

Energy Council

September, 2022

THE DUAL CHALLENGE

ENERGY SECURITY AND ENVIRONMENTAL PROTECTION



Scott W. Tinker





**It is the mark of an
educated mind to be able
to entertain a thought
without accepting it.**

...Aristotle

**“If the world was
perfect, it wouldn’t be.”**

... Yogi Berra

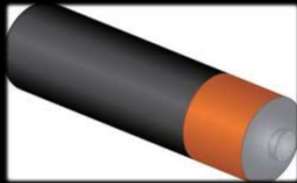
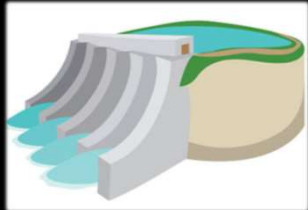


A diverse food mix Team provides diverse diet and cultural sensitivity



Telaon G. Dada

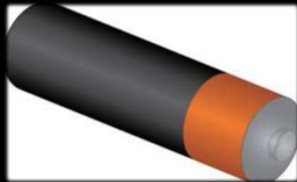
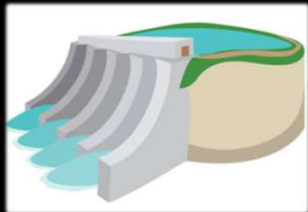
Low Density

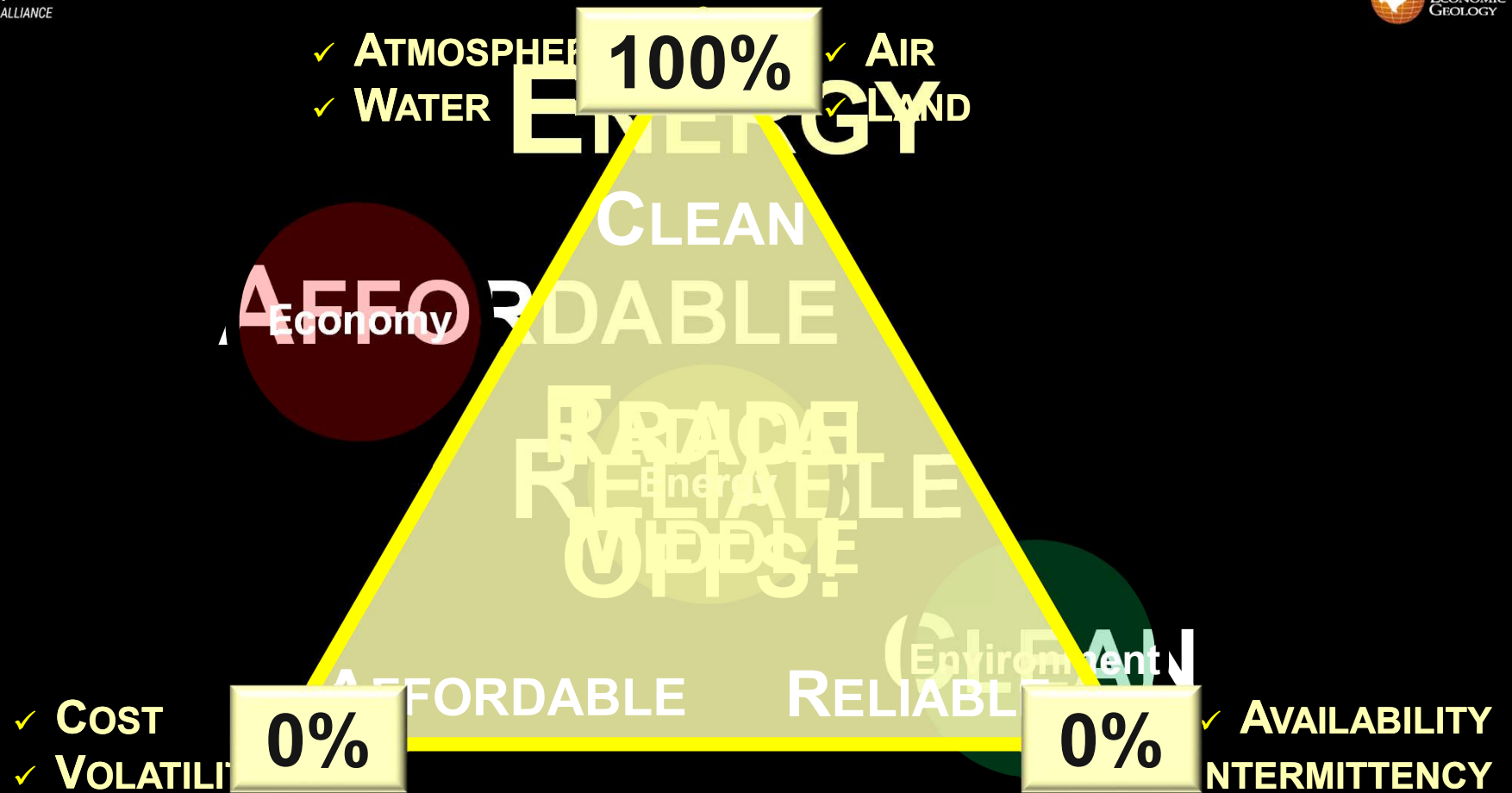


High Density

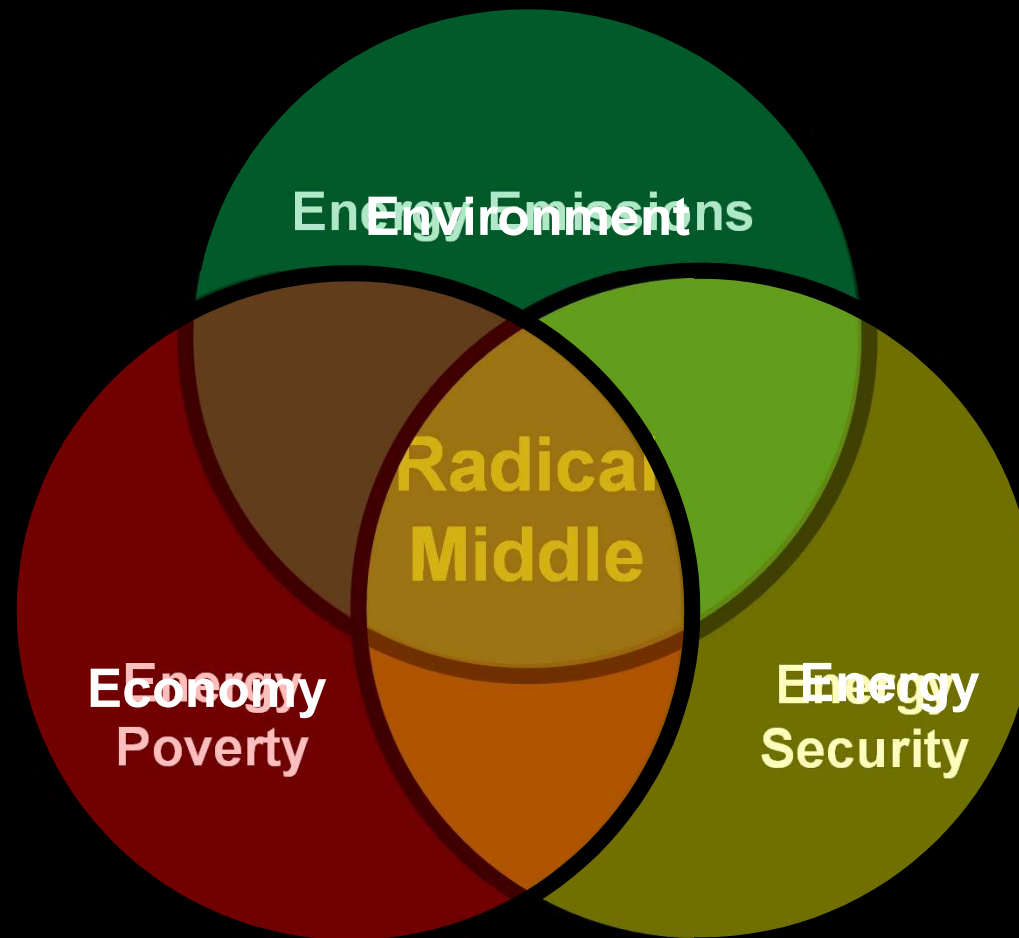


A Diverse Energy Energy Security





GLOBAL ENERGY ISSUES



ENERGY POVERTY

ENERGY SECURITY

ENERGY EMISSIONS



Everything in our Lives
Depends on Energy!



