

# Climate Change, Energy Security, and National Security: Impact of Putin's invasion of Ukraine

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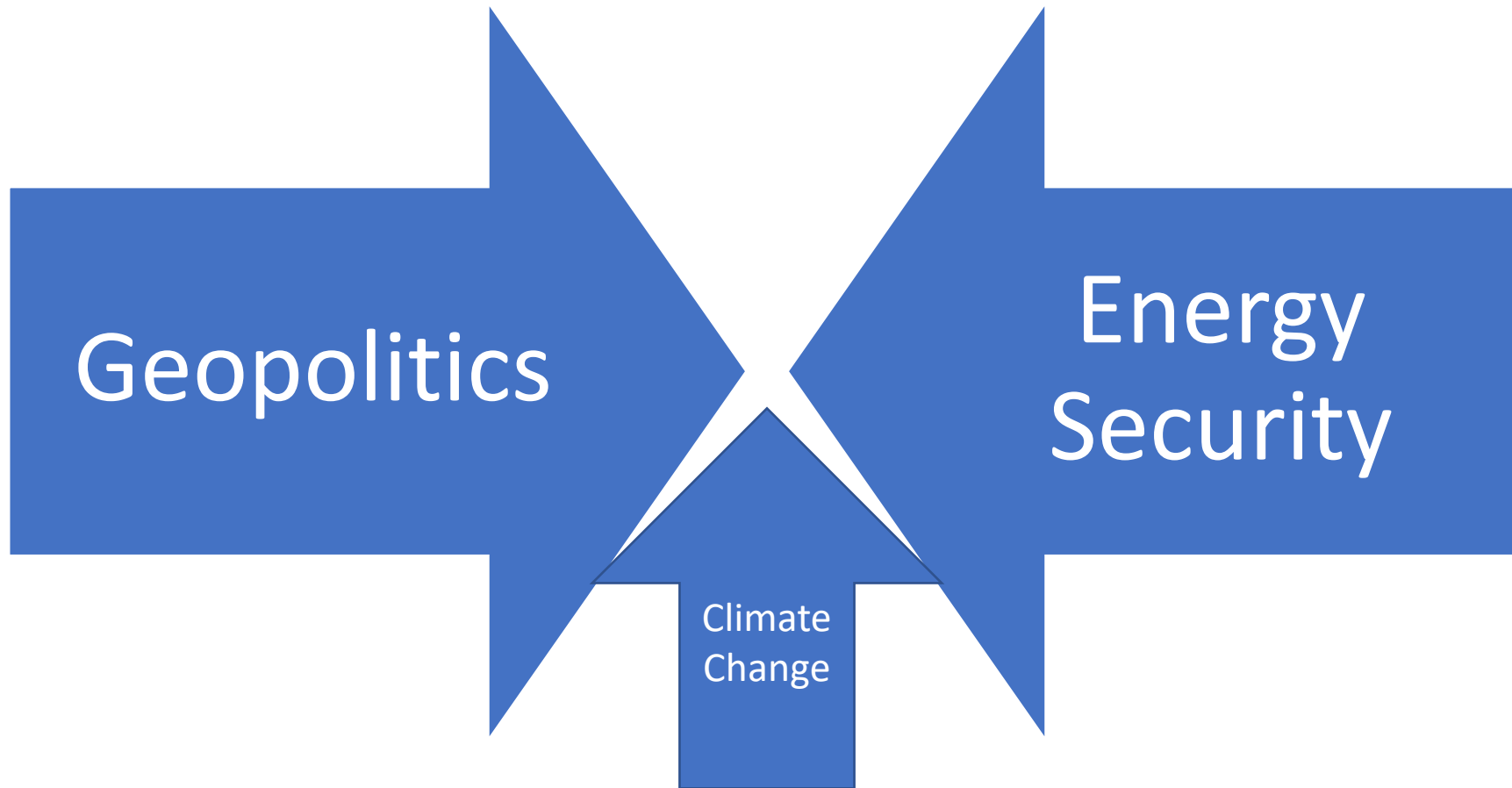
Schar School of Government and Policy

George Mason University

# Assumptions About Putin's War

- No return to status quo ante 2/22/22
- Putin will not surrender – long-term, “frozen” conflict
  - War crimes
  - Reparations
- Remarkable US/European (and beyond) consensus will fray
- Sanctions (especially financial) will be difficult to unwind
- Short-term priority “energy security” in Europe
  - Unknown: will it stimulate or slow the move to renewable and non-fossil energy?
  - How to replace Russian (natural) gas
- Complicated intersection of geopolitics (national security) /energy security/climate change
- NB: Kennan's “Long Telegram” remains valid

# Collision Effecting National Security



# Supply of Energy

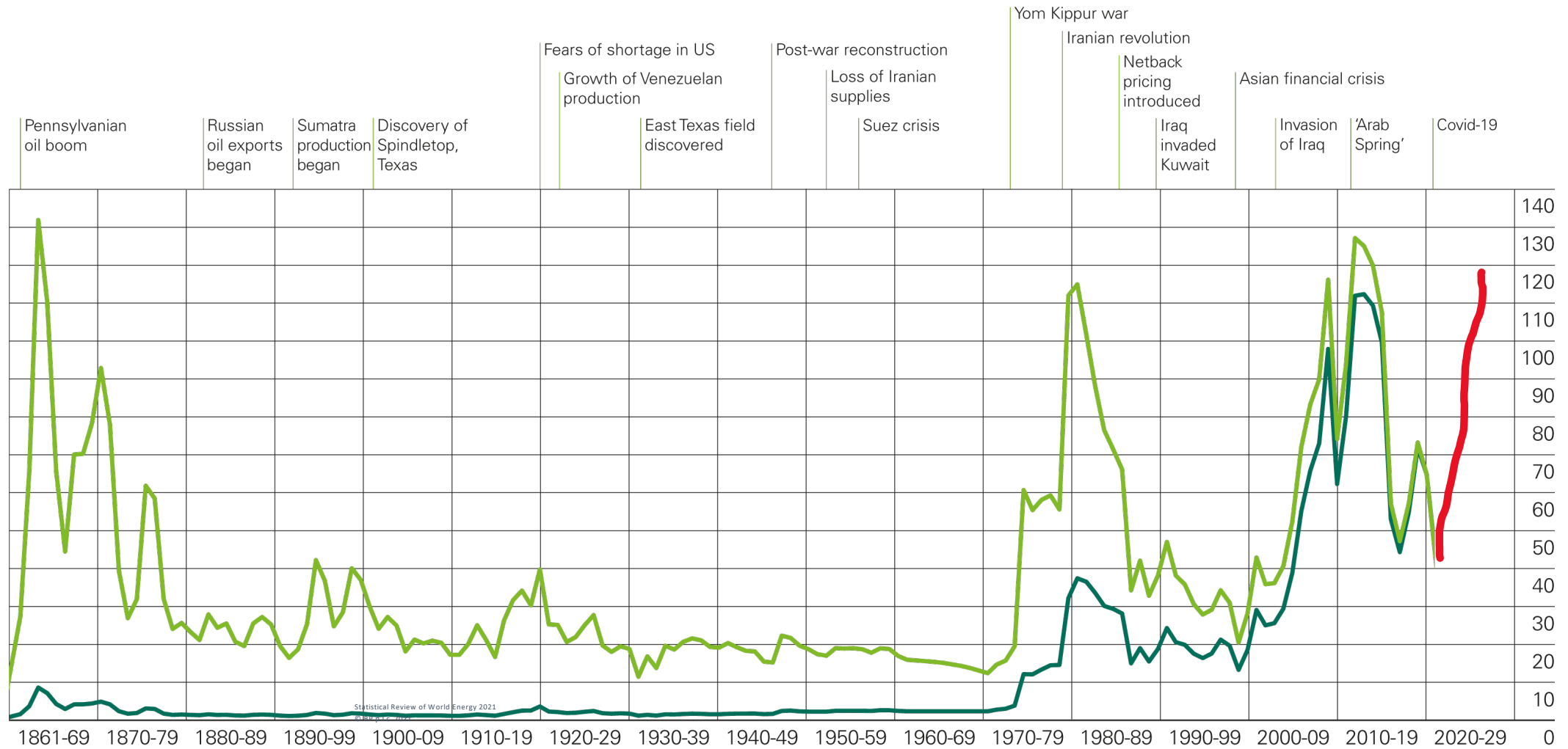
Gas (geopolitics) is not the same as oil (wealth)...

