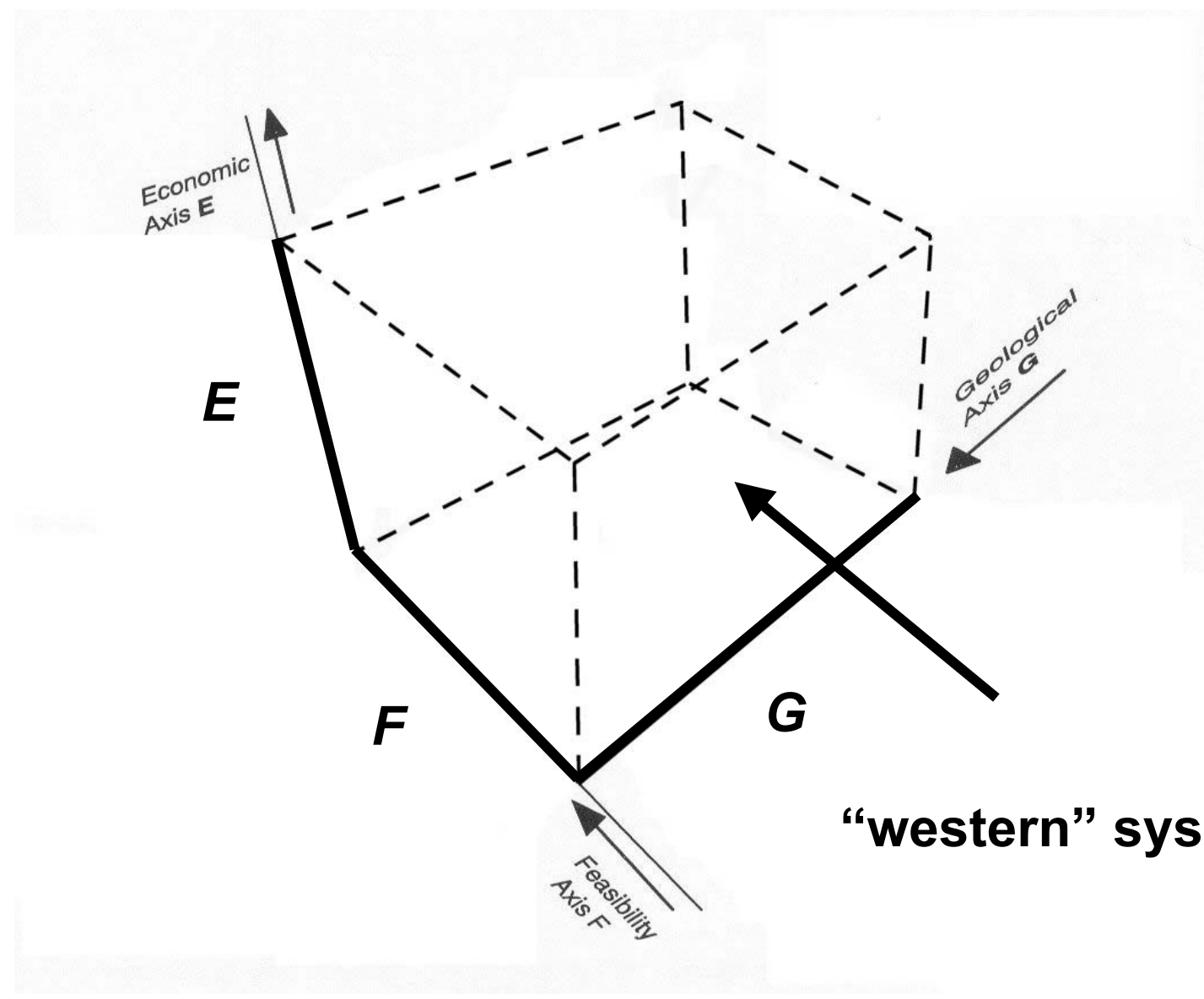


Mc Kelyv Box		TOTAL RESOURCES				
		Identified		Undiscovered		
		Demonstrated		Inferred	Hypothetical (in known districts)	Speculative (in undiscovered districts)
		Measured	Indicated			
Economic		RESERVES				
Subeconomic	Paramarginal	Resources				
	Submarginal					

Other occurrences	Includes nonconventional and low grade materials
--------------------------	---