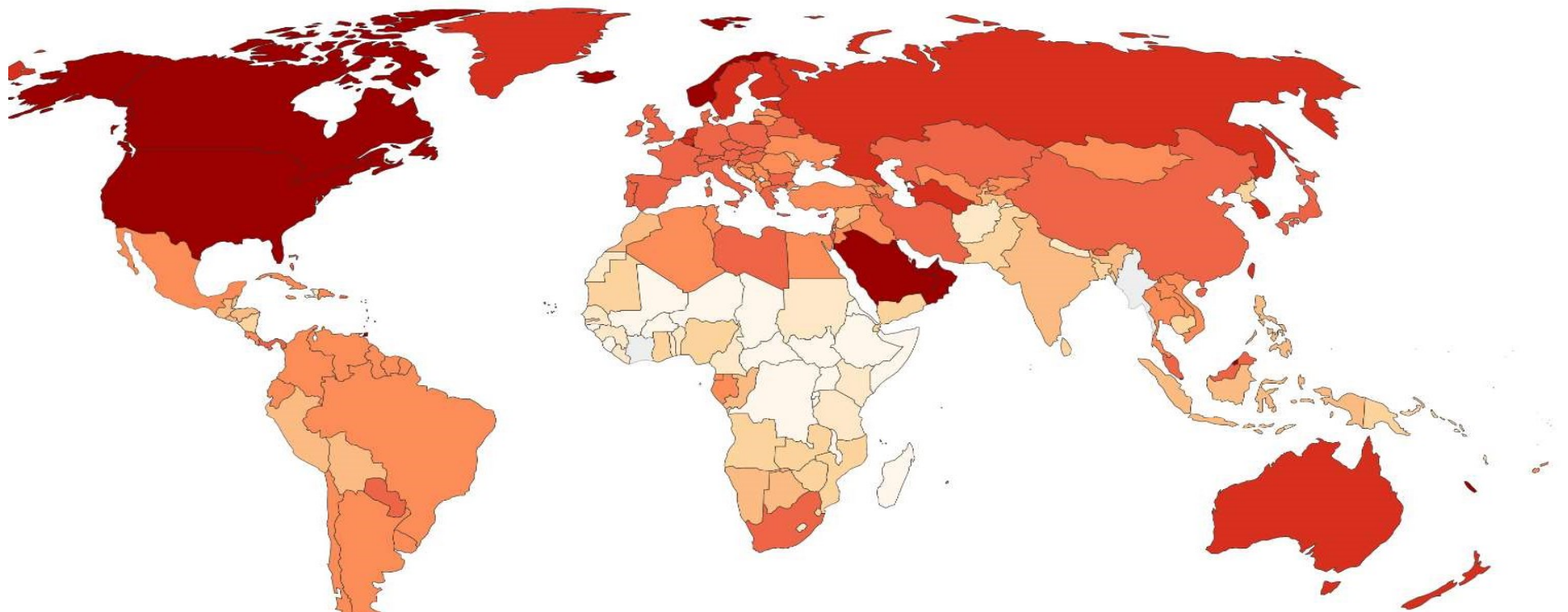


Kenya

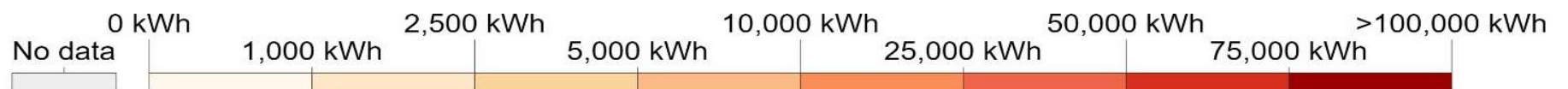




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Per Capita Energy



THERE ARE 3 KINDS OF PEOPLE
IN THE WORLD.

THOSE WHO ARE GOOD AT MATH,
AND THOSE WHO AREN'T.

