

# ΕΛΛΗΝΙΚΗ ΕΞΟΡΥΚΤΙΚΗ ΒΙΟΜΗΧΑΝΙΑ

*Ευκαιρίες και κίνδυνοι σε ένα  
ασταθές γεωπολιτικό  
περιβάλλον*

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Ευρωπαϊκή  
Κοινότητα Άνθρακα  
και Χάλυβα



FINANCIAL TIMES

The FT View Global Economy + Add to myFT

## Three inconvenient truths about the critical minerals race

China is so far winning the global scramble for metals needed in the green transition



euronews.next

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## Europe in race to secure raw materials for energy transition

Partnership with The European Commission



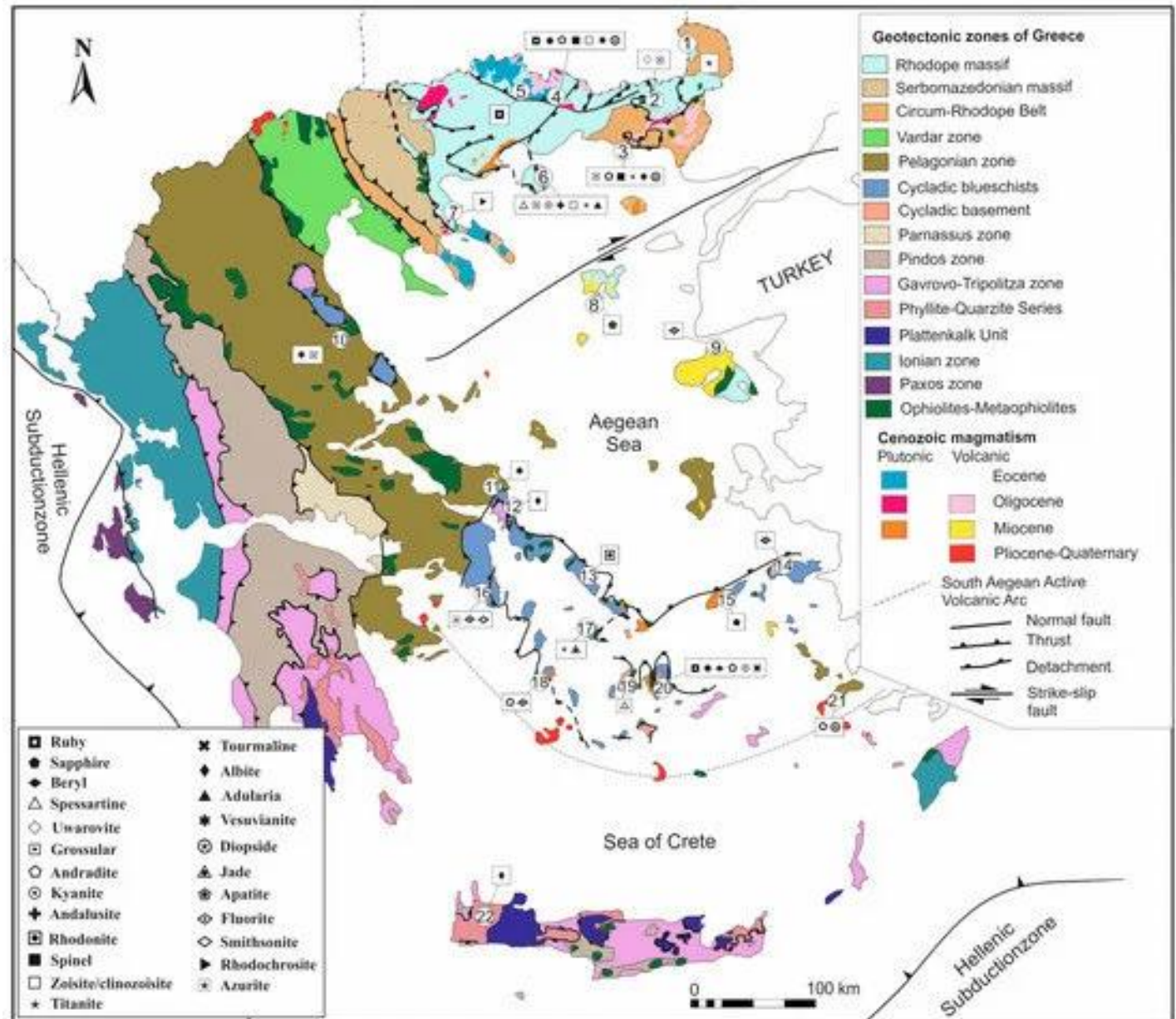
Mining + Add to myFT

## The Big Dig: Germany reopens its mines in quest for mineral self-sufficiency

Berlin wants to reduce its dependence on China by extracting more critical raw materials, such as fluorspar, at home




Supply ...