...but then came Putin's War

Markets matter – it's a matter of supply and demand

# Crude oil prices 1861-2020

US dollars per barrel, world events



■ \$ 2020 (deflated using the Consumer Price Index for the US)

■ \$ money of the day

1861-1944 US average.

1945-1983 Arabian Light posted at Ras Tanura.

1984-2020 Brent dated.

The 10 largest oil<sup>1</sup> producers and share of total world oil production<sup>2</sup> in 2020<sup>3</sup>

Country	Million barrels per day	Share of world total
United States	18.61	20%
Saudi Arabia	10.81	12%
Russia	10.50	11%
Canada	5.23	6%
China	4.86	5%
Iraq	4.16	4%
United Arab Emirates	3.78	4%
Brazil	3.77	4%
Iran	3.01	3%
Kuwait	2.75	3%
Total top 10	67.49	72%
World total	93.86	

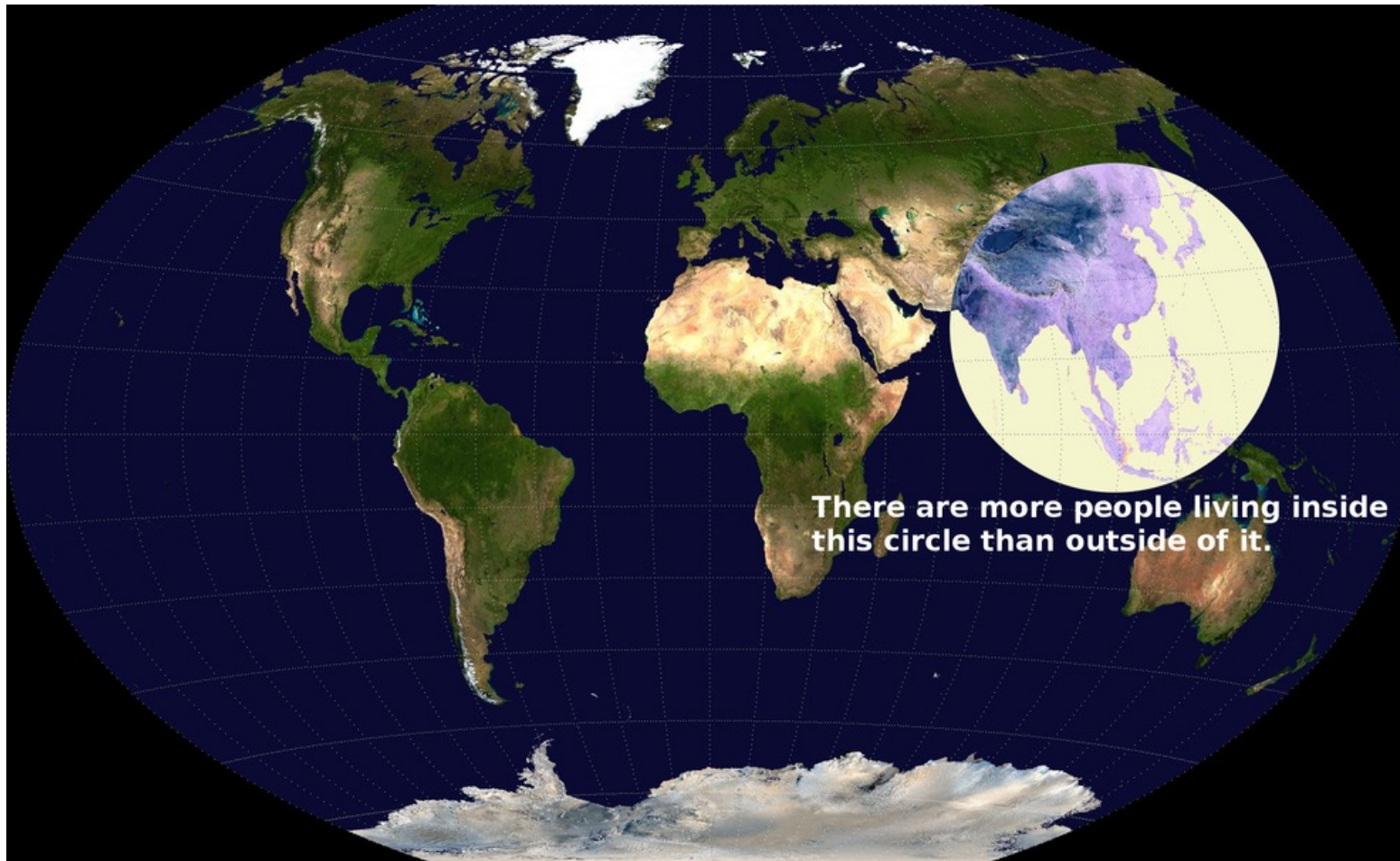
Source EIA  
<https://www.eia.gov/tools/faqs/faq.php?id=709&t=6>

# Don't Forget Demand

Importance of Supply Chain Disruptions

# What Does This Say About Energy Security – and Geopolitics?

Created by BCMM – Brilliant Maps



If the world were a village of 100, 61 would be Asians from Statoil Energy Perspectives

2017



# How Do We (Universal) Want Our Energy? Core of Energy Security

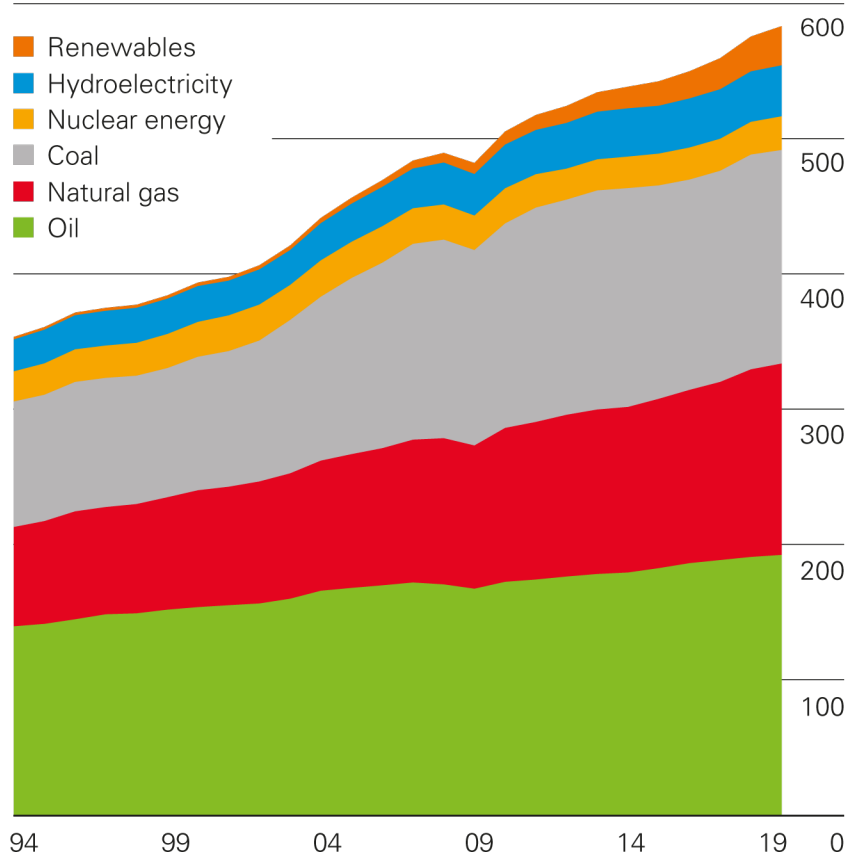
- Abundant
- Affordable
- Reliable
- Clean
- Diversified supply
- Accessible