Energy Poverty & Economic Poverty



Lo

High

Severe Economic Poverty

Low



***It's Time to
Power the
People***

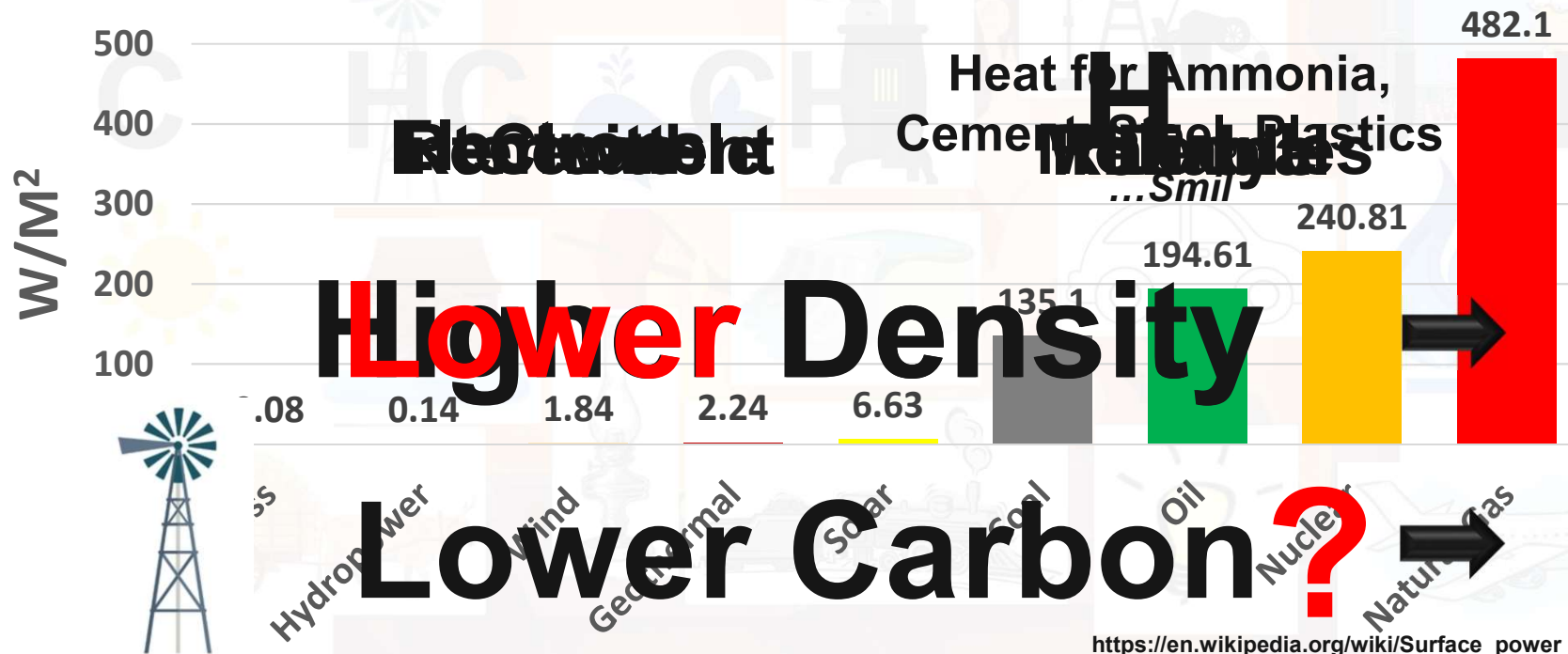
ENERGY POVERTY

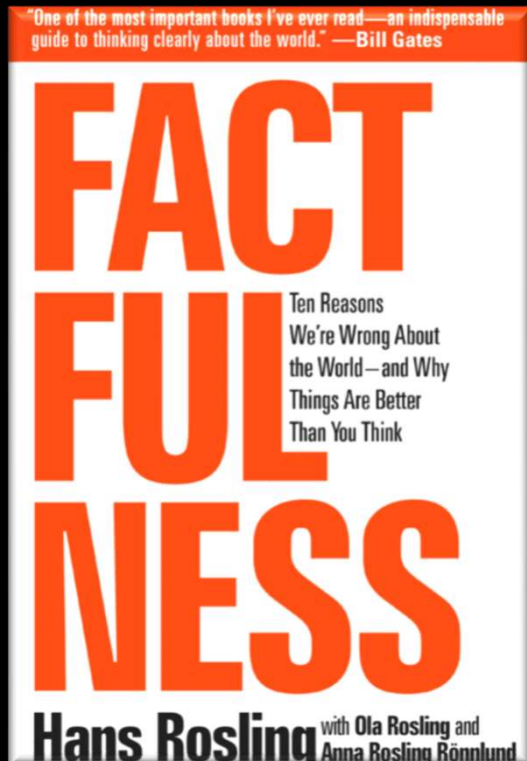
ENERGY SECURITY

ENERGY EMISSIONS

ENERGY FUNDAMENTALS

Surface Power Density





**“Data must be used to
tell the truth, not to
call to action, no
matter how noble the
intentions.”**

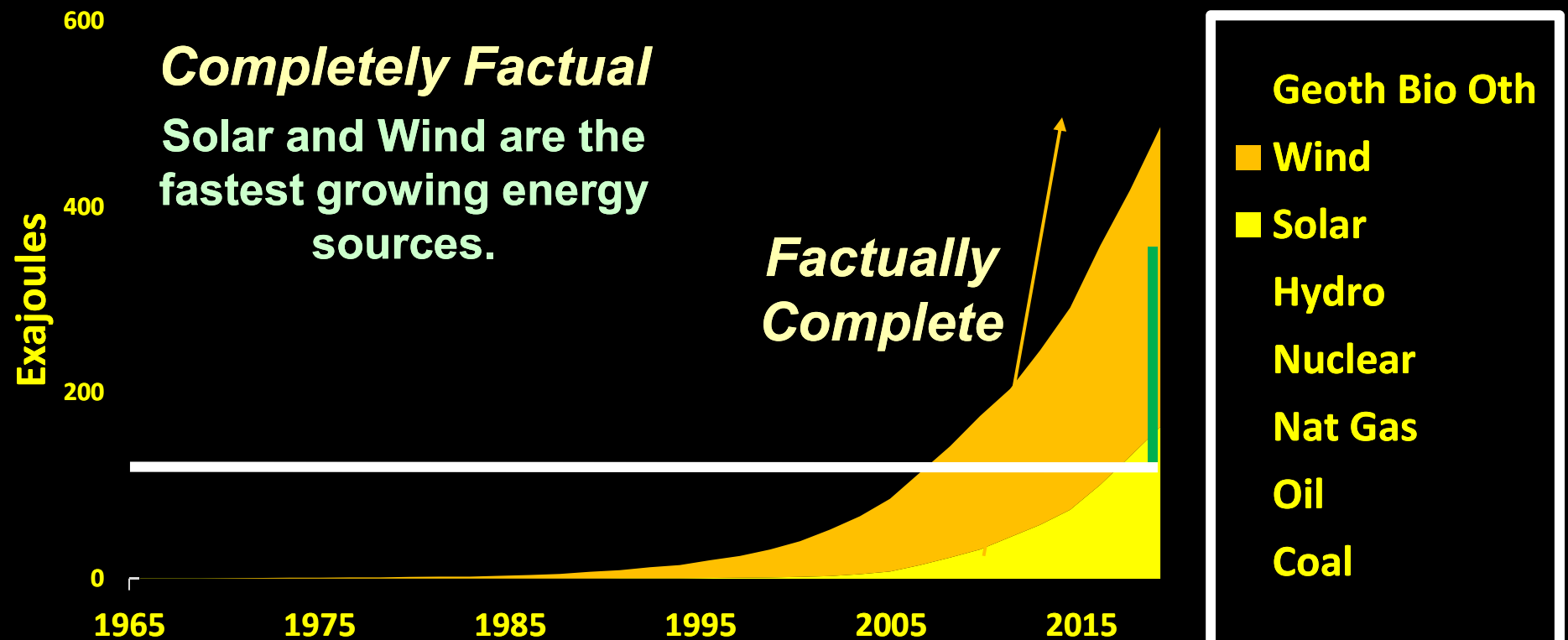
**...Hans Rosling
*Factfulness***

**We must strive to be both
*completely factual, and
factually complete.***

**-- Tinker
U. S. Senate Testimony, 2021**

Global Energy Consumption

Energy Mix and Scale



Data: BP Statistical View of World Energy (2020)

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Europe Pays and Pays for Net Zero

Prices and subsidies are both soaring thanks to foolish climate policy.



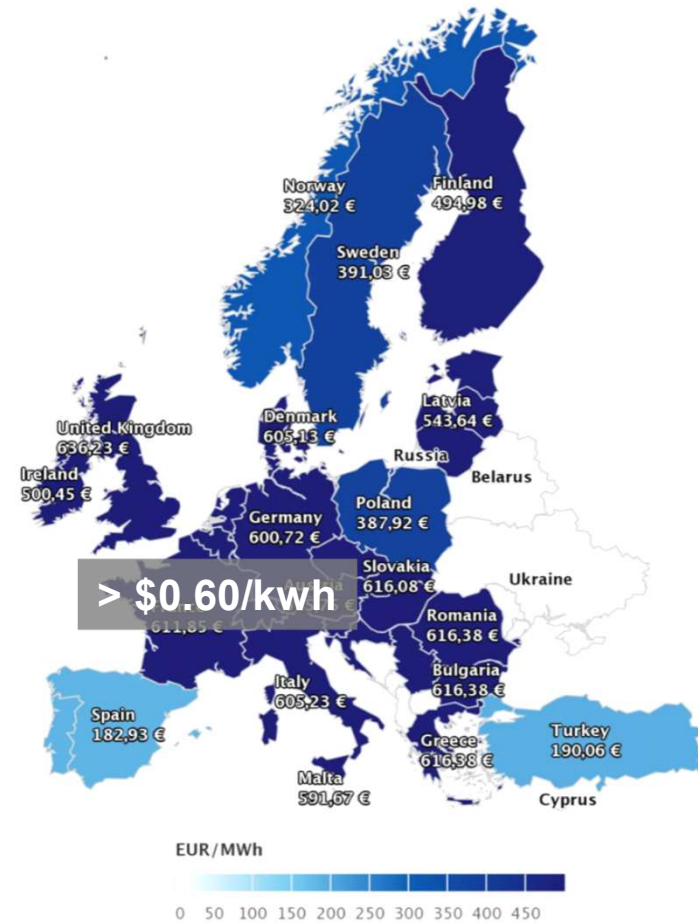
British Prime Minister Liz Truss speaks in the House of Commons to set out her energy plan to shield households and businesses from soaring energy bills, London, Sept. 8.

HOUSE OF COMMONS/ZUMA PRESS

By The Editorial Board [+ Follow](#)

September 08, 2022 06:51 p.m. EDT

Average Day-Ahead Market prices for 2022-08-23



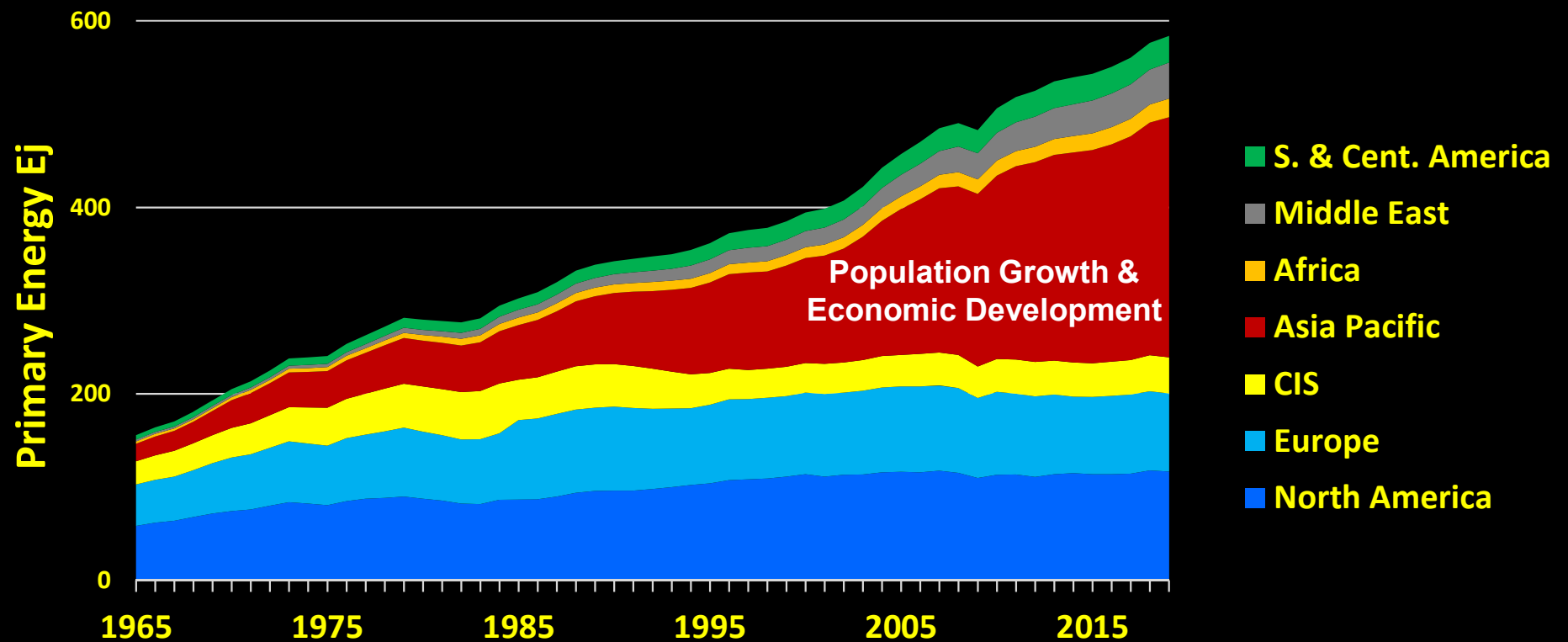
> \$0.60/kwh

EUR/MWh

0 50 100 150 200 250 300 350 400 450

service provided to the Hellenic Regulatory Authority for Energy (RAE), powered by DIEM, sources: ENTSOe, GME; last update: 2022-08-23 06:58