# Critical & strategic RM in Greece

<b>Active extraction</b>	<b>Planned extraction</b>	<b>Idling extraction</b>	<b>Indication</b>
Bauxite	Copper	Antimony	Arsenic
Nickel and Cobalt		Baryte	Gallium
Magnesite		Feldspar	Rare earths
Quartz		Manganese	Scandium
			Tungsten
			Germanium
			Graphite

The .....  
Others !

Aggregates

Attapulgite

Bentonite

Calcium  
Carbonate

Gold /  
silver

Gypsum

Lead &  
Zinc

Lignite

Marble

Perlite

Pozzolan

Pumice

Let's discuss  
about  
demand.....



Metal	Element	Total metal required produce one generation of technology units to phase out fossil fuels (tonnes)	Global Metal Production 2019 (tonnes)	Years to produce metal at 2019 rates of production (years)
Copper	Cu	4 575 523 674	24 200 000	189,1
Nickel	Ni	940 578 114	2 350 147	400,2
Lithium	Li	944 150 293	95 170	9920,7
Cobalt	Co	218 396 990	126 010	1733,0
Graphite (natural flake)	C	8 973 640 257	1 156 300	3287,9
Graphite (synthetic)	C		1 573 000	-
Silicon (Metallurgical)	Si	49 571 460	8 410 000	5,9
Vandium	V	681 865 986	96 000	7101,2
<b><u>Rare Earth Metals</u></b>				
Neodymium	Nd	965 183	23 900	40,4
Germanium	Ge	4 163 162	14 000	29113,0
Lanthanum	La	5 970 738	35 800	166,8
Praseodymium	Pr	235 387	7 500	31,4
Dysprosium	Dy	196 207	1 000	196,2
Terbium	Tb	16 771	280	59,9

\* Estimated from mining production. All other values are refining production values.

◆ Natural flake graphite and synthetic graphite was combined to estimate total production

(Source: BGR 2021, USGS, Friedrichs 2022)



A few more  
numbers ....

	Ni	Co	Li
Per battery (kg)	35	15	8
For 100 mio evs (million tons)	3.5	1.5	0.8
Today's production	3.0	0.16	0.13
Extra production	116%	837%	515%

For  
commodities  
(goods with  
finite supply)