Economic feasibility of recovery ↑

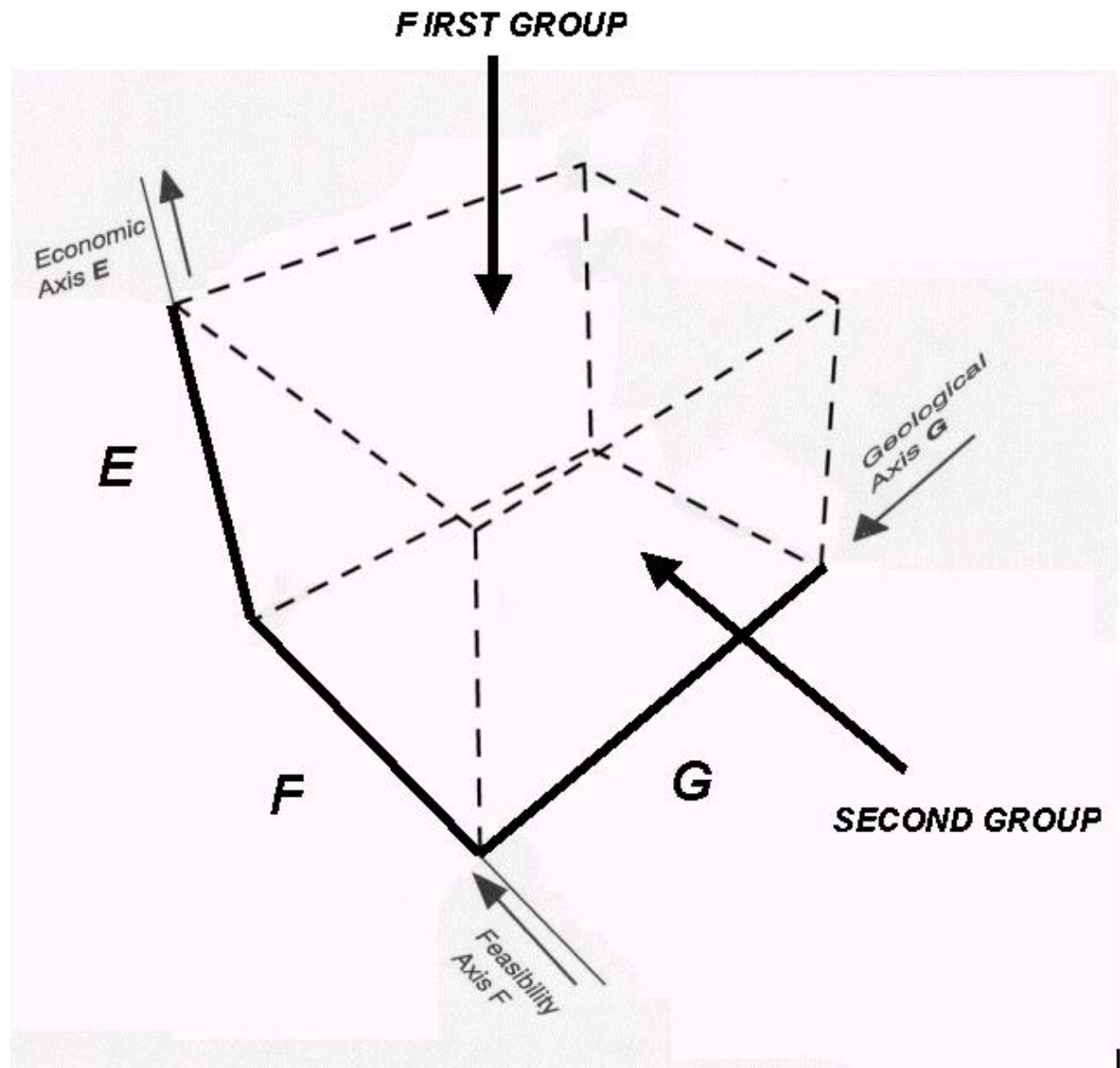
← Increasing degree of geological assurance