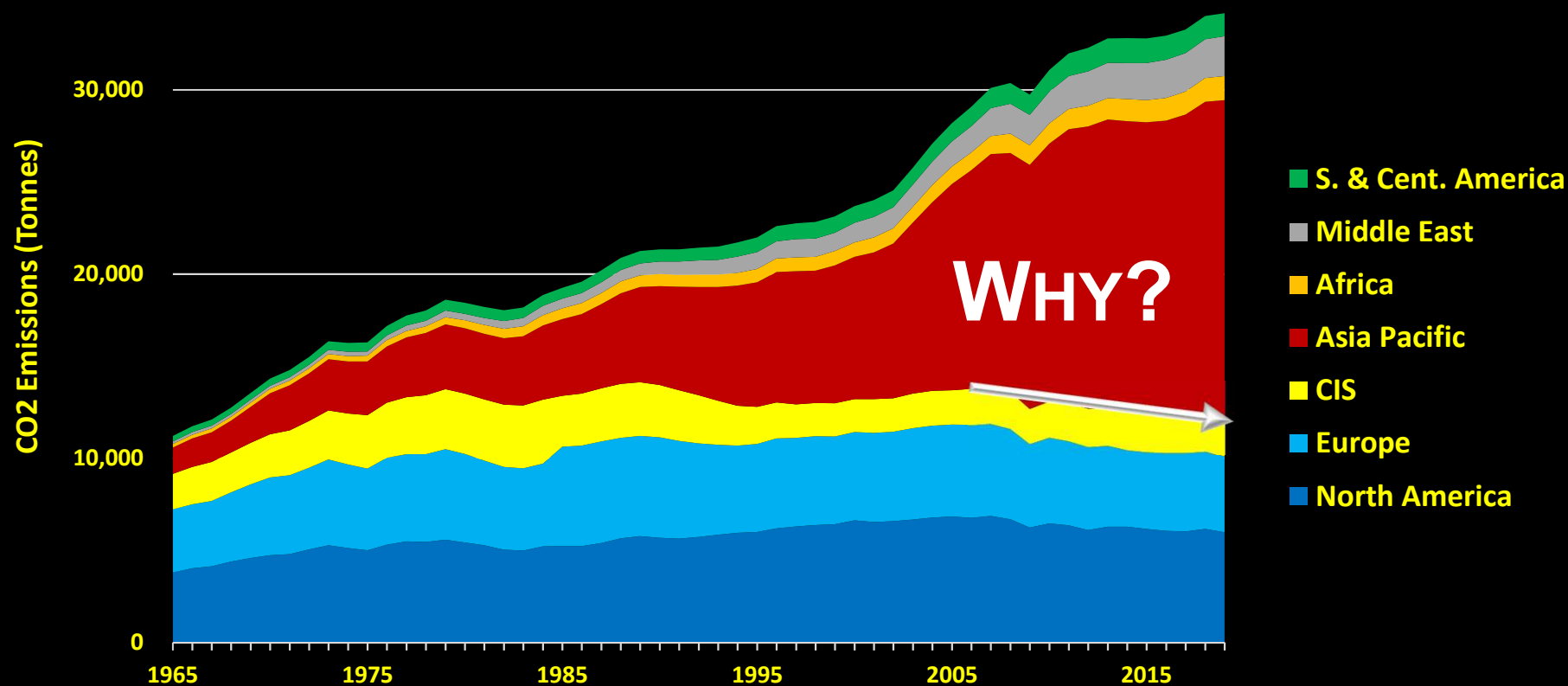
Global Energy Consumption by Region



Data: BP Statistical View of World Energy (2020)

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Global Anthropogenic CO₂ Emissions



Data: BP Statistical View of World Energy (2020). Analysis Tinker 2020

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China Energy

Bloomberg

China's Xi Says Climate Compromise Energy

- Emissions policies have constrained
- Government takes a safety-first approach

Bloomberg News

January 25, 2022, 10:12 PM CST Updated on

Coal Oil Nat Gas Nuclear Hydro Solar

Data: BP Statistical View of World Energy (2020) Analysis Tinker

Bloomberg

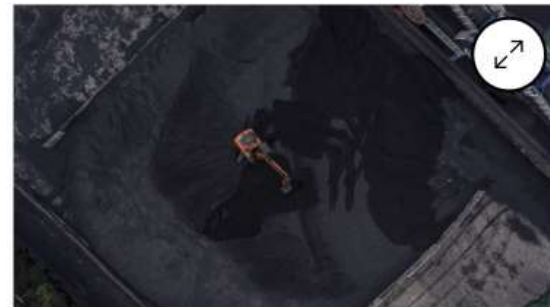
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Green | Climate Politics

China May Boost Coal Power Plant Building Amid Energy Crunch

- Engineering firm expects 270 GW of new capacity by 2025
- Chinese utilities have been shifting to cheaper renewables



Heavy machinery operates at a coal stockpile in Taicang, China. Photographer: Qilai Shen/Bloomberg

Bloomberg News

September 8, 2022, 7:49 AM CDT

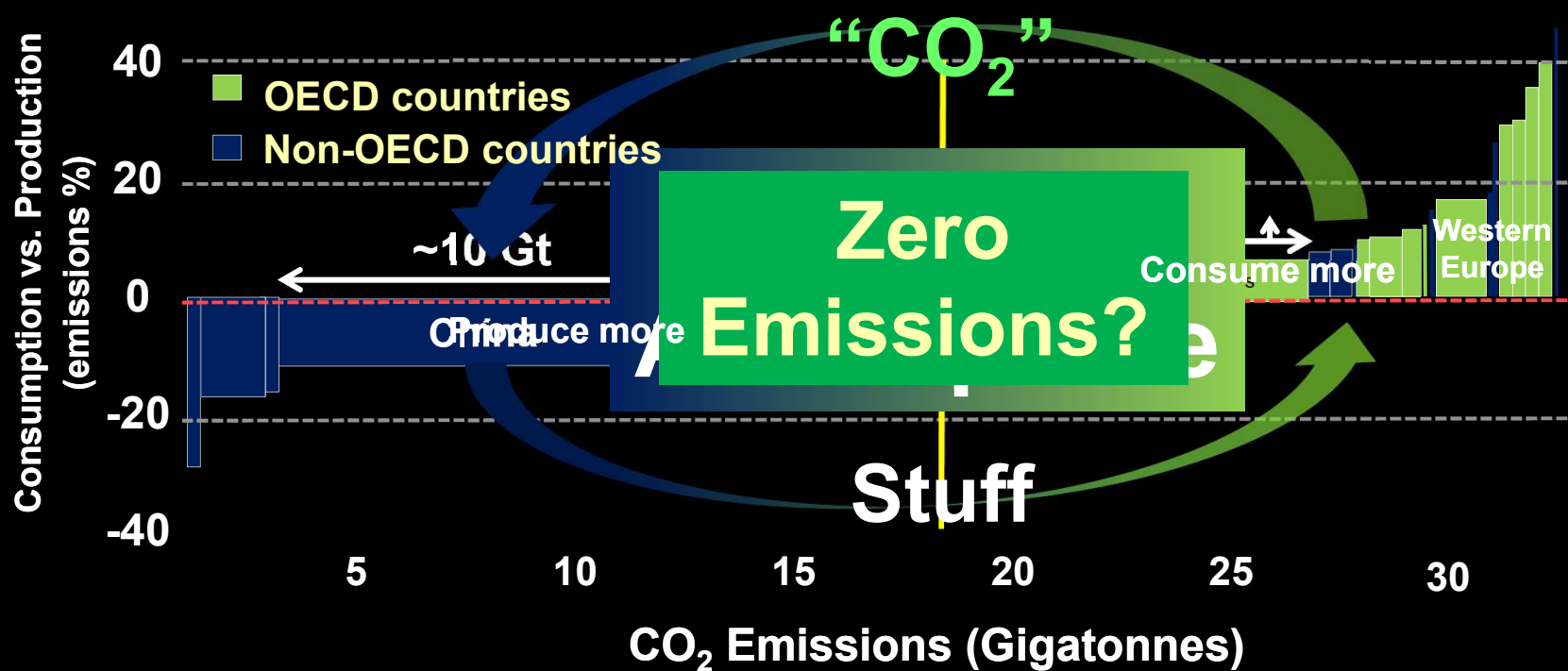
Updated on September 9, 2022, 3:20 AM CDT

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CO₂ Emissions Consumption vs. Production