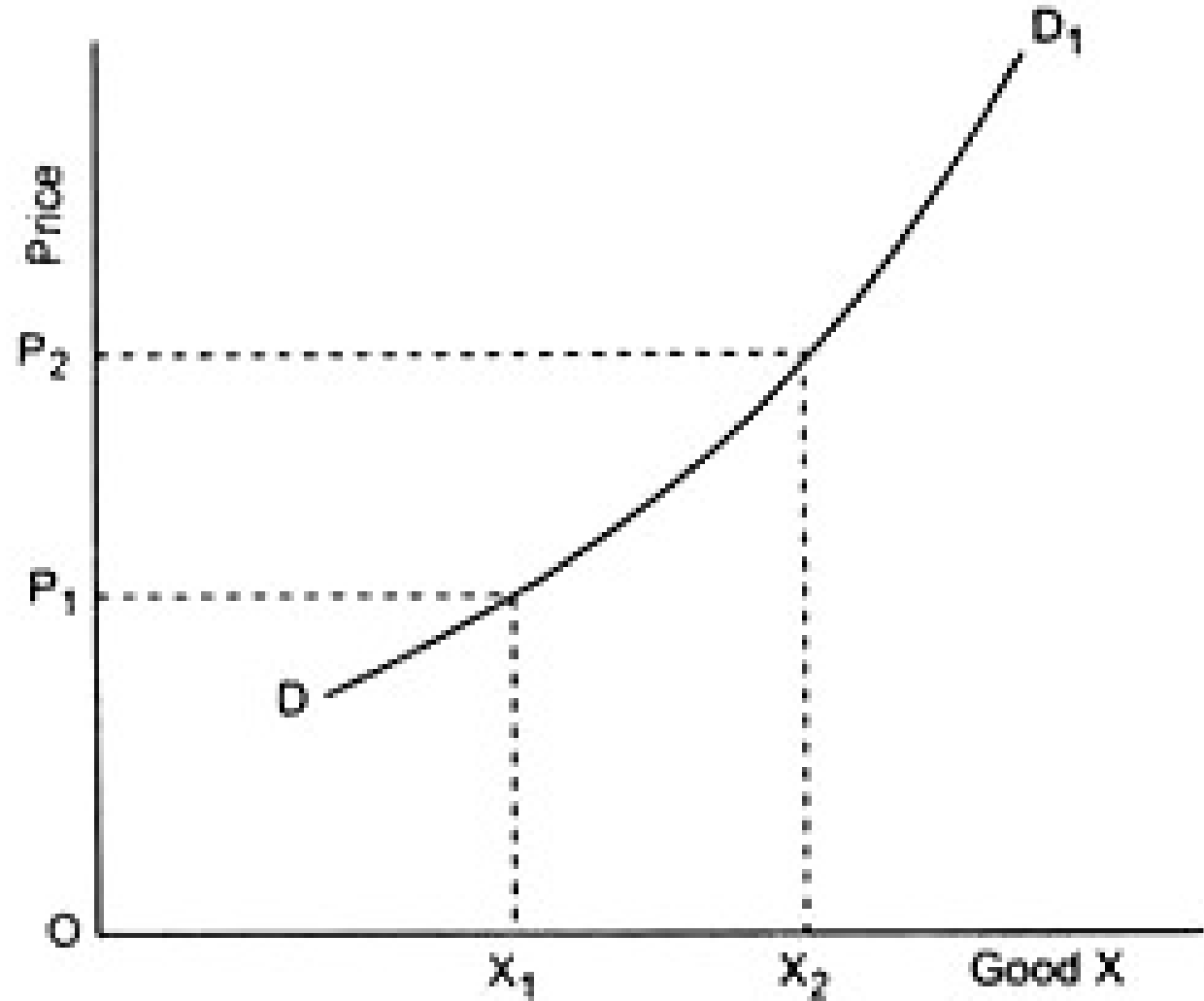


Fig. 17.2

# Let's talk about production.....

China is world's largest producer of 31 different commodities:

- 4 Iron and Ferro-Alloy Metals:  
Mo, Ti, W, V
- 15 Non-Ferrous Metals:  
Al, Sb, As, Bi, Cd, Ga, Ge, In, Pb, Hg, REE, Se, Te, Sn, Zn
- 1 Precious Metal: Au
- 9 Industrial Minerals:  
Bentonite, Fluorspar, Gypsum, Magnesite, Salt, Sulfur, Talc
- 2 Mineral Fuels:  
Steam Coal, Coking Coal