From manuscript by Berneli & Simon

# Primary energy

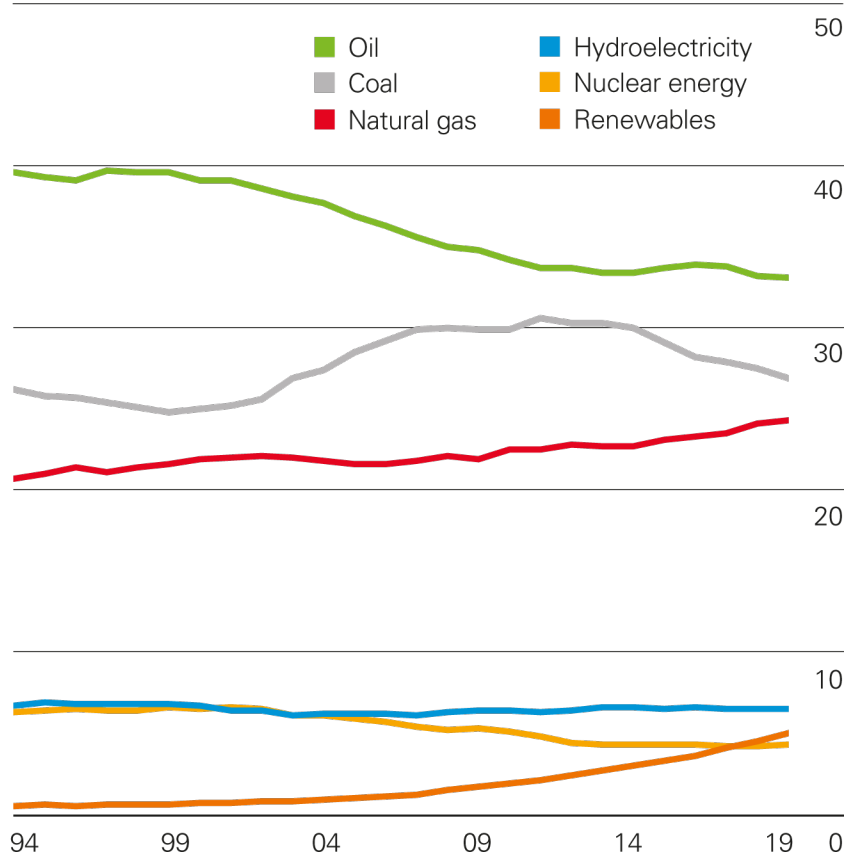
## World consumption

Exajoules



## Shares of global primary energy

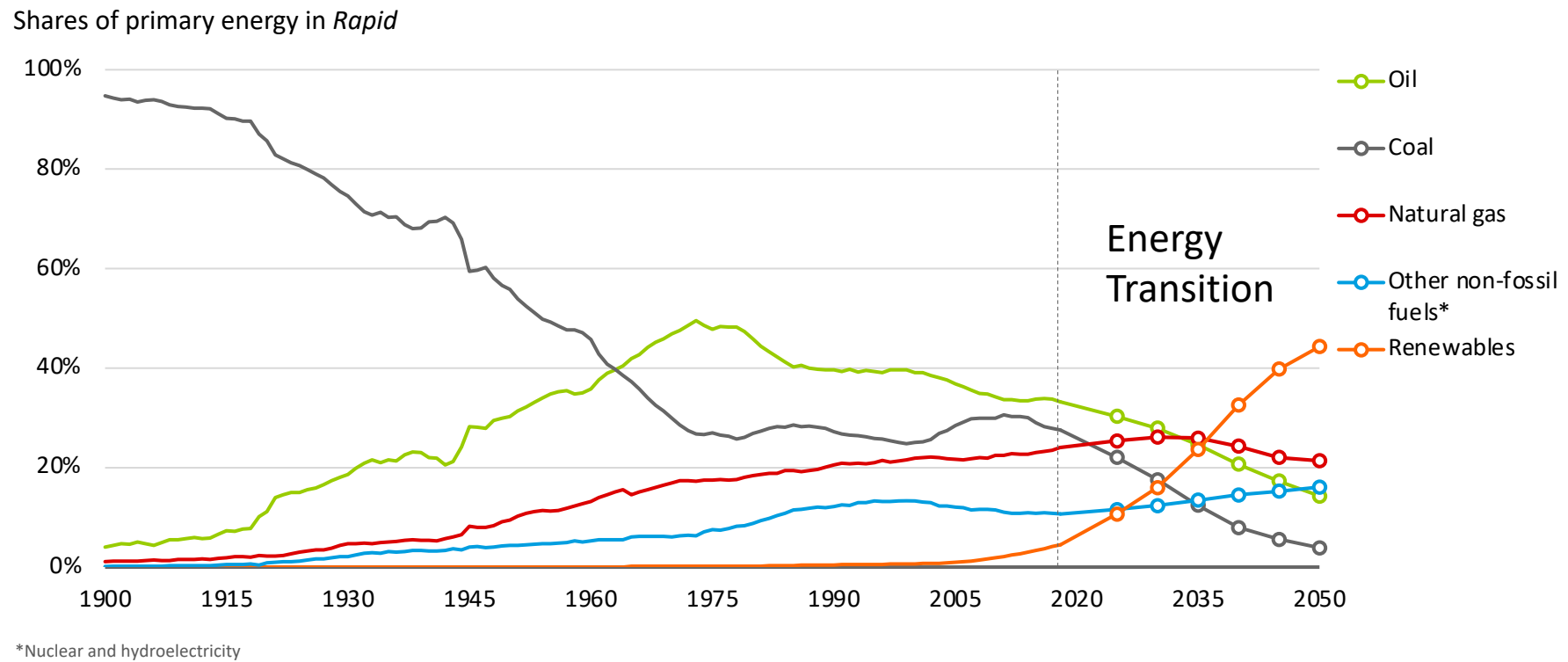
Percentage



# Complex Interactions and Public Policy Choices

Climate Change Goals – zero carbon energy system by 2050 ??

# Changing structure of global energy system according to BP

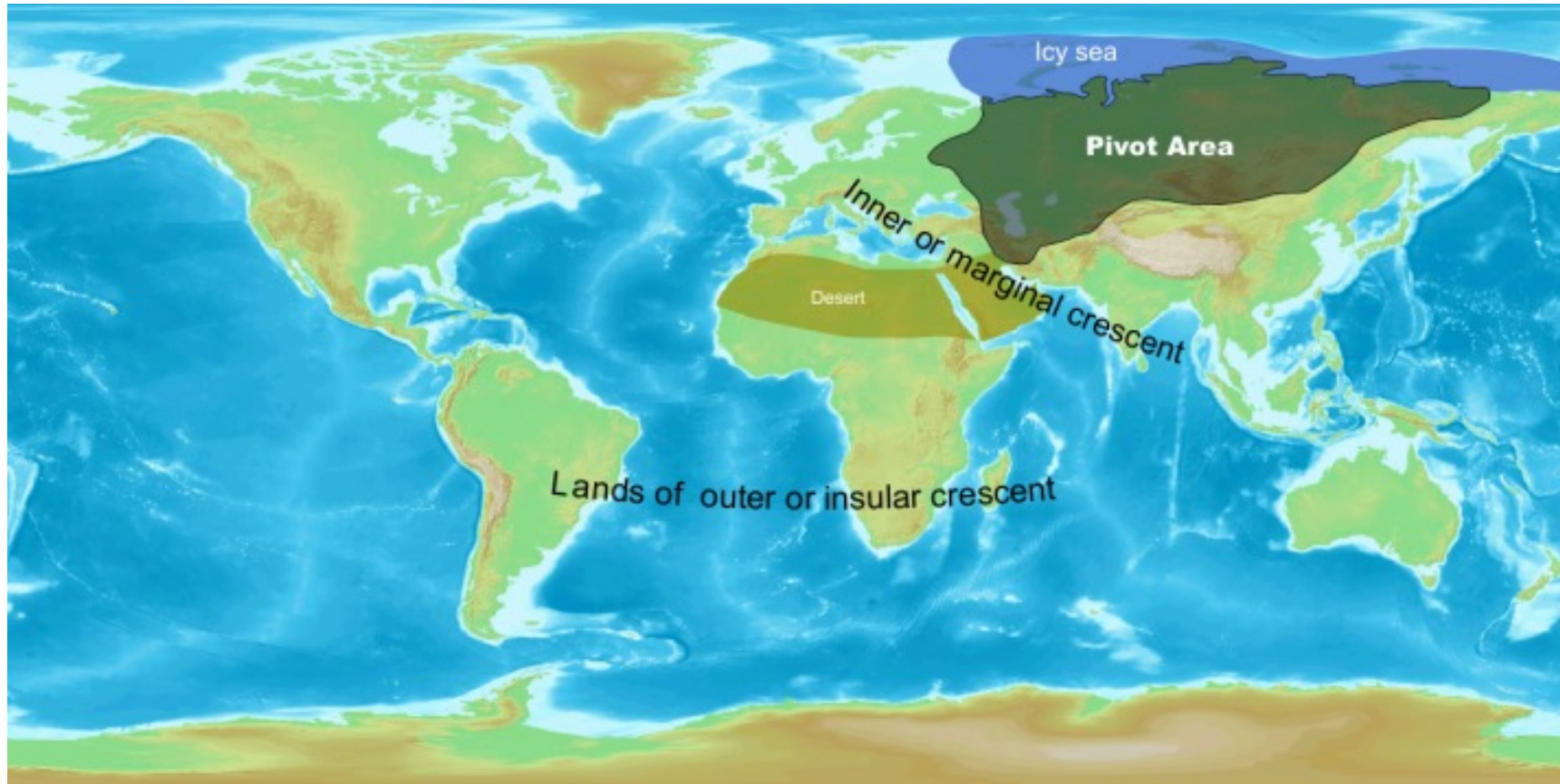


# Geopolitics: Europe, Russia and the US

Not only about maps, but economics, technology and infrastructure

Not only oil and gas but renewables

# Halford Mackinder: Heartland Theory The Geographical Pivot of History (1904)



In 1919, Mackinder summarized his theory as:

"Who rules East Europe commands the Heartland; who rules the Heartland commands the World-Island; who rules the World-Island controls the world."<sup>1</sup>

# 21st Century "Pivot Area/Heartland" -- Geopolitics 101





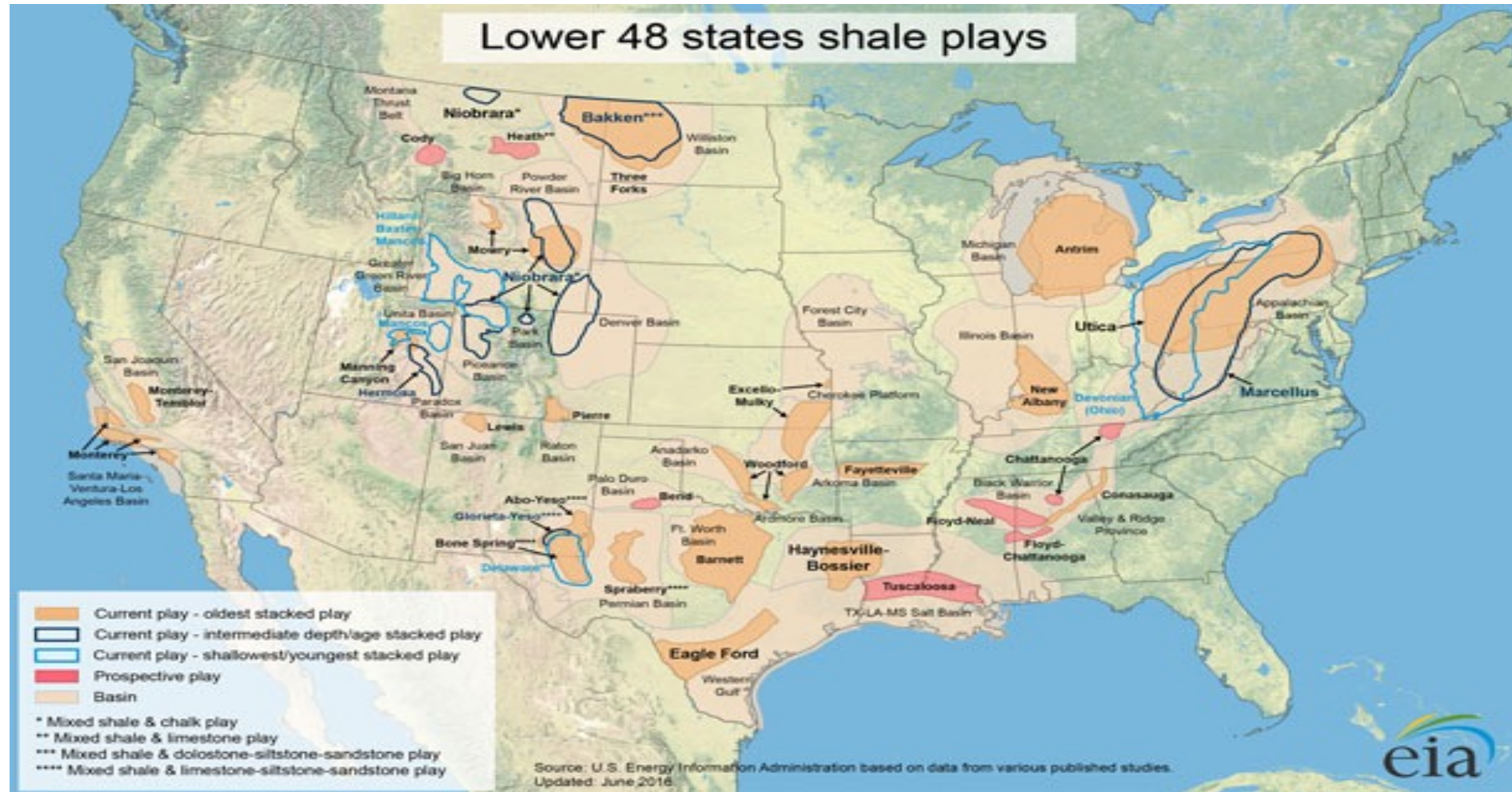
# New Silk Roads | China is assembling new trade routes, binding other regions closer to it



[Geo-economics 101](#) – trade, infrastructure, energy

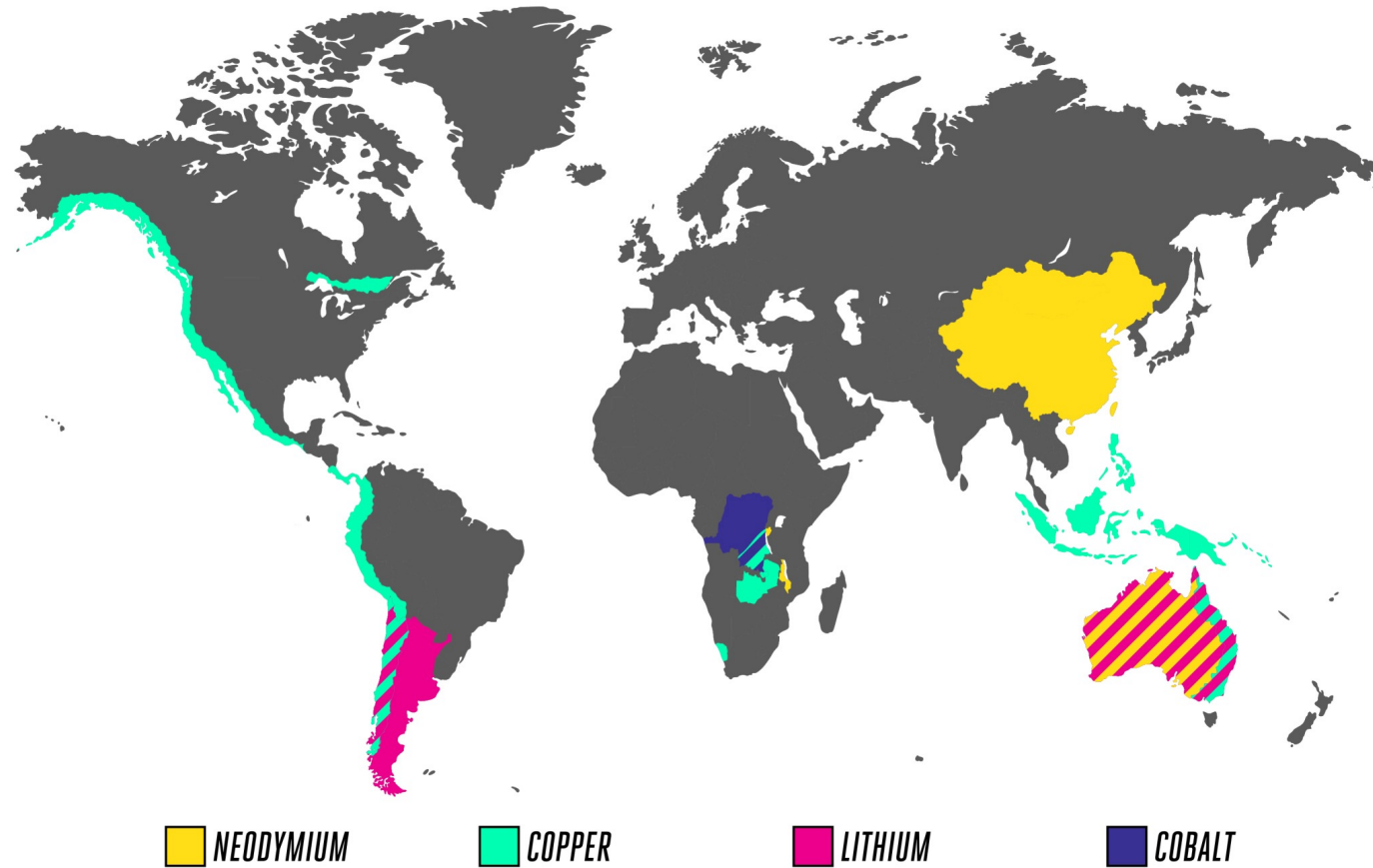


## Geo-technology 101?



“Although [George] Mitchell had plenty of ambitious goals...they were relatively close to home. But **the unconventional oil boom** he helped launch had even bigger and more widespread impacts. It **altered geopolitics** in ways Mitchell couldn’t have foreseen...”  
O’Sullivan pg. 40