**It's not an
Energy Transition**

**It's an
Emission Transition**

ENERGY POVERTY

ENERGY SECURITY

ENERGY EMISSIONS

Most people
gasoline
electric
But

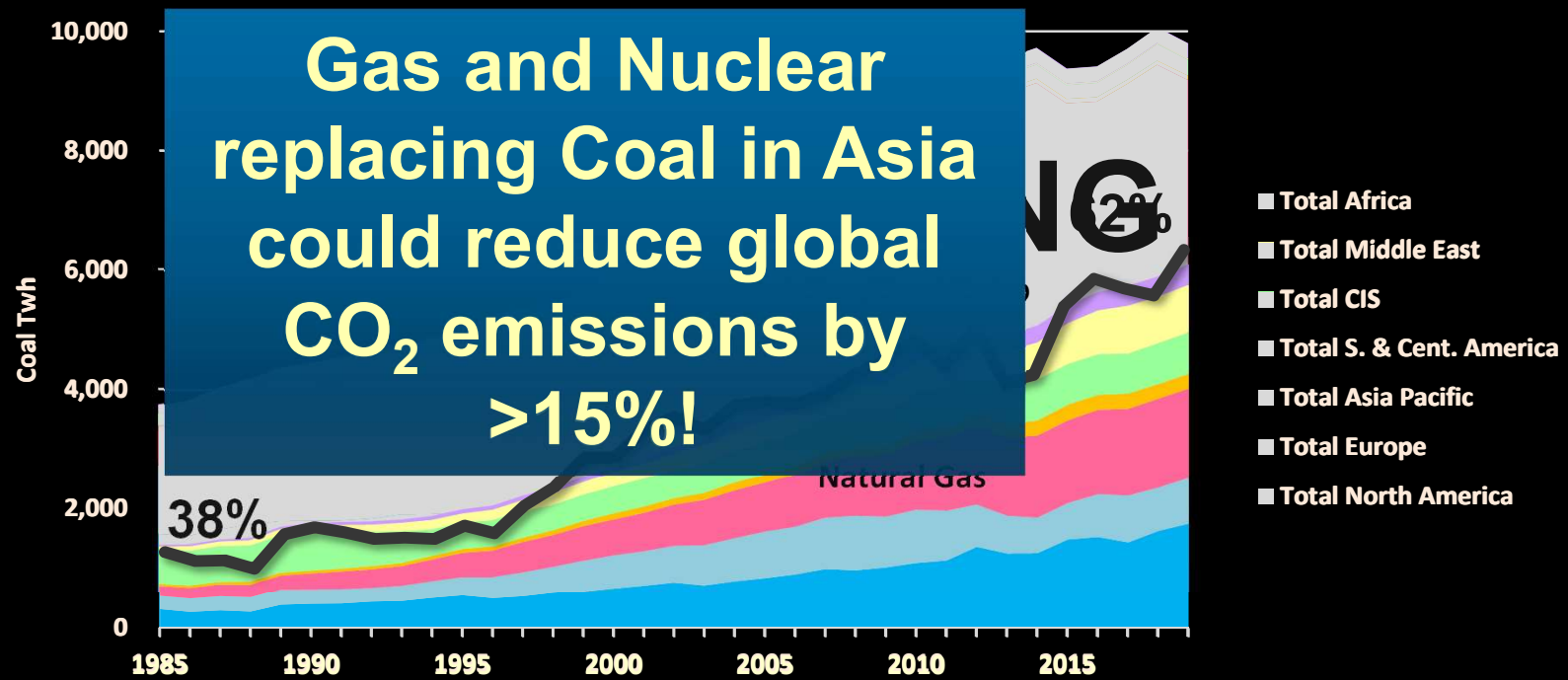


Now how
where
from.
do!

The Emission Transition

- **Technology**
Natural Gas and Nuclear Replacing Coal
- **Cost**
Hydrogen, Geothermal, Hydro
- **Scale**
CCUS, DAC, Nature Solutions
- **Efficiency**
Solar, Wind, Batteries
- **Timeframe**
Efficiency and Conservation

GLOBAL ELECTRICITY GENERATION COAL AND NATURAL GAS



Green

Europe Ramps Up Coal Burning With Natural Gas Out of Favor

By Todd Gillette

March 11, 2022, 10:31 AM EST

WESTERN ENERGY NEWS

Region seeks to reduce dependence on Russian gas supplies
Coal prices stable on Friday after swinging wildly earlier

Bloomberg

US Edition ▾

San Diego and existir



by Jonathan P. Thompson
August 4, 2022

Green
Climate
Politics

EU Lawmakers Remove Last Hurdle to Label Gas, Nuclear as Green

- Parliament votes to approve including gas in taxonomy
- Regulation will most likely enter into force at start of 2023

By John Ainger

July 6, 2022 at 5:21 AM CDT Updated on July 6, 2022 at 5:56 AM CDT



Geothermal Hydrogen CCUS Nuclear Coal to Gas Batteries Solar Wind

ENERGY IMPACTS

Climate

ATMOSPHERE

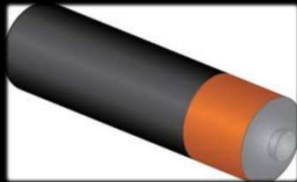
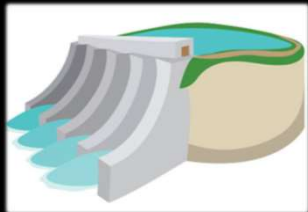
Land

The Environment is an Interconnected System

Air

Water

“Clean”

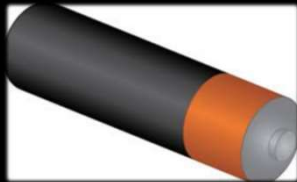
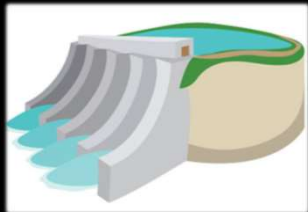


- Manufacturing
- Mining & Drilling
- Water Handling
- Transportation
- Refining
- Combustion & Emissions

“Dirty”



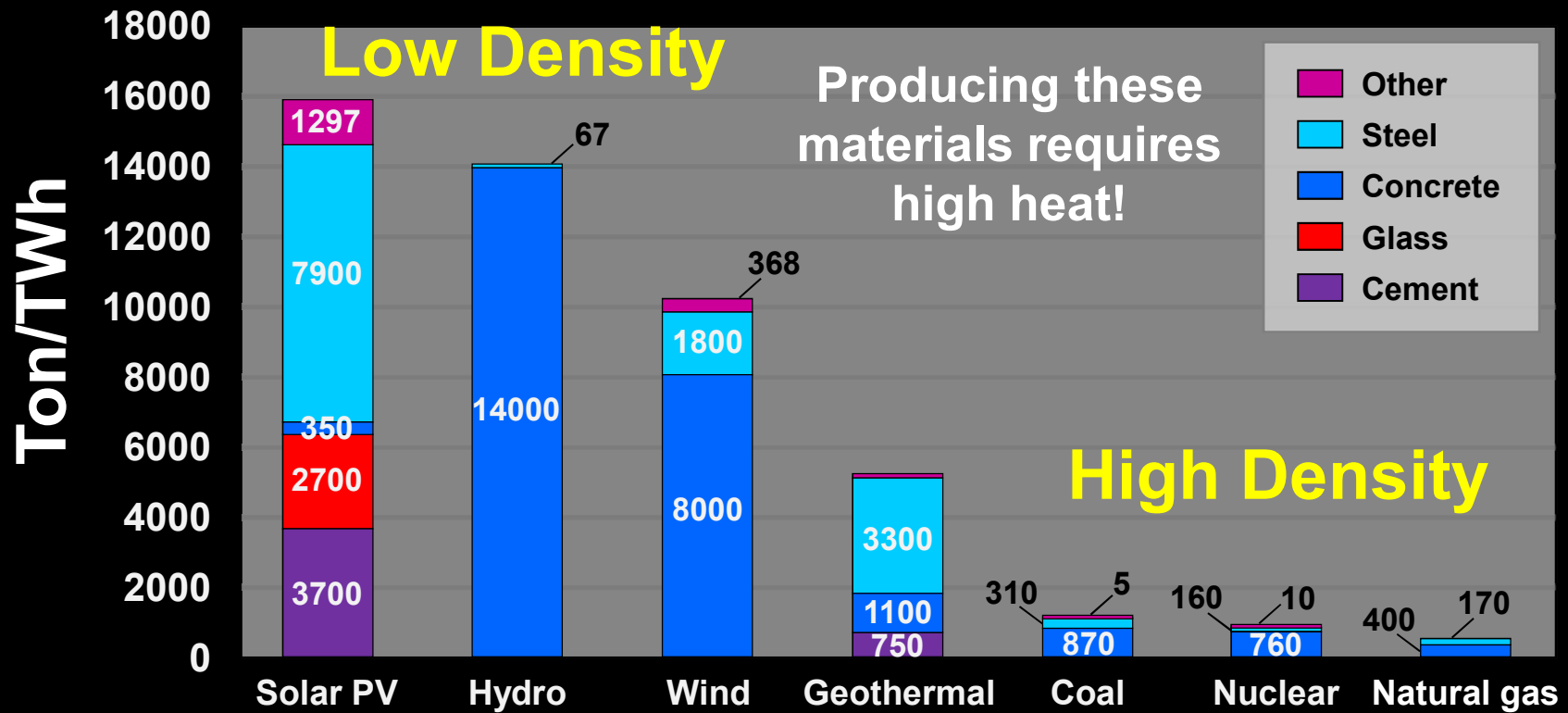
- Mining & Processing
- Manufacturing
- Production
- **“Clean”** Transmission
- Land & Ocean Disposal



- Mining & Manufacturing
- Drilling
- Water Handling
- Transportation
- Refining
- Combustion



Materials Usage



Where Energy Metals Are Produced

Polysilicon Production



CLIMATEWIRE

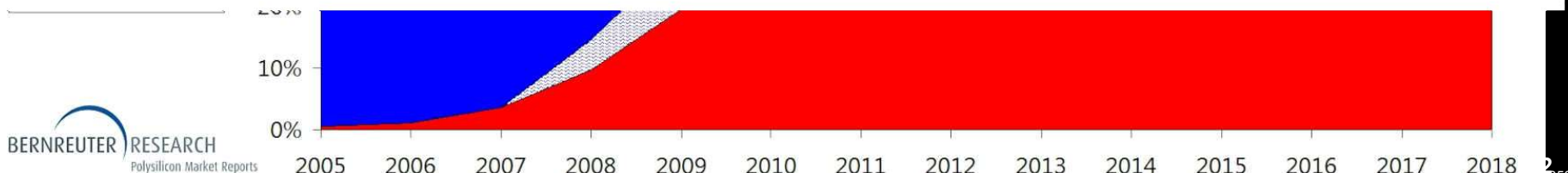
CHEMICALS AND TOXINS & 18 OTHERS



Europe's clean energy plan has a mining problem

The E.U. accelerated its historic transition to renewable energy yesterday. But it might not be able to secure the minerals and metals needed to reach its goals.