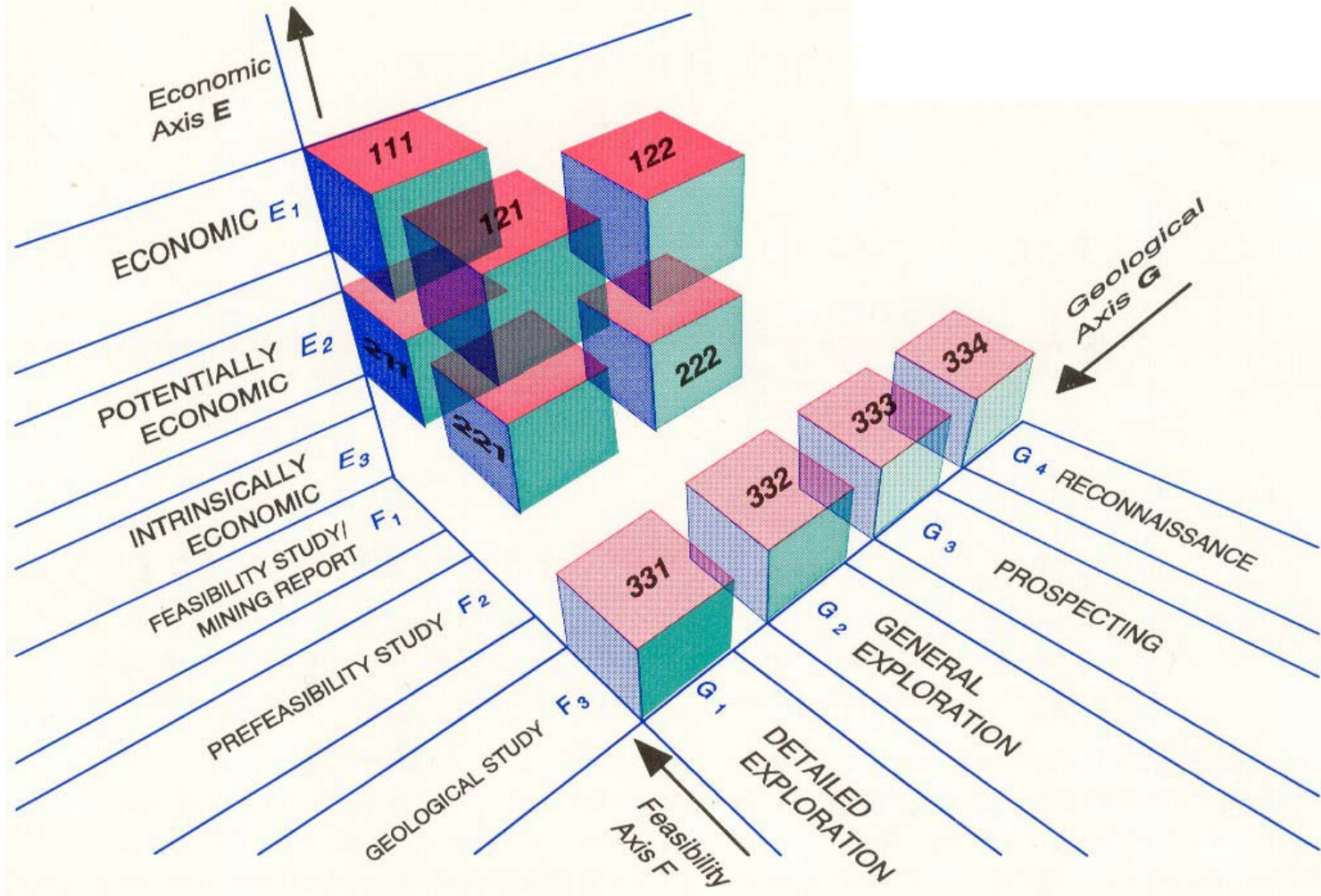


“western” systems

Most difficult task:

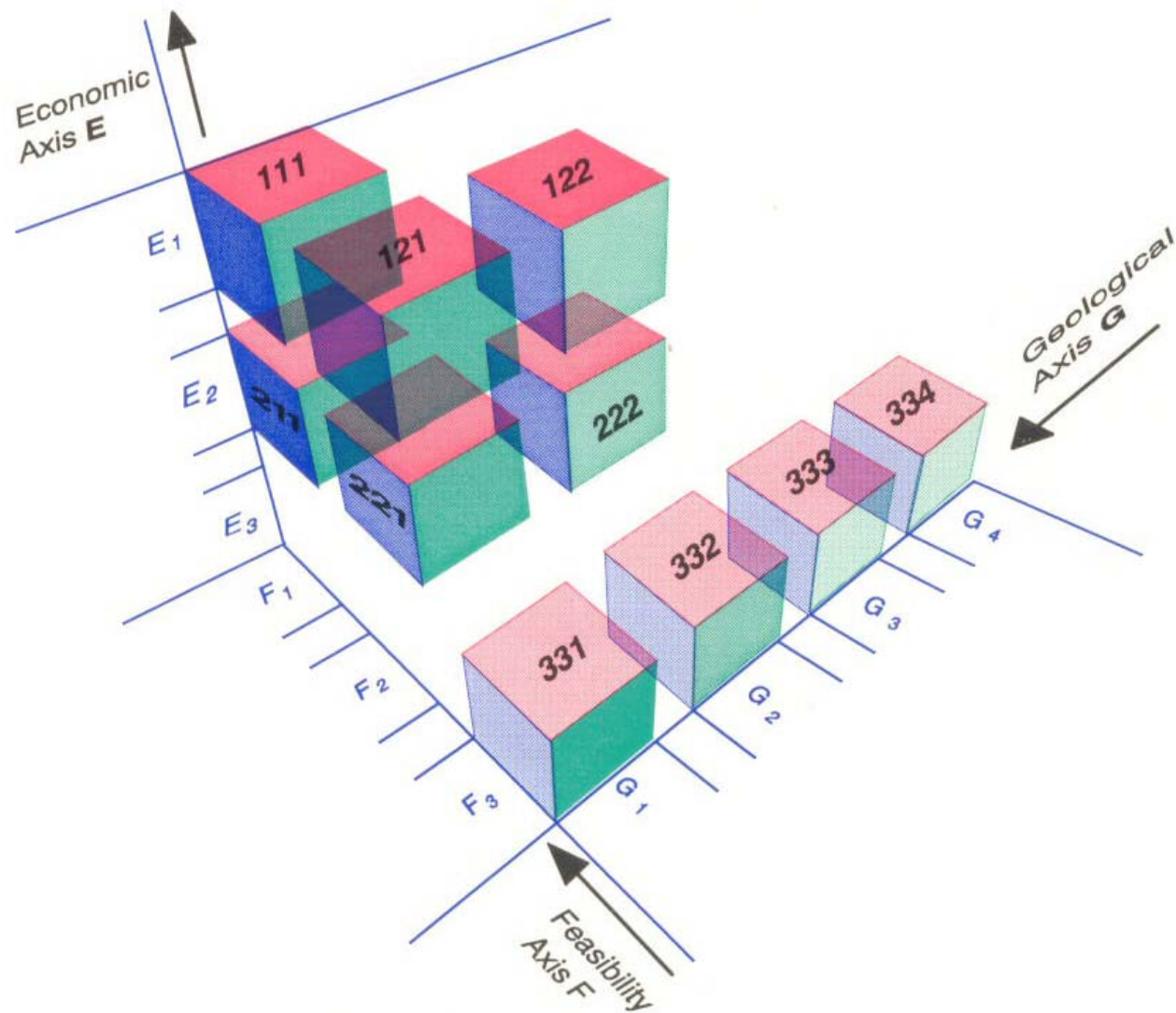
- to integrate all systems of the two different groups into one - unique - system**





By courtesy of UN ECE

Three-digit numerical code



Why numeric code

- **semantic problems**
- **every nation has the right to use its own language**
- **“soft” globalization**
- **easy transformation from one to another system**
- **everybody uses what he needs**

Question of Potentially Economic Category

UNITED NATIONS INTERNATIONAL FRAMEWORK CLASSIFICATION FOR RESERVES/RESOURCES - Solid Fuels and Mineral Commodities -

UN International Framework		Detailed Exploration	General Exploration	Prospecting	Reconnaissance	
↓	↓ National System →					
Feasibility Study and/or Mining Report		1 (111)		usually not relevant		
		2 (211)				
Prefeasibility Study		1 (121)				+ (122)
		2 (221)				+ (122)
Geological Study		1-2 (331)	1-2 (332)	1-2 (333)	? (334)	

Economic Viability Categories: 1 = economic . 2 = potentially economic. 1-2 = economic to potentially economic (intrinsically economic). ? = undetermined
 Classification Code: (111). = (E,F,G), where E = degree of Economic Viability, F = stage of Feasibility Assessment, and G = stage of Geological Assessment.