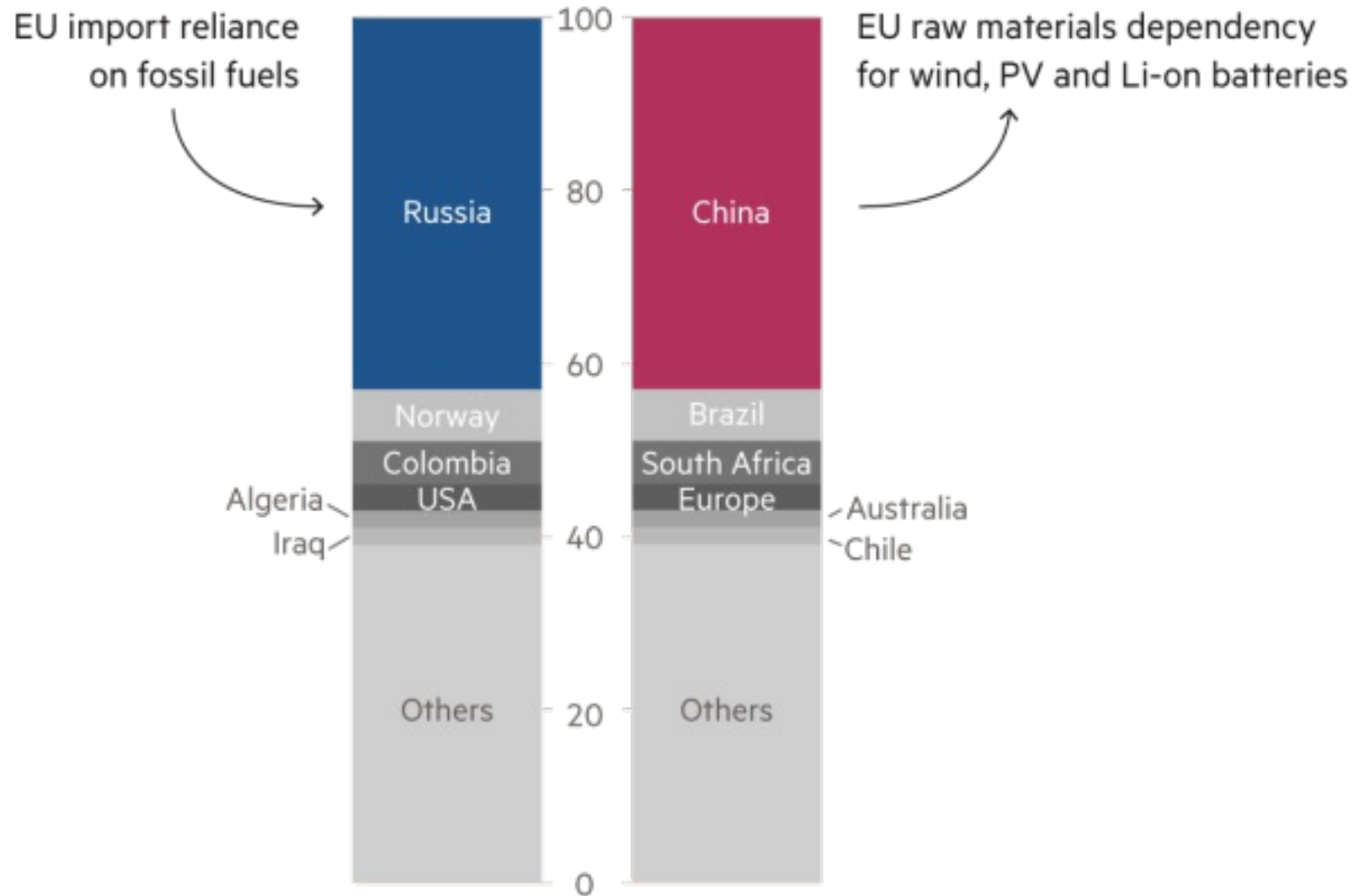
# Do Rare Earth and Battery-related Mineral Producers Become the OPEC of the 21<sup>st</sup> Century?



<https://www.theverge.com/2019/2/15/18226210/energy-renewables-materials-mining-environment-neodymium-copper-lithium-cobalt>

# The geopolitical shift facing the EU

Per cent



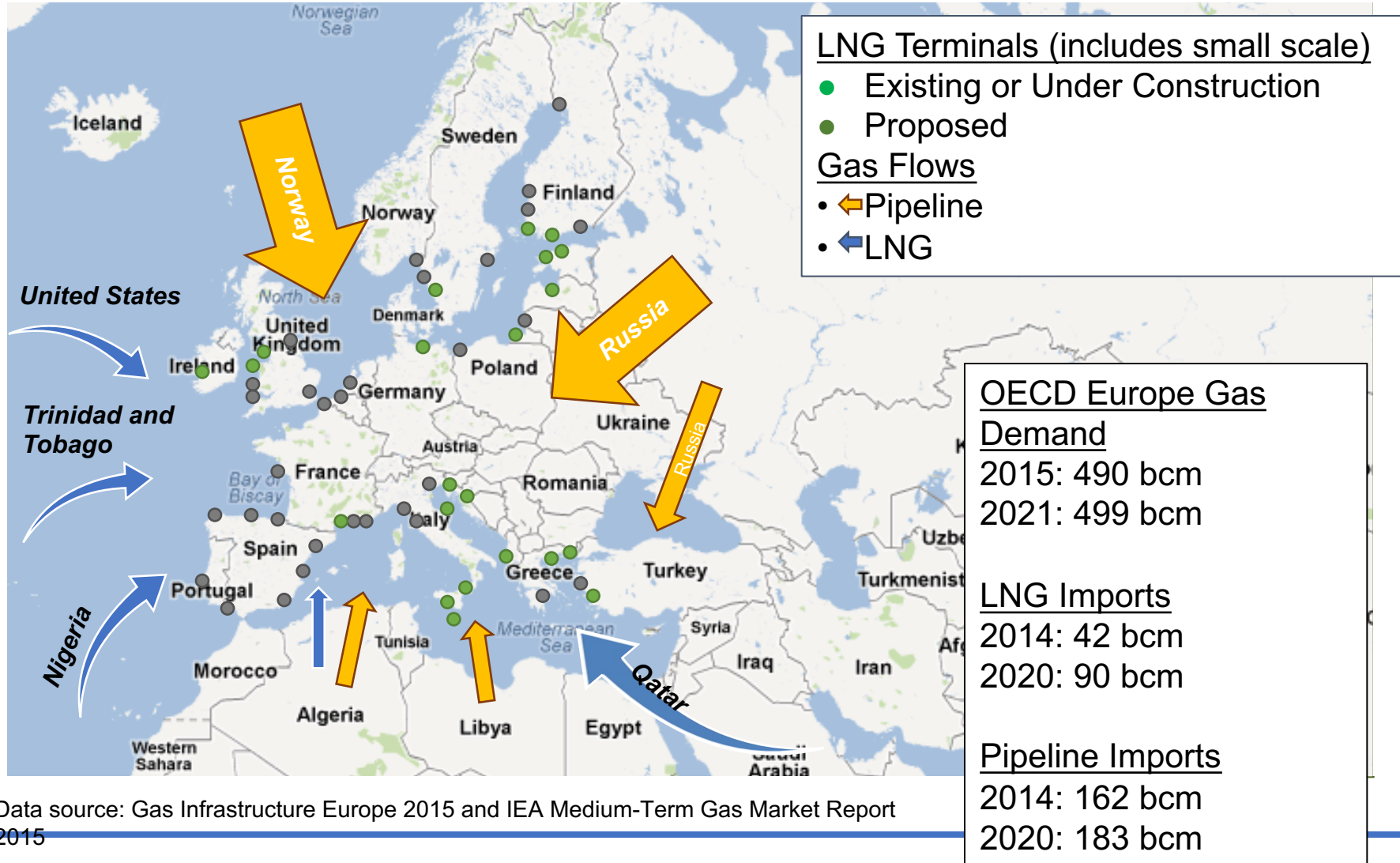
Source: JRC Petten, Darina Blagoeva, 2017 data