BY: SARA SCHONHARDT | 05/19/2022 06:15 AM EDT



Source: International Energy Agency • <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>

07/09/2023

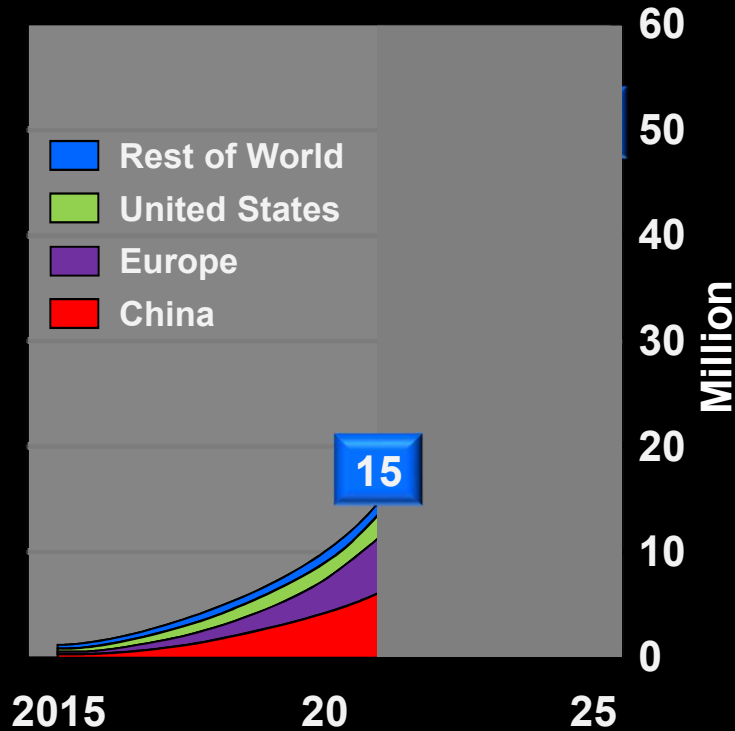


Electrons!

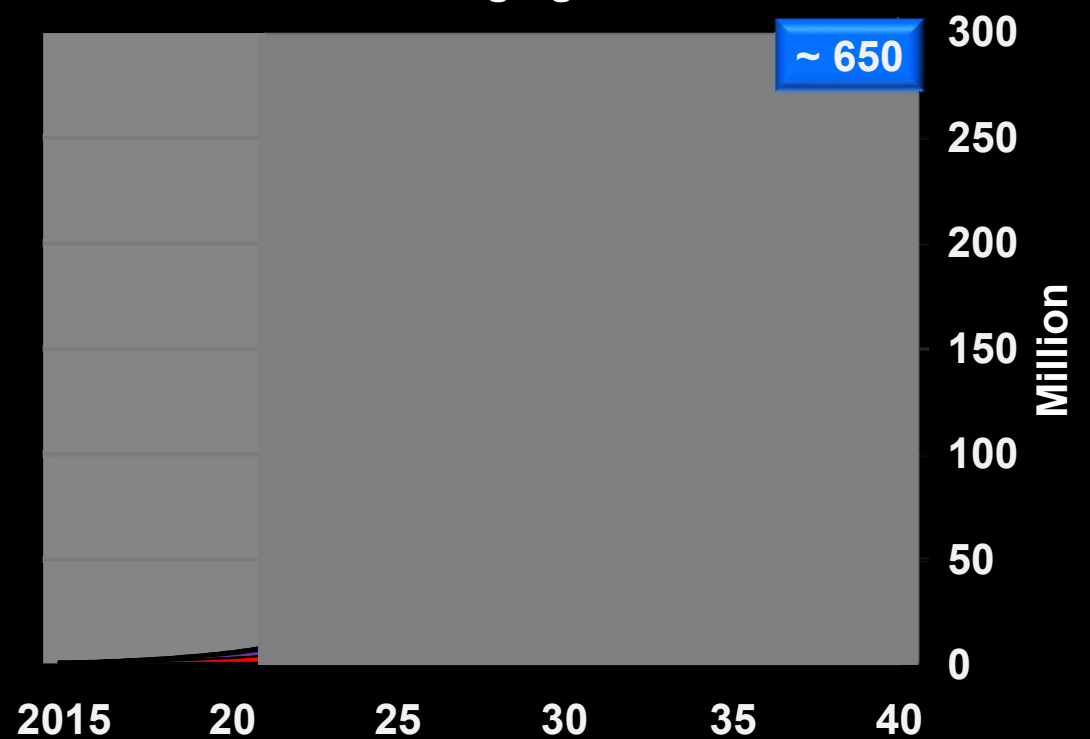
...Diesel!