Δ 2000/2020 - declining production rates since 2000 only in Europe

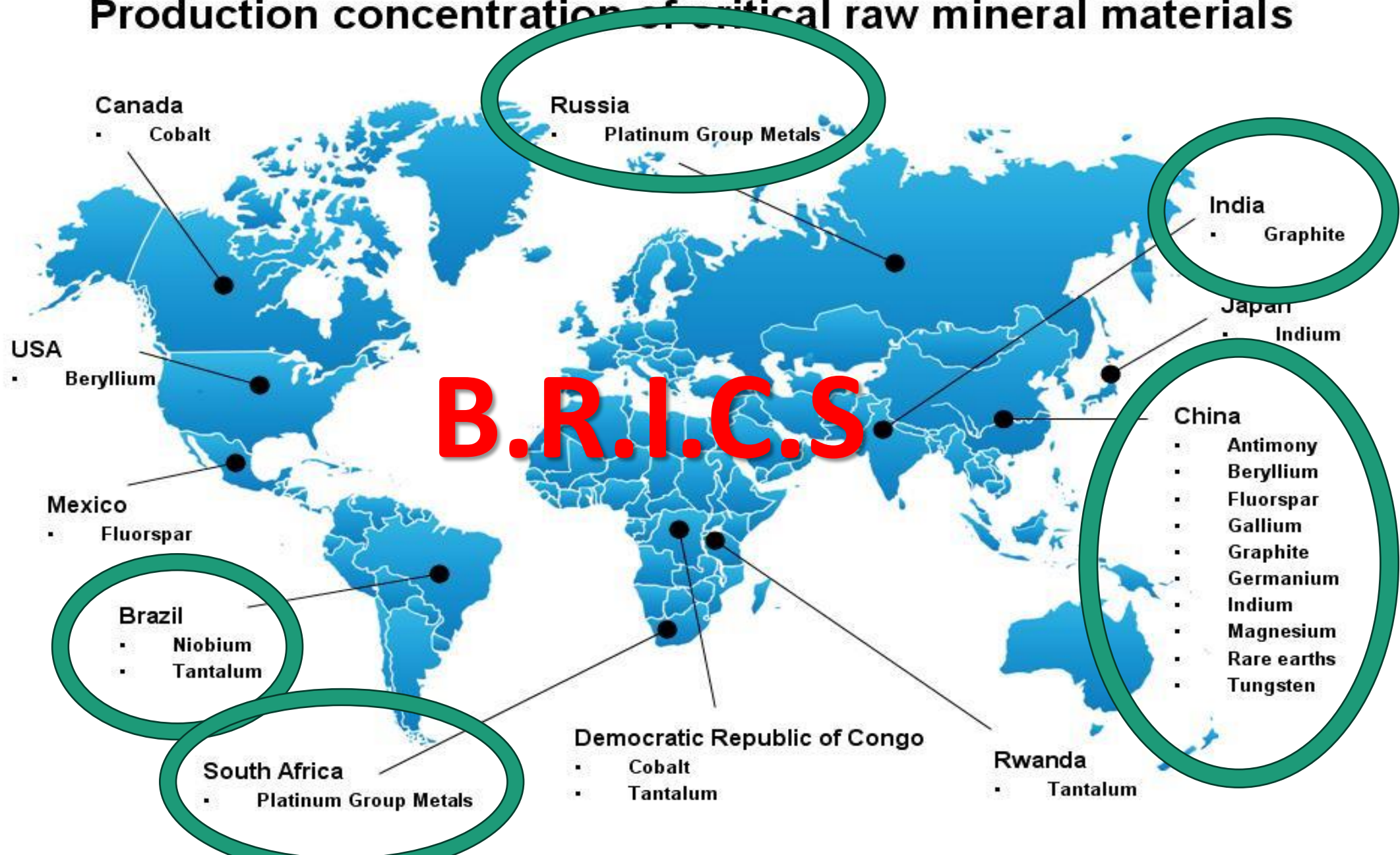
EU IMPORTS 1990 -2020 : +380%

EU GDP : + 40%

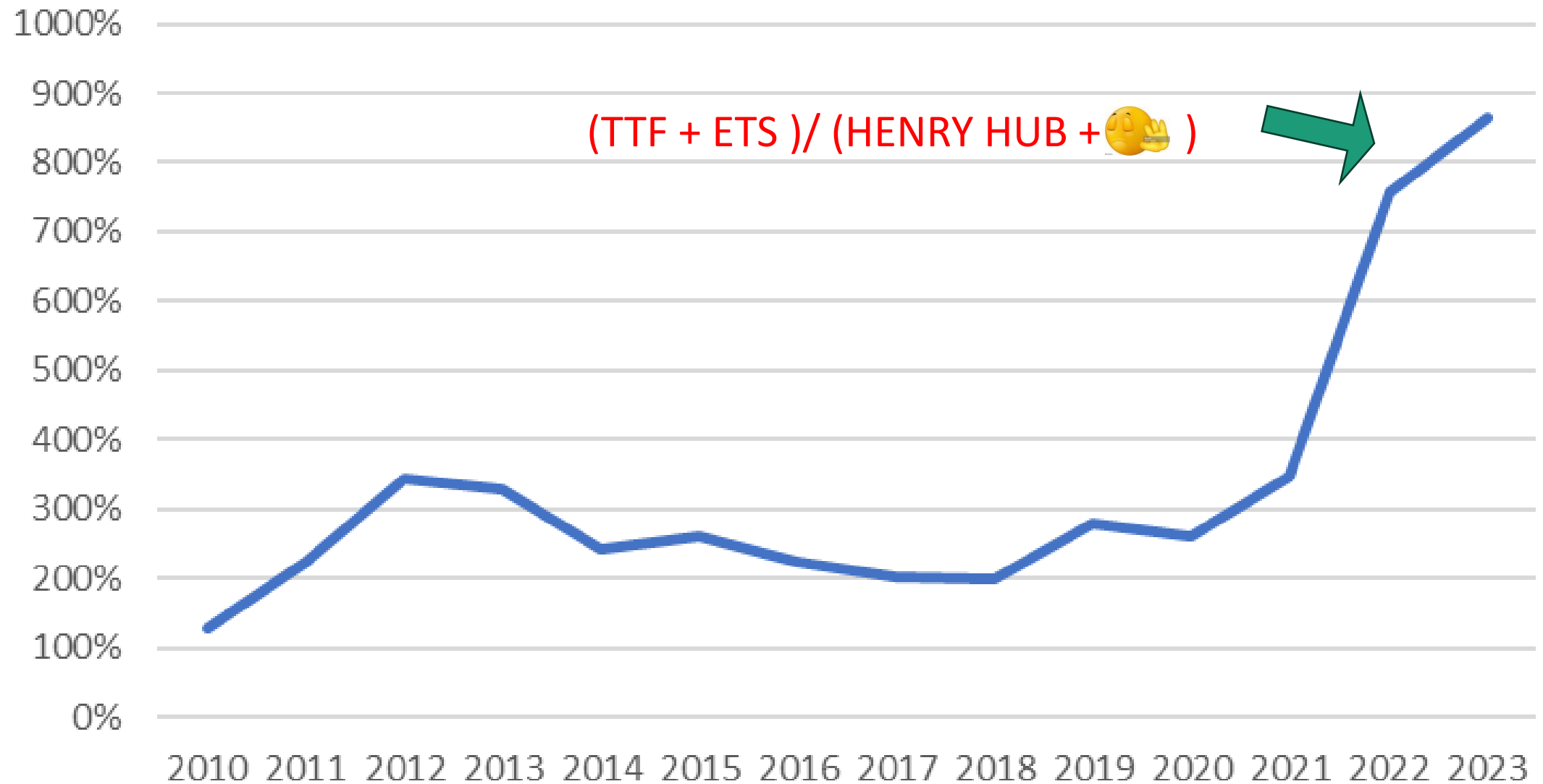
EU IMPORTS : + 160%

World Mining Data 2022

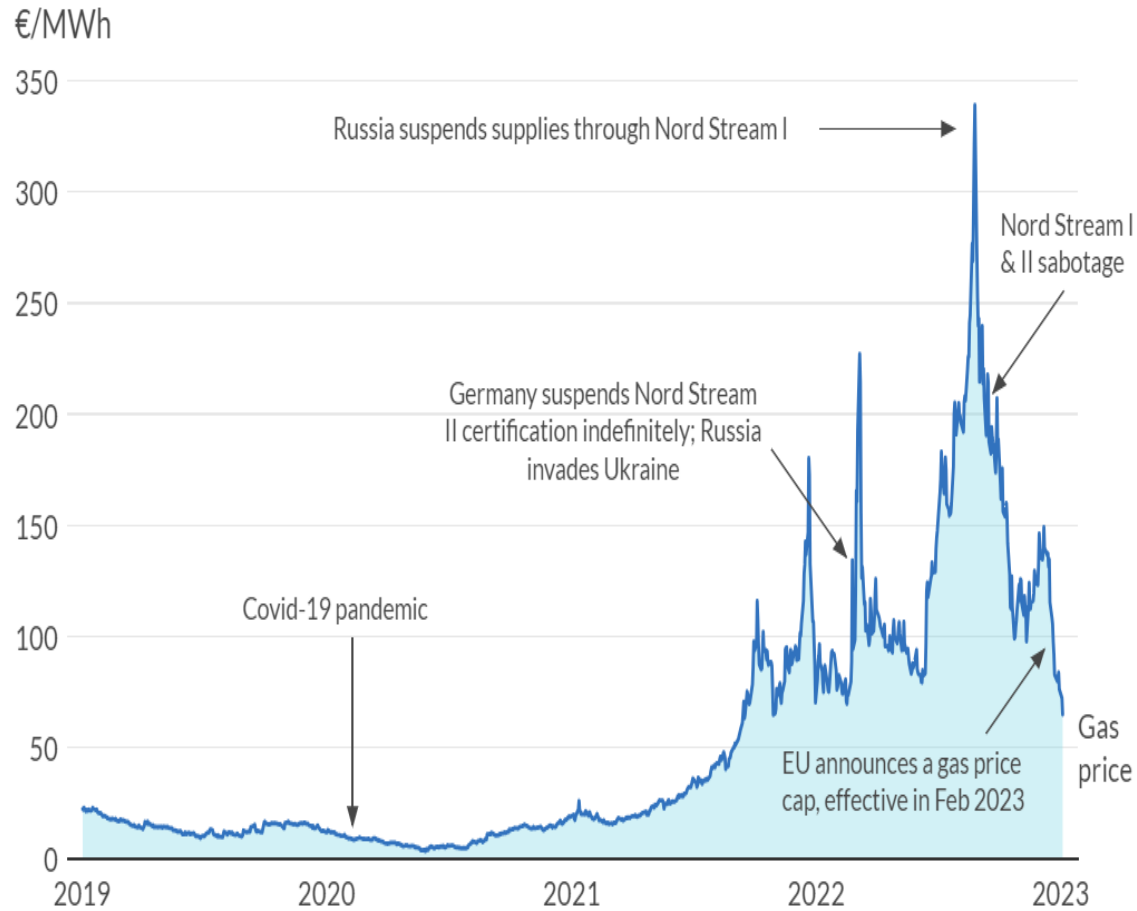
# Production concentration of critical raw mineral materials



# EU vs US NAT. GAS TOTAL COST



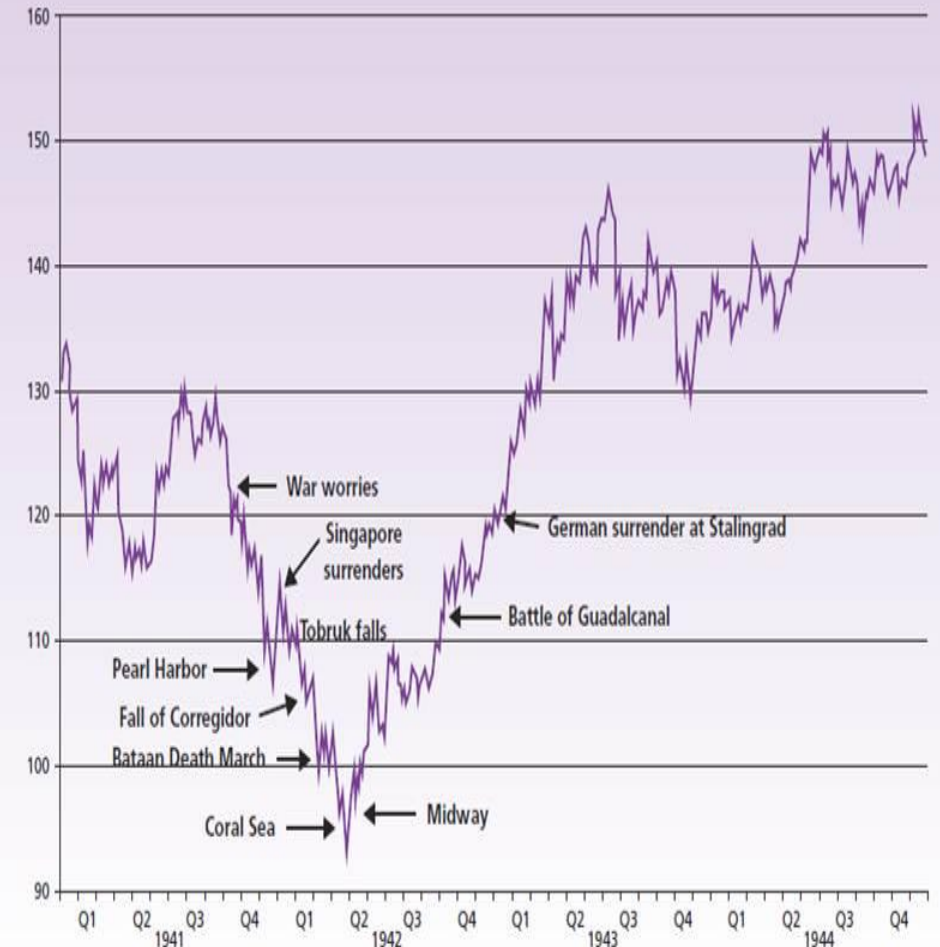
## Dutch TTF gas price, January 2019 to February 2023



European gas markets experienced very high volatility and record prices in 2022. Europe's main gas price benchmark reached an all-time high of nearly 340 euros per megawatt-hour (MWh) on August 26, 2022

Source: Investing.com

## Dow Jones Industrial Average: 1941 - 1944



Source: Wealth, War and Wisdom, Barton Biggs, Wiley Inc., 2008

# Sustainability

.....



Doesn't  
work  
anymore





# Βιώσιμη εξόρυξη ...

Η πλέον βιώσιμη  
εξόρυξη είναι η ΜΗ  
εξόρυξη !!!

Η επόμενη πλέον  
βιώσιμη εξόρυξη είναι  
η εξόρυξη που γίνεται  
εντός της Ευρωπαϊκής  
Ένωσης