© FT

# Europe and Gas

Geopolitics and Energy Security in Real Time:  
the challenge of a long-war and the winter of 2022-23

# European Gas Trade 2014-2020





**IN OPERATIONS**

- ✓ Nord Stream 1
- ✓ NEL
- ✓ OPAL
- ✓ Yamal-Europe
- ✓ Ukrainian Transit
- ✓ Blue Stream
- ✓ Medgaz
- ✓ MEG
- ✓ Transmed
- ✓ Green Stream

**CONSTRUCTION**

- TANAP
- TAP
- Turkish Stream

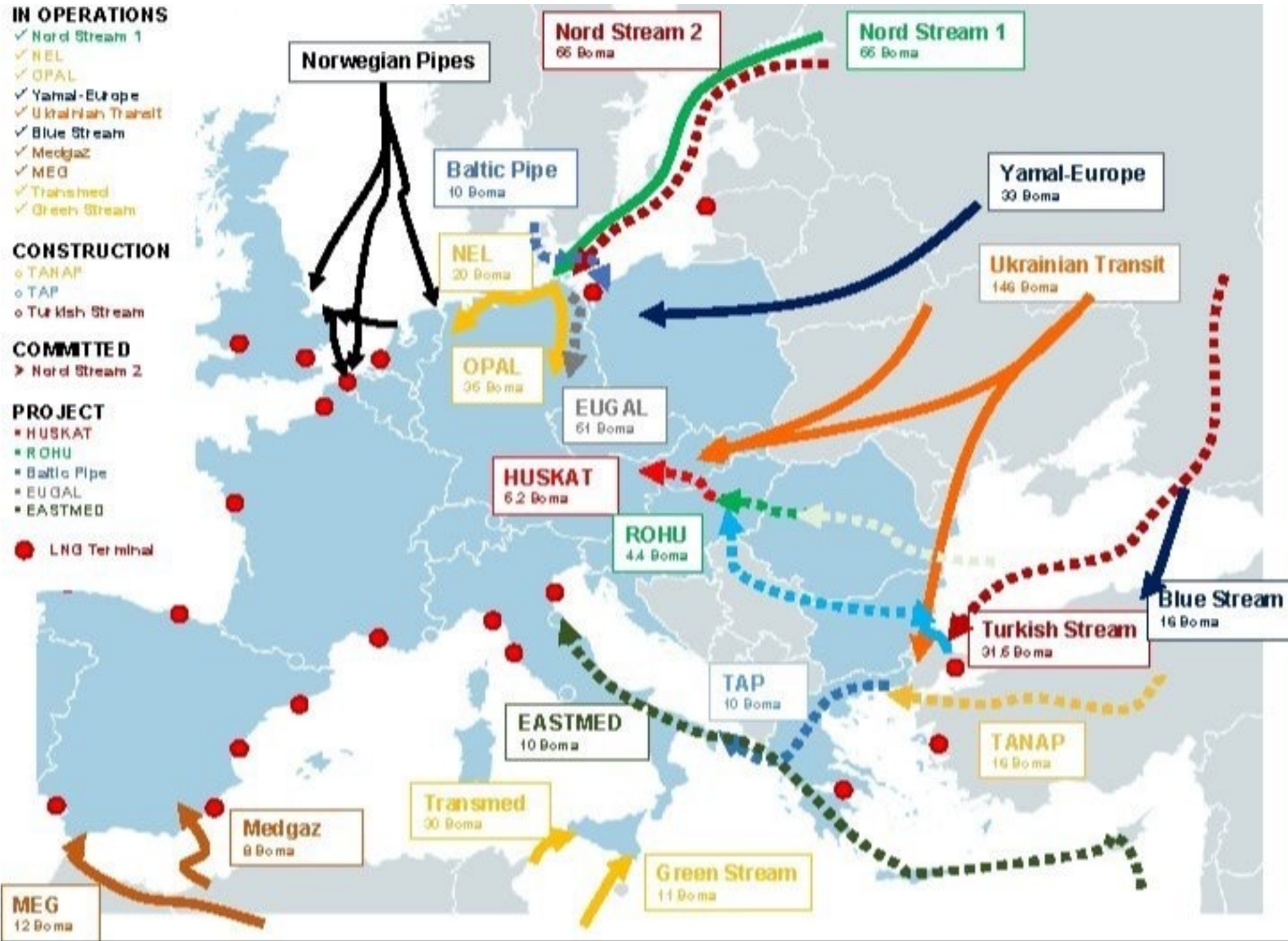
**COMMITTED**

- Nord Stream 2

**PROJECT**

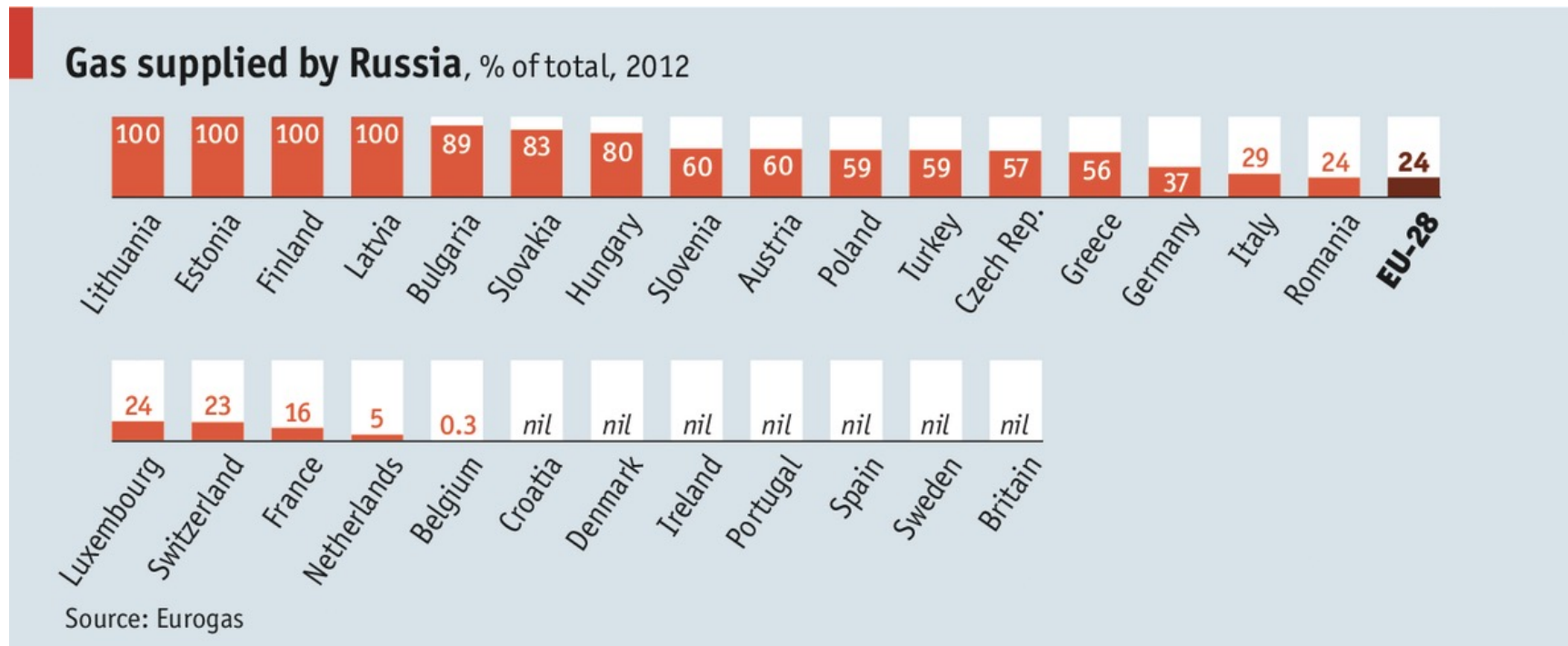
- HUSKAT
- ROHU
- Baltic Pipe
- EU GAL
- EASTMED

● LNG Terminal



# Individual EU Countries' Gas Dependency

(from the Economist April 5, 2014)