Electric Vehicles

passenger vehicles

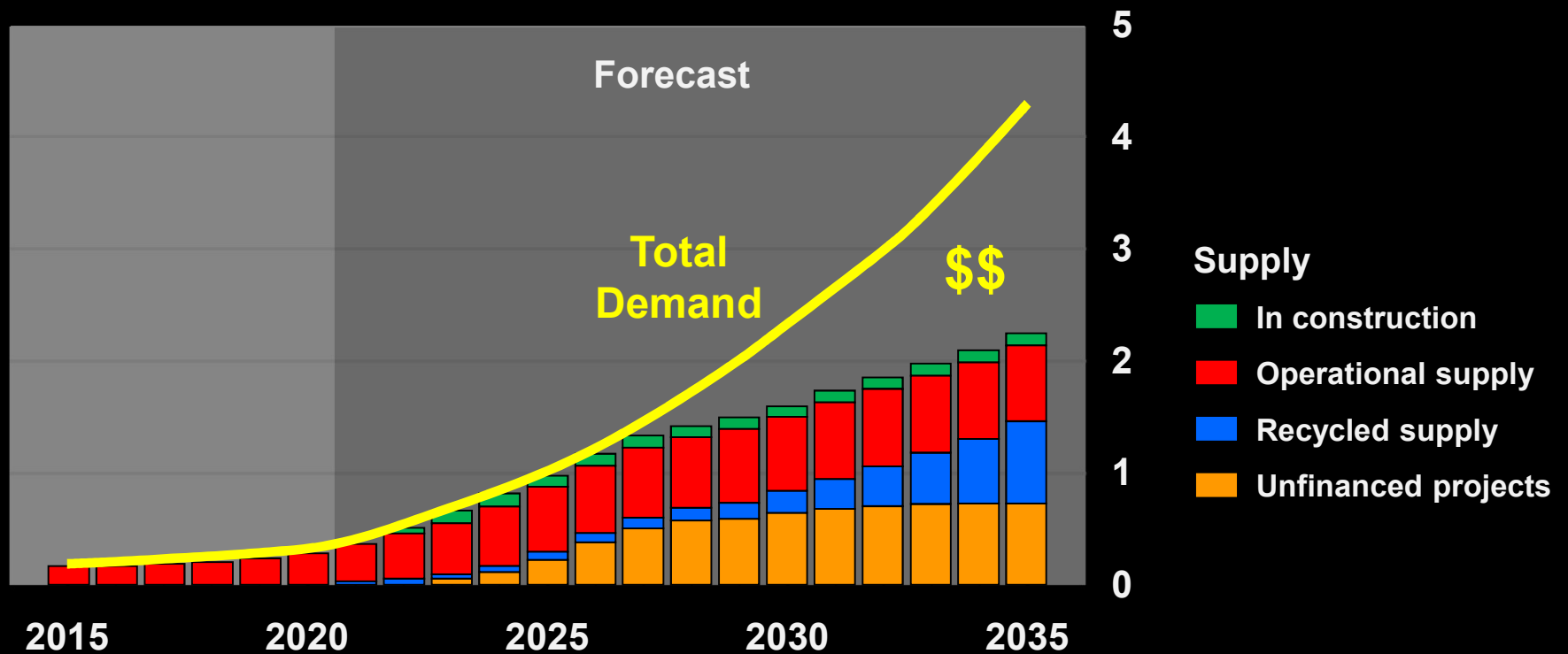


Global # of charging connectors

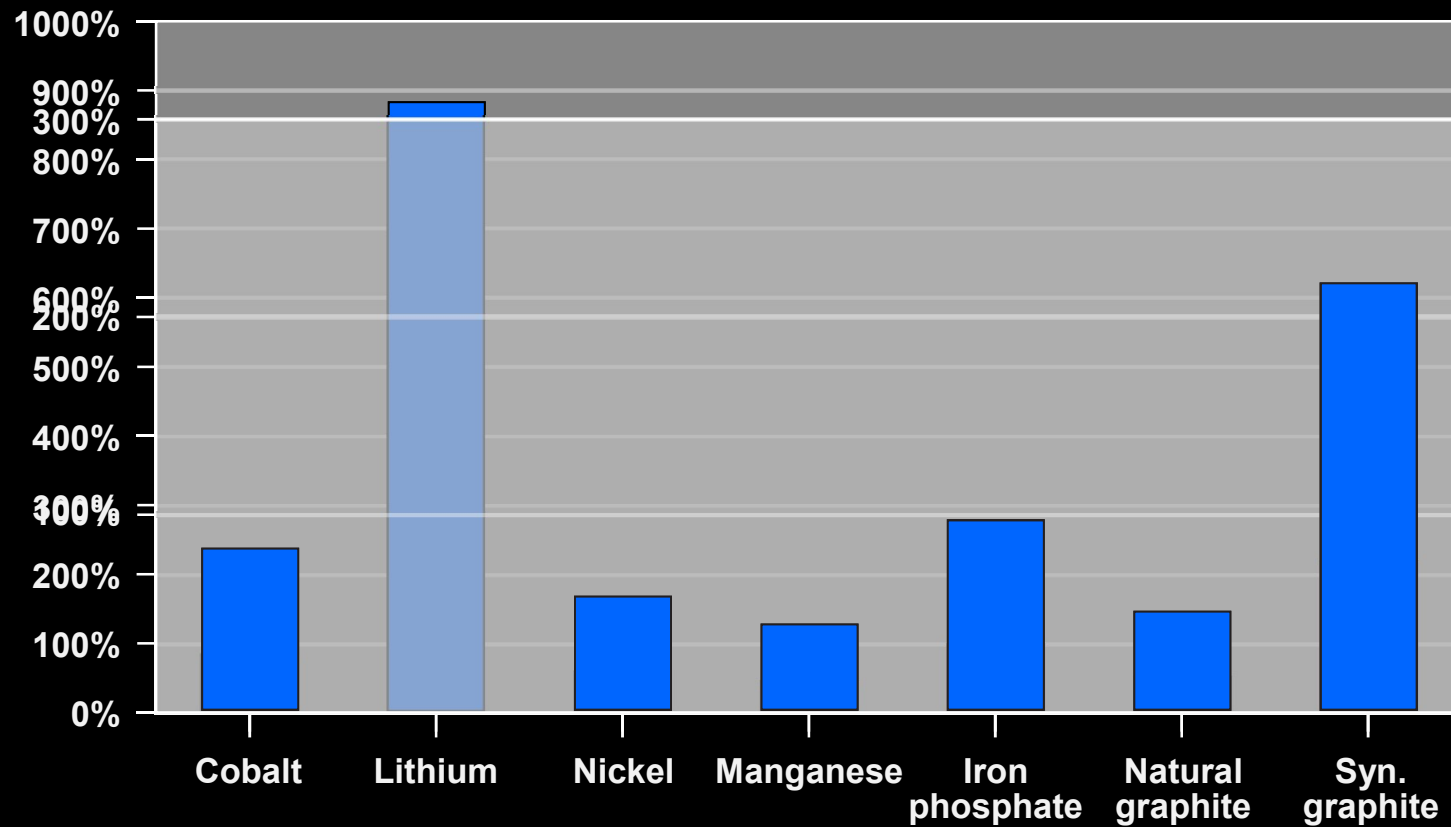


Worldwide Lithium Demand and Supply

Millions of tonnes of lithium carbonate equivalent



Percentage Increase in Critical Battery Raw Materials Costs Since January 2020



Source: Benchmark Mineral Intelligence

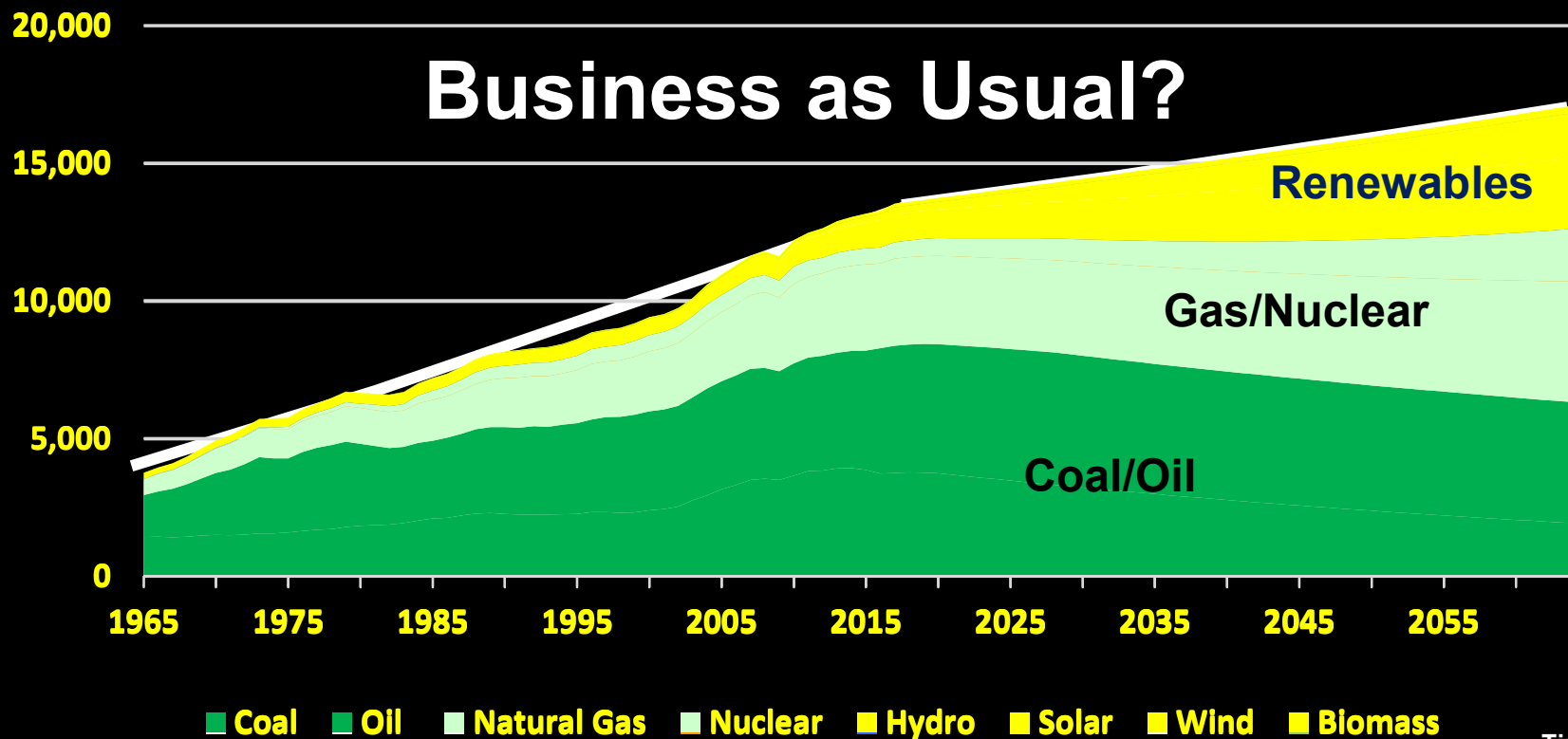
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ENERGY FUTURE