1. $TMW^* = \text{resource}^{1)}$

2. $TMW^* = \text{reserve} + \text{resource}^{2)}$

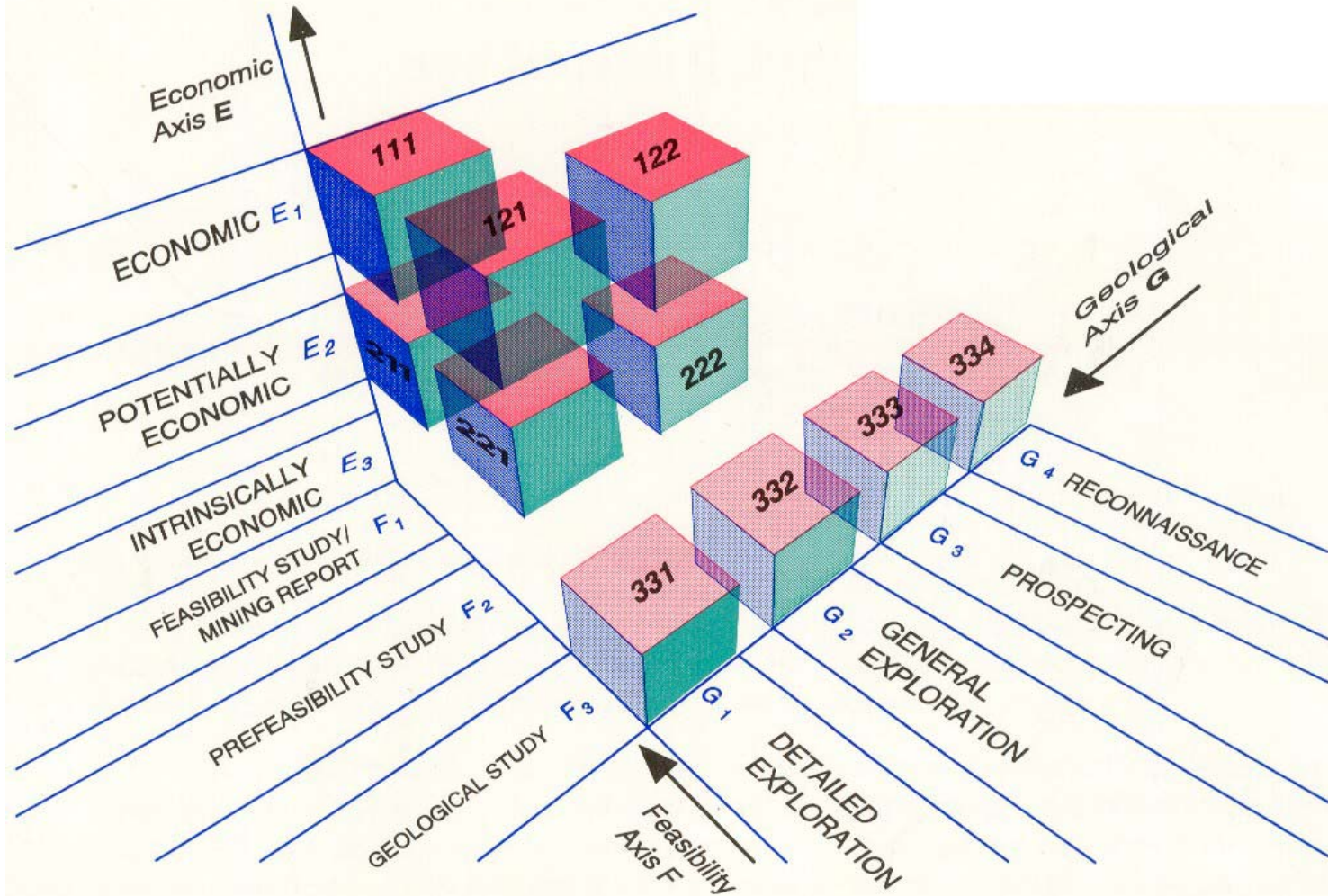
3. $\text{resource} = \text{reserve} + \text{resource}$
(equation only true for reserve = 0)