# Short- and Long-Term Energy – and Climate Change -- Challenge

US, Germany, China, and India Compared

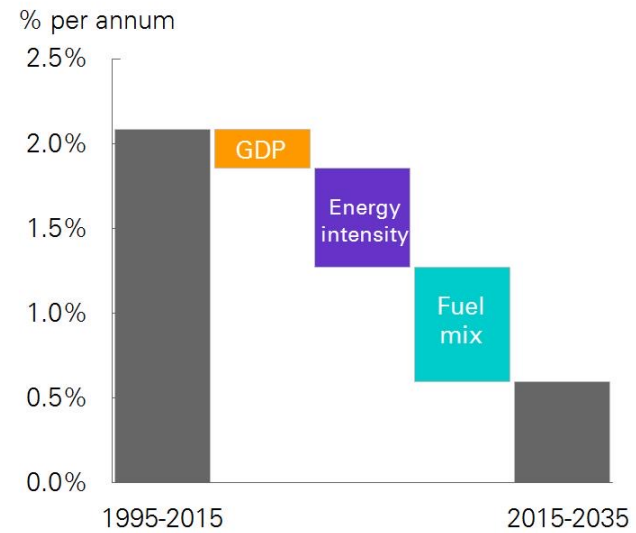


# The Public Policy Conundrum: Emissions + CO2 in Atmosphere

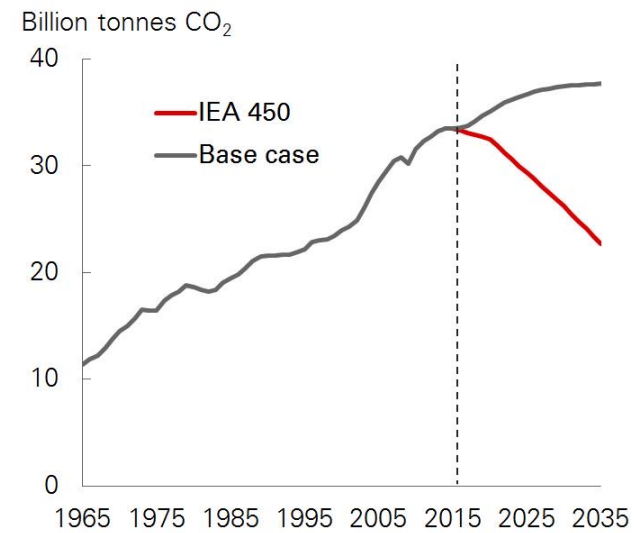


## Carbon emissions

Contributions to slower growth of carbon emissions



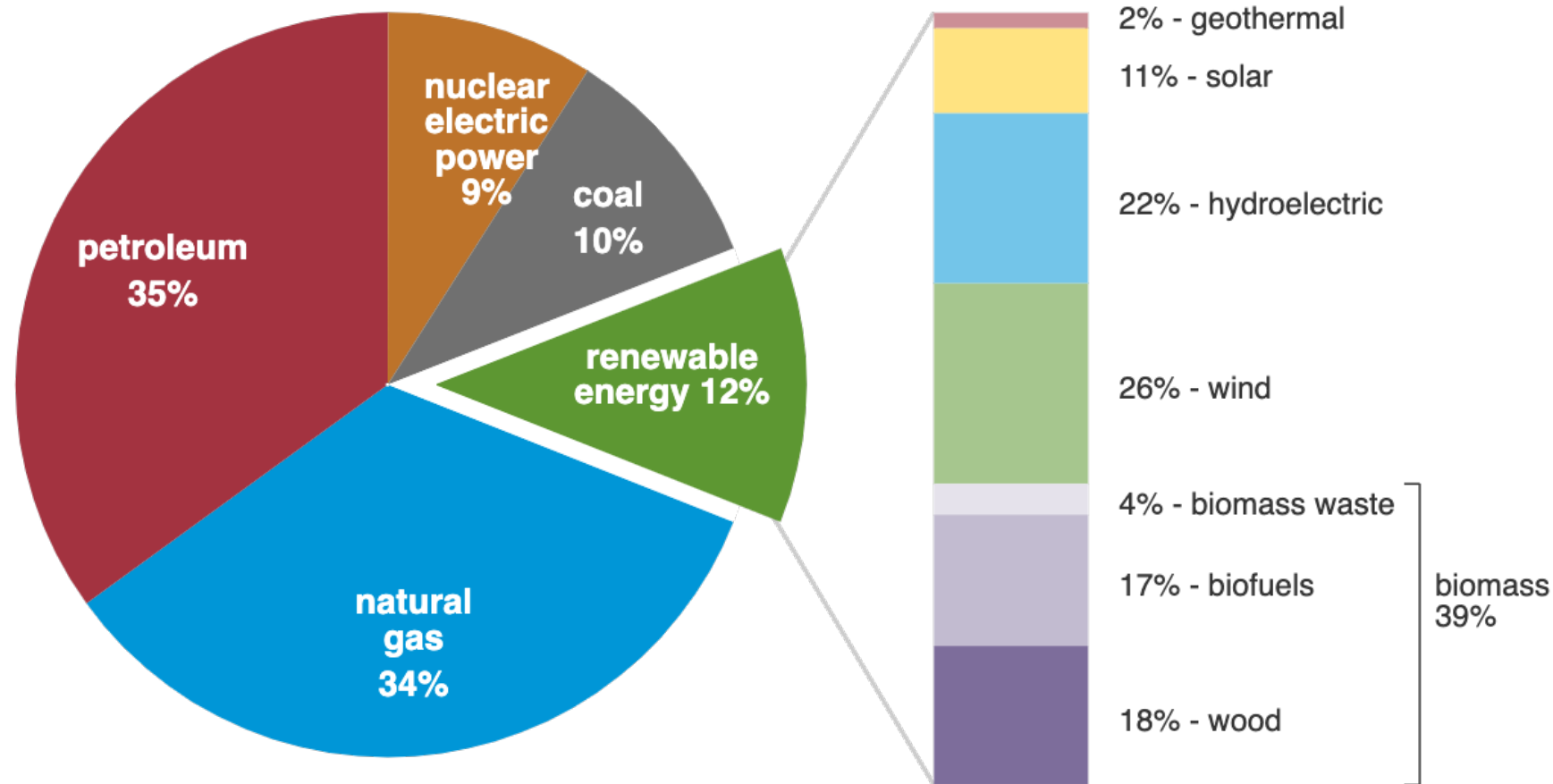
Carbon emissions



# U.S. primary energy consumption by energy source, 2020

total = 92.94 quadrillion  
British thermal units (Btu)

total = 11.59 quadrillion Btu



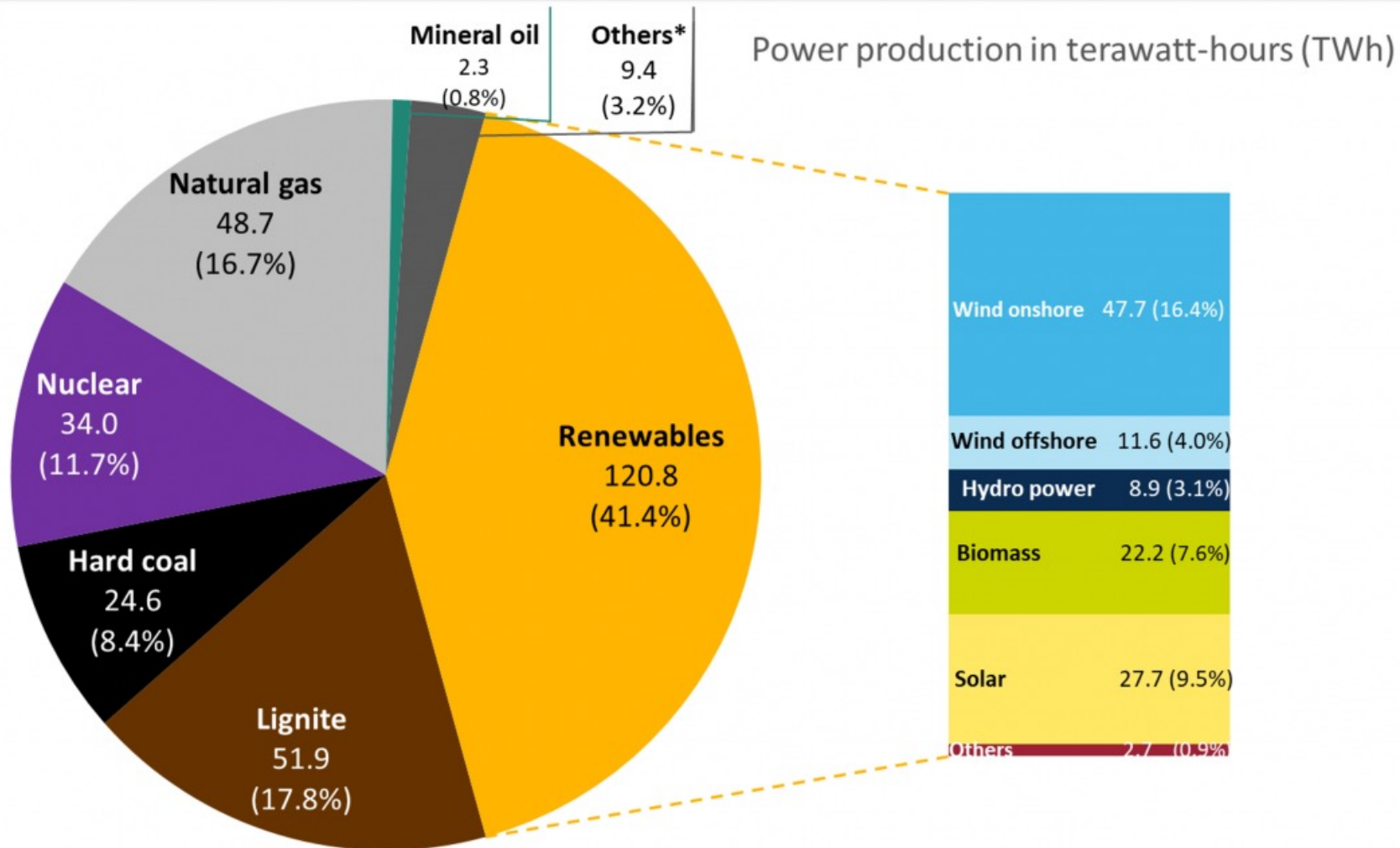
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2021, preliminary data