Global Transition

Global Energy Consumption (MTOE)
25% Renewable

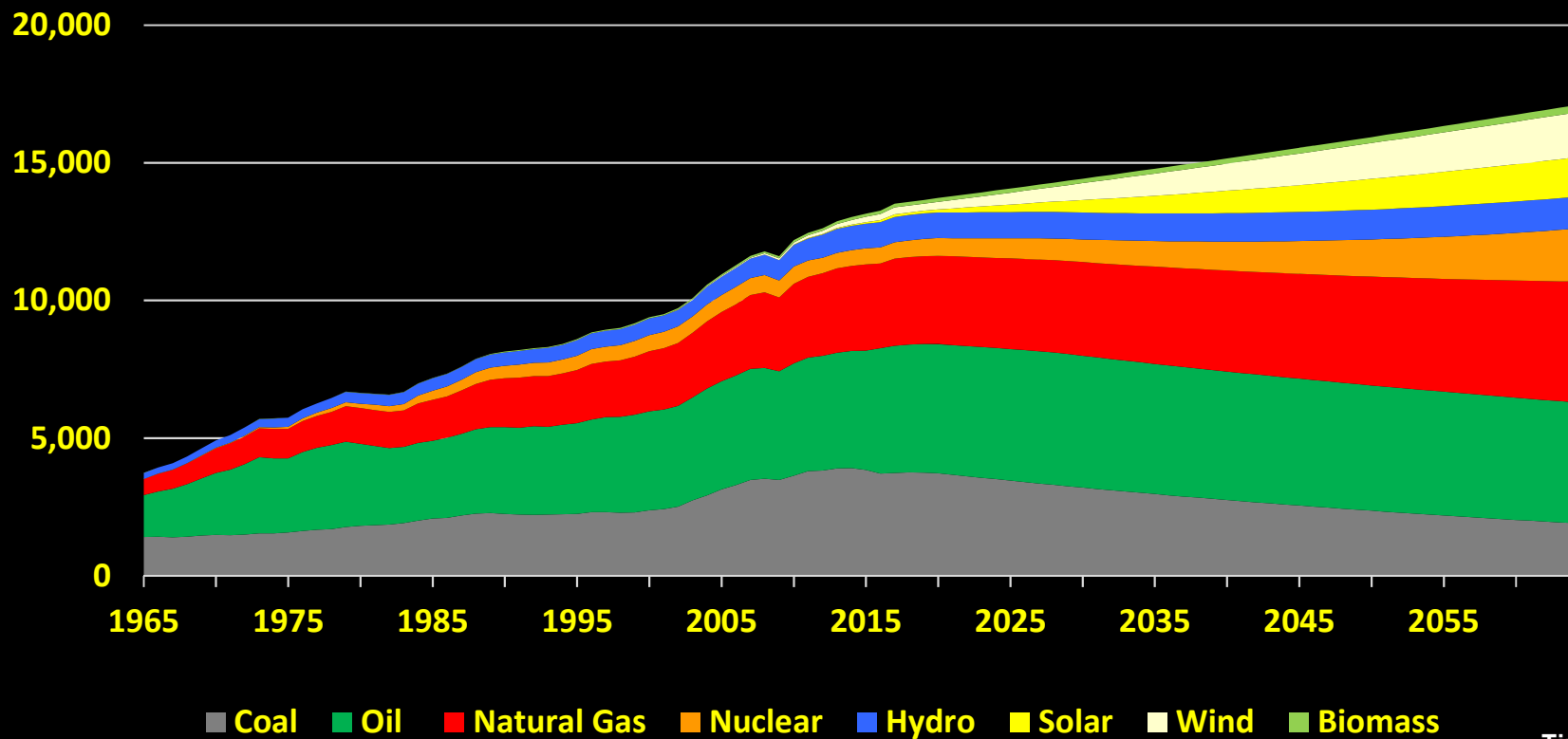


Historical Data: BP Statistical View of World Energy (2020) Analysis Tinker, 2017

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Global Transition

Global Energy Consumption (MTOE)
25% Renewable

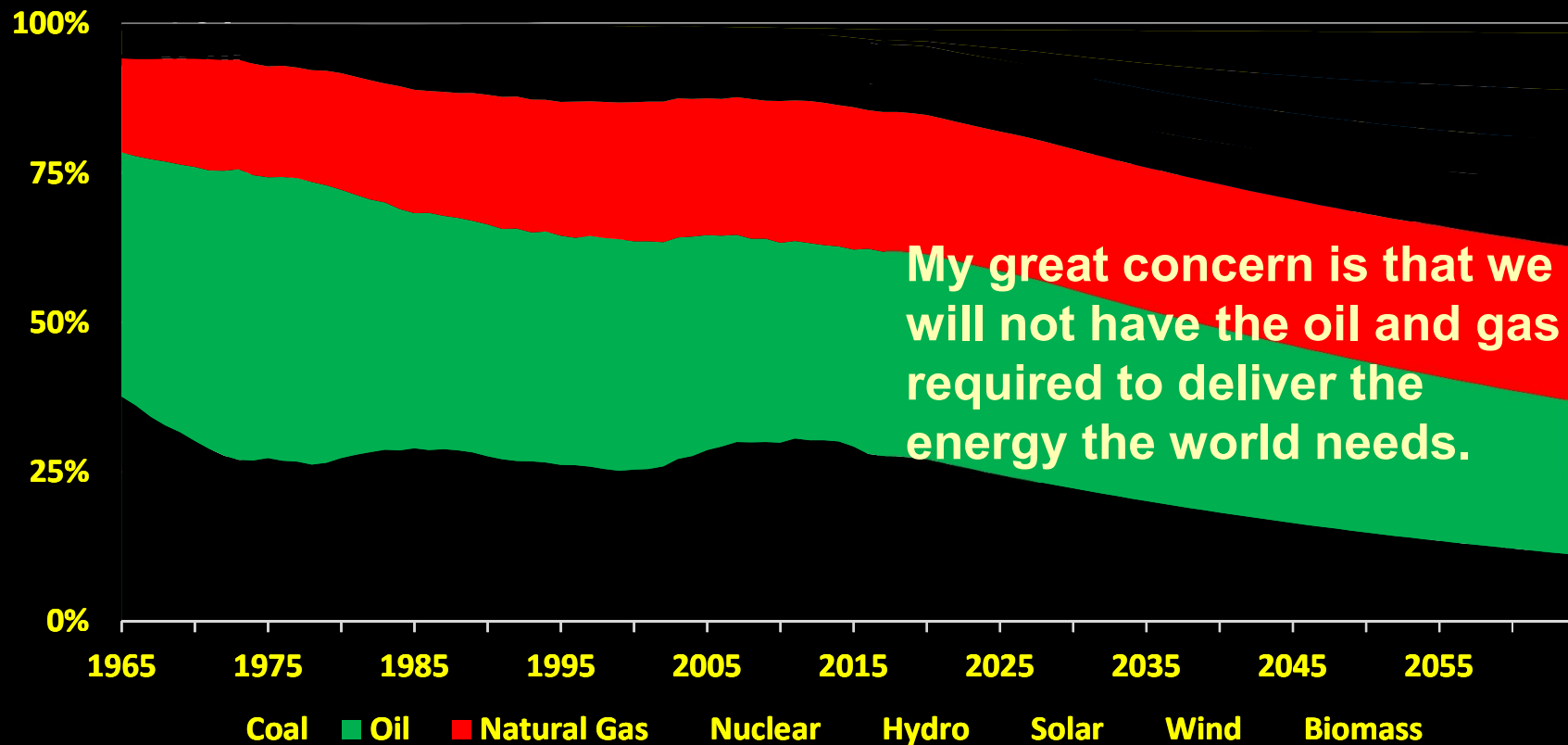


Historical Data: BP Statistical View of World Energy (2020) Analysis Tinker, 2017

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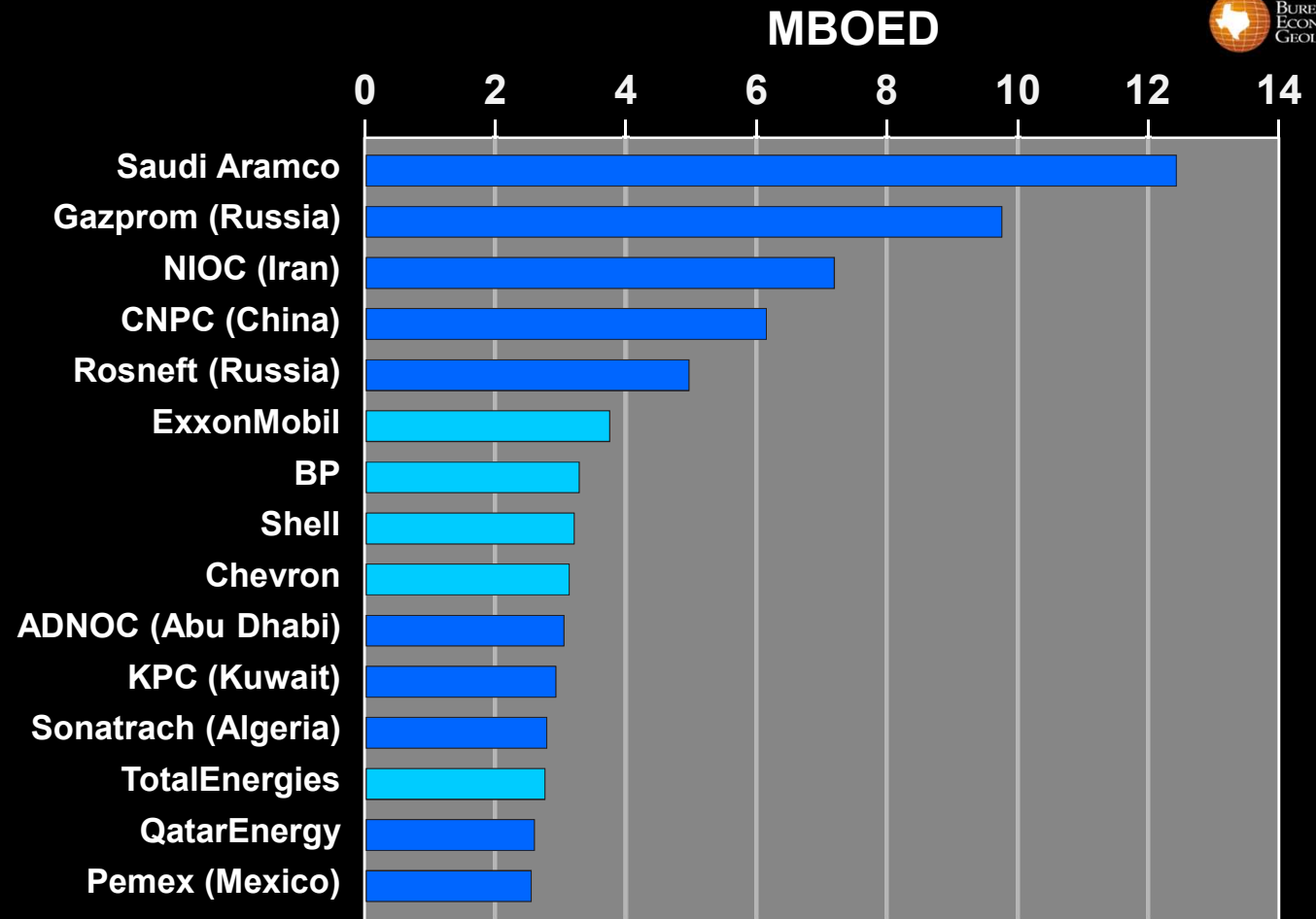
Global Transition