**total resource = reserve +
remaining/additional resource**

***TMW = total mineral wealth**

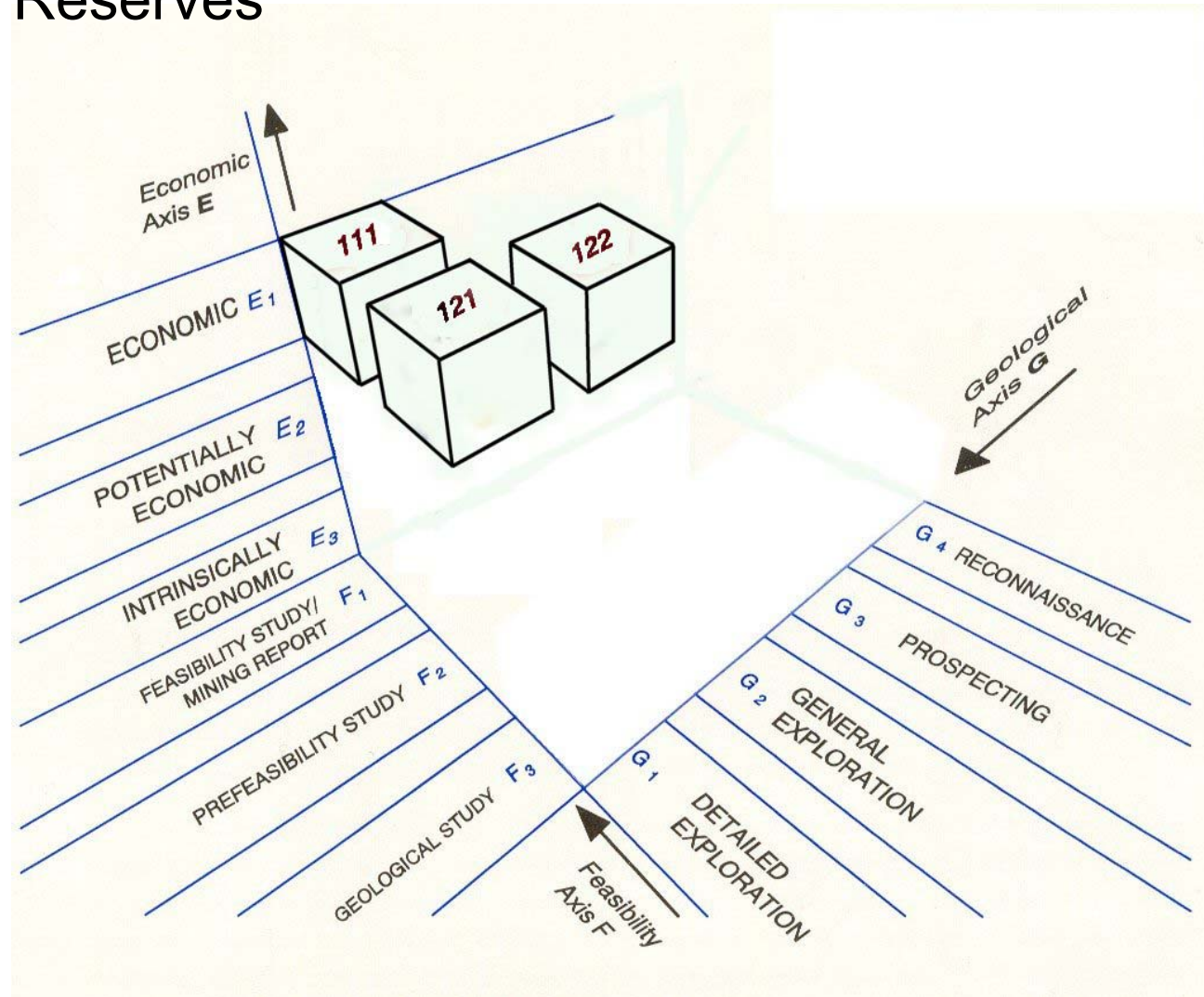
1) usual perception, 2) professional expression

Total resources

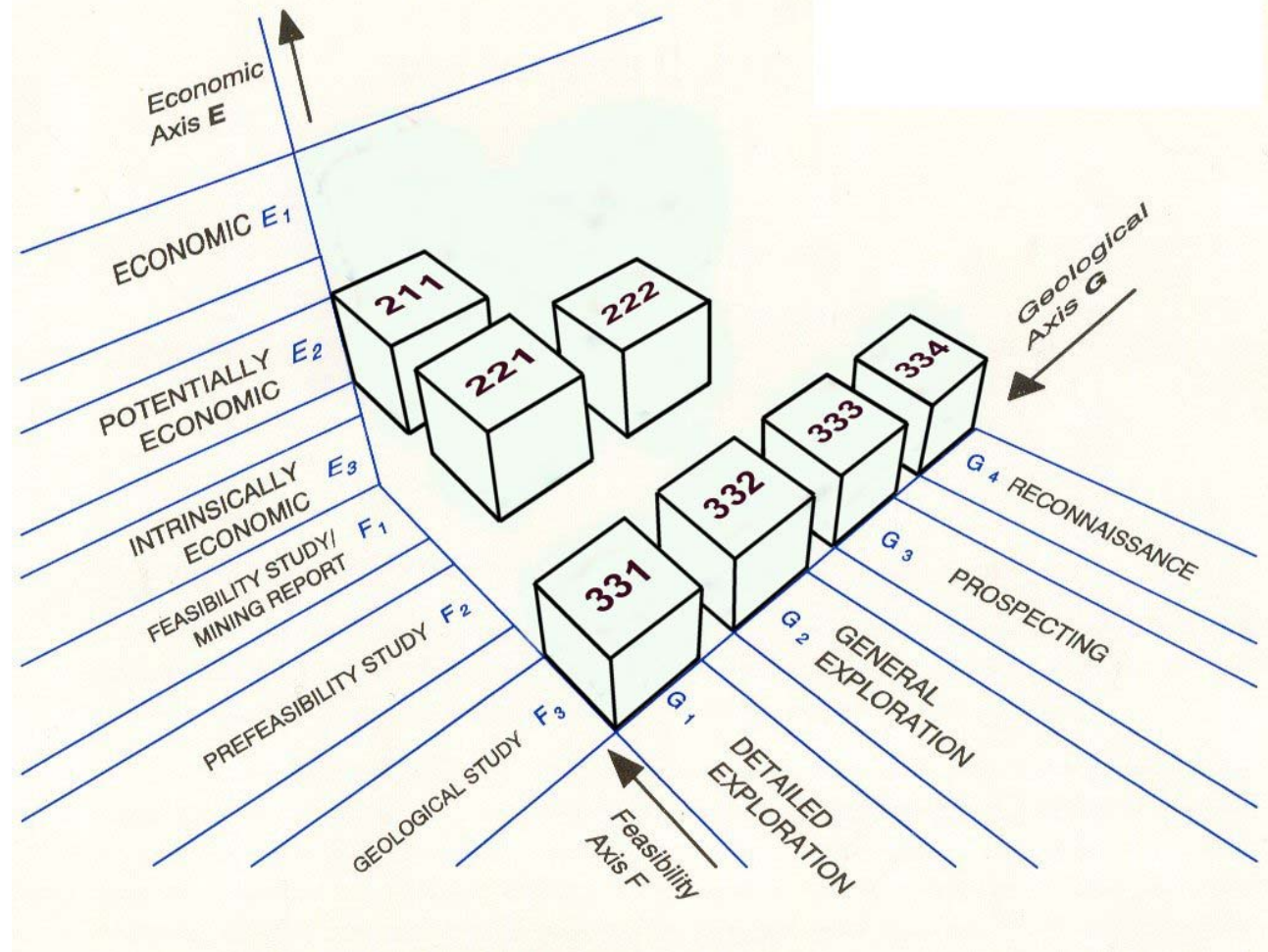


By courtesy of UN ECE

Reserves



Remaining or additional resources

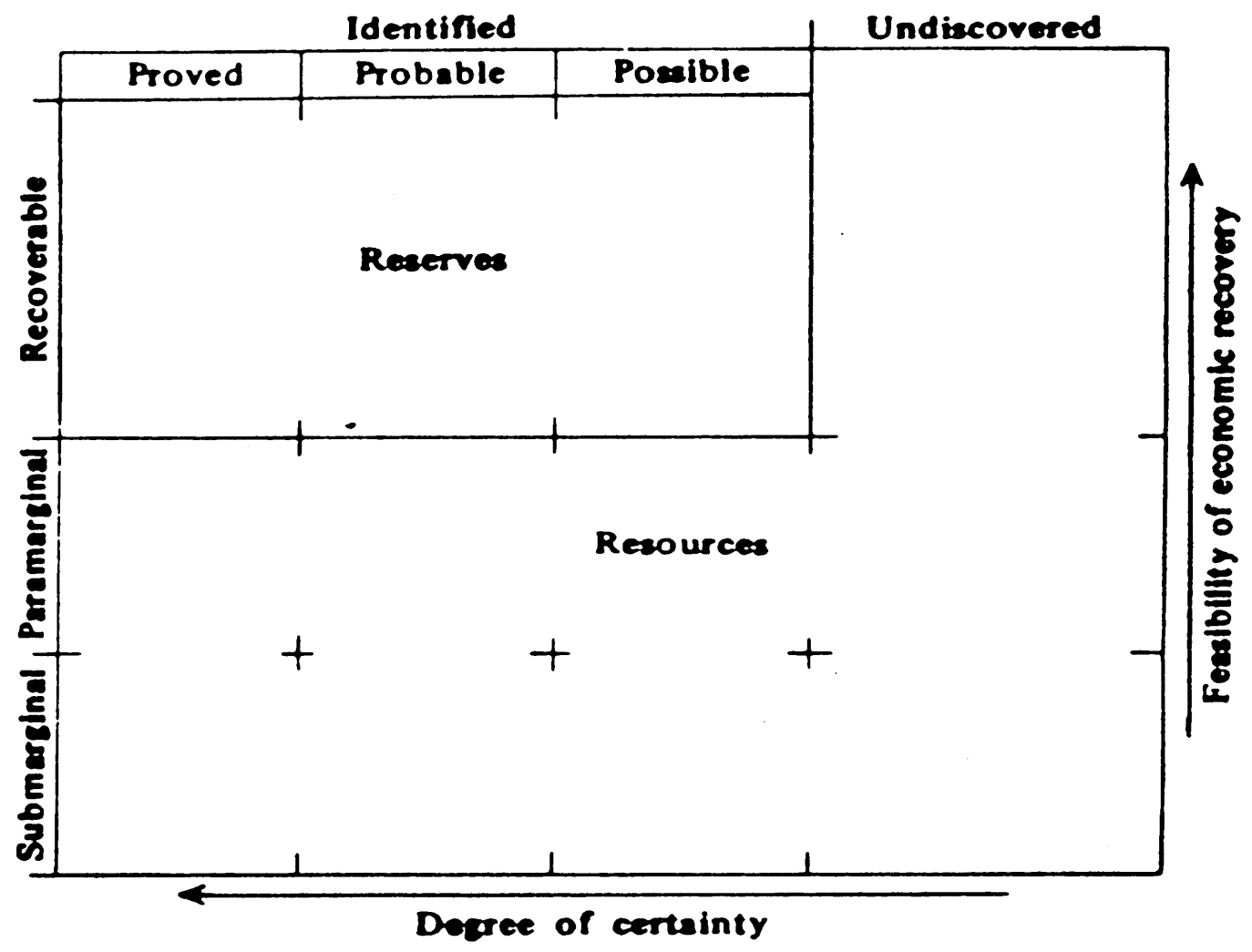


**UNFC System is universal,
very flexible and covers all
different needs - close to
“global system”**

UNFC System is very flexible

it can be adapted to specific needs:

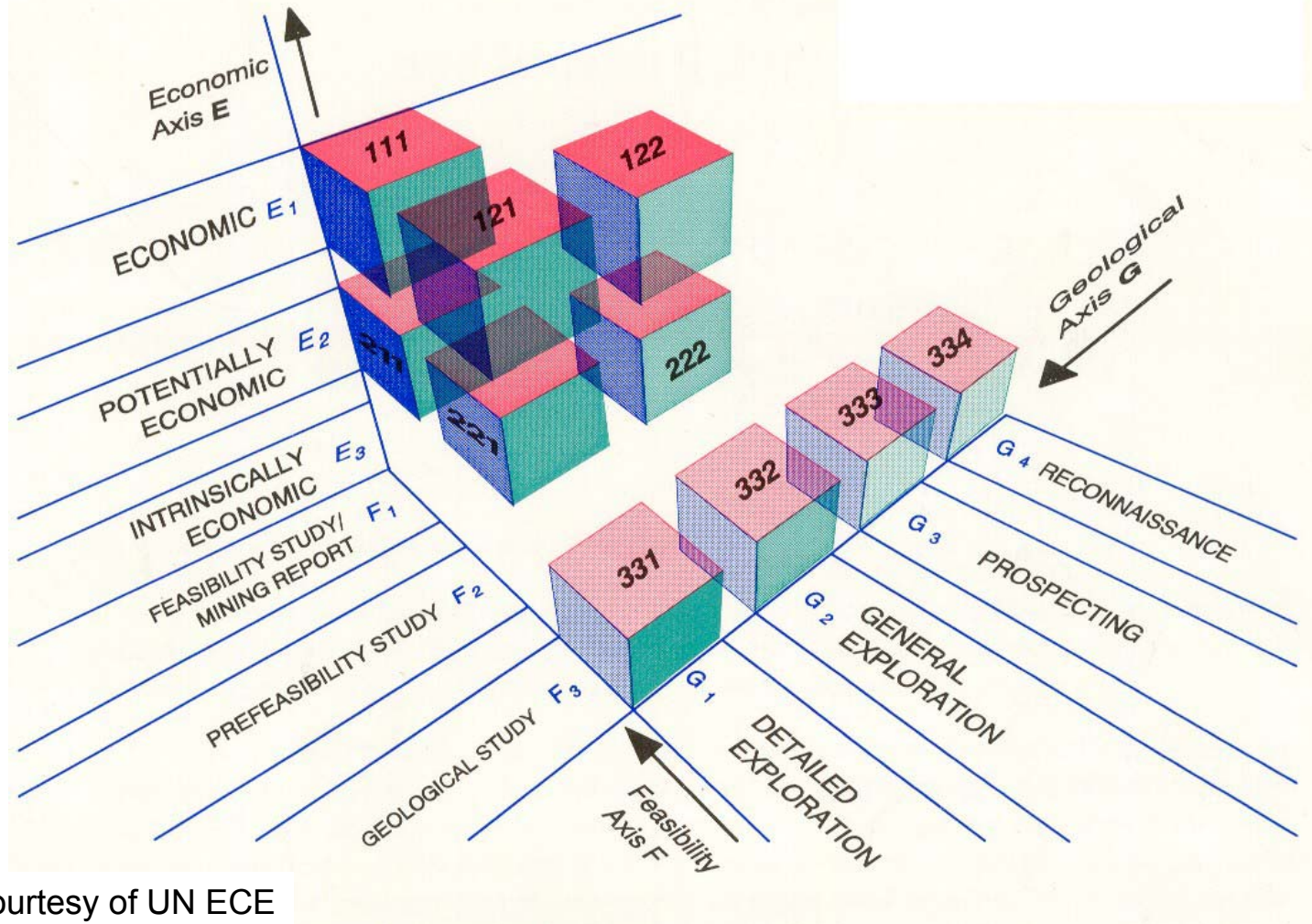
- low capital commodities**
- proposal for oil and gas**



Uranium (NEA/IAEA)

NEA/IAEA	RAR	EAR-1	EAR-2	Speculative
	UNFC			
< 40 \$/kg _U	111	121,122	Usually not relevant	
40-80 \$/kg _U	211	221,222		
80-130 \$/kg _U	311	321,322		
> 130 \$/kg _U	331	332	333	334

International UNFC system applied To coal, uranium and other solid minerals



By courtesy of UN ECE