Note: Sum of components may not equal 100% because of independent rounding.

# Share of energy sources in gross German power production in first half 2021.

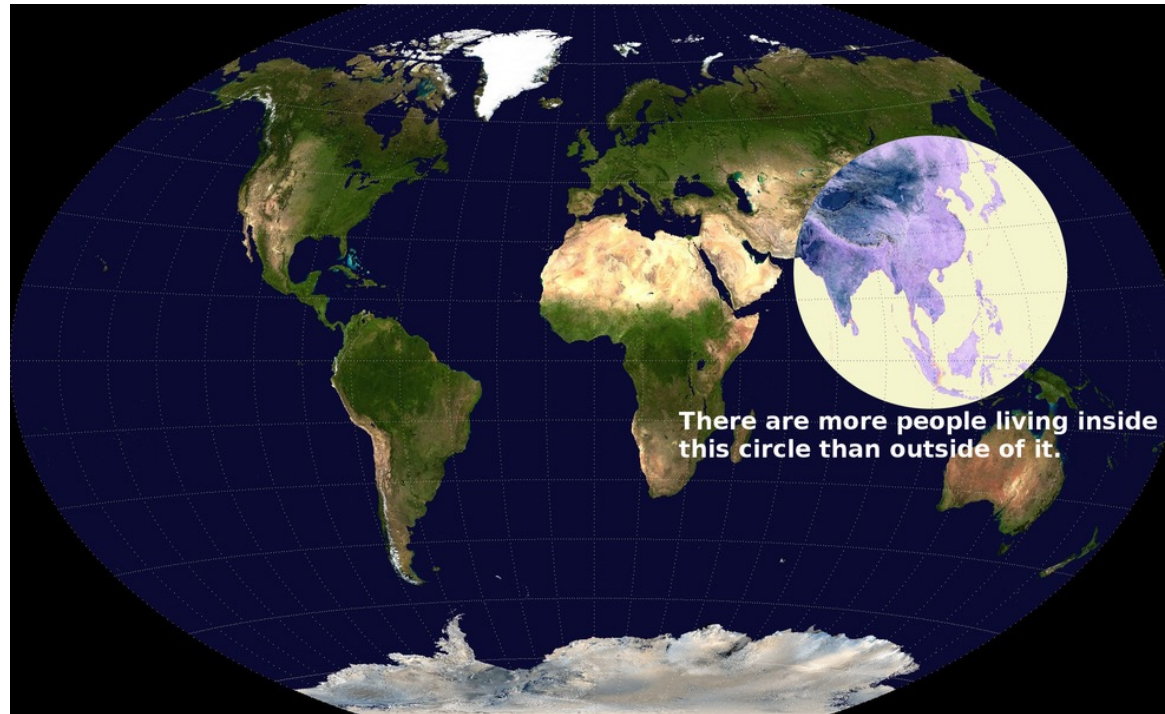
Data: BDEW 2021, preliminary.



\*Without power generation from pumped storage

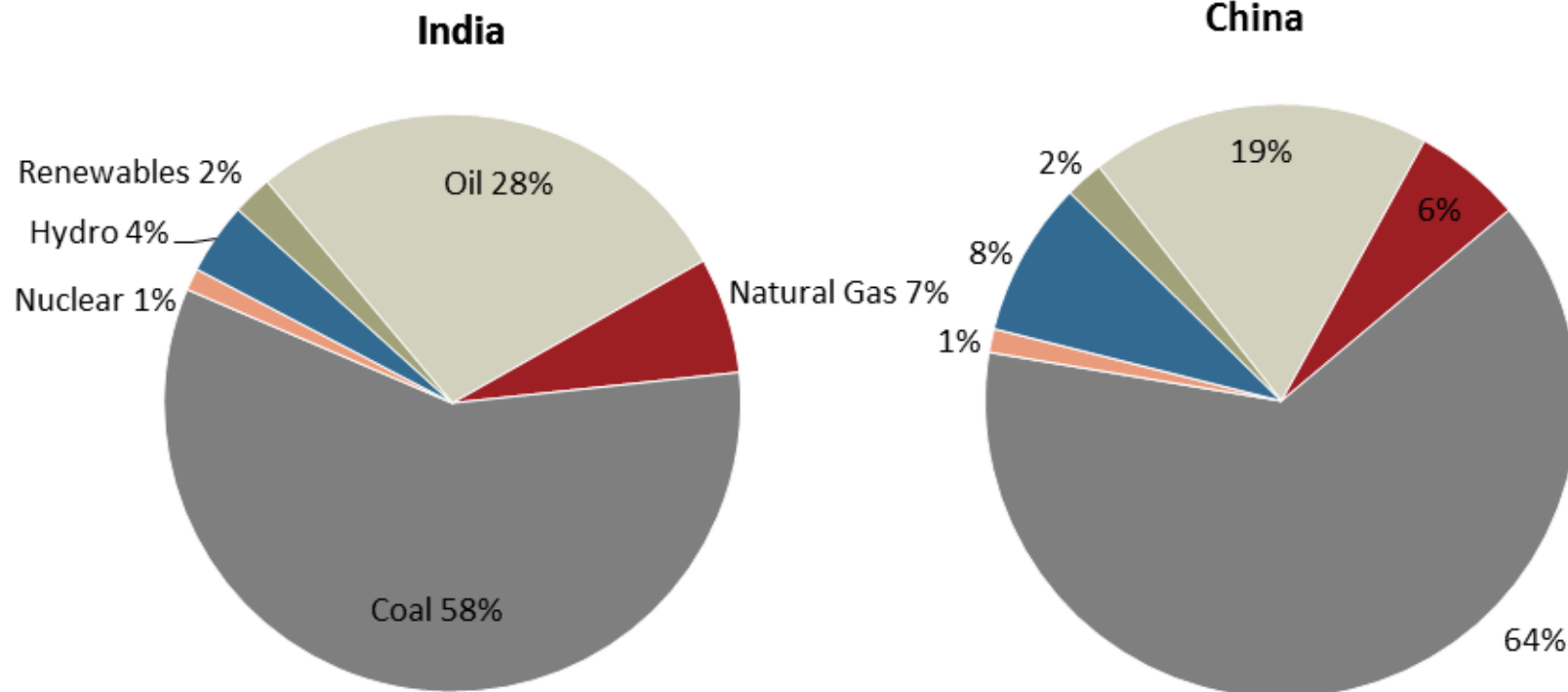
Note: Government renewables targets are in relation to total power consumption (271 TWh in H1/2021), not production. Renewables share in gross German power consumption H1/2021 (without pumped storage): 44.6%.

# Post COP26 What Does This Say About Energy Security, Climate Change, and Geopolitics?



If the world were a village of 100, 61 would be Asians from  
Statoil Energy Perspectives 2017

# India and China Primary Energy Consumption (2015) Compared



From "India's Natural Gas: A Small Part of the Energy Mix" CRS February 13, 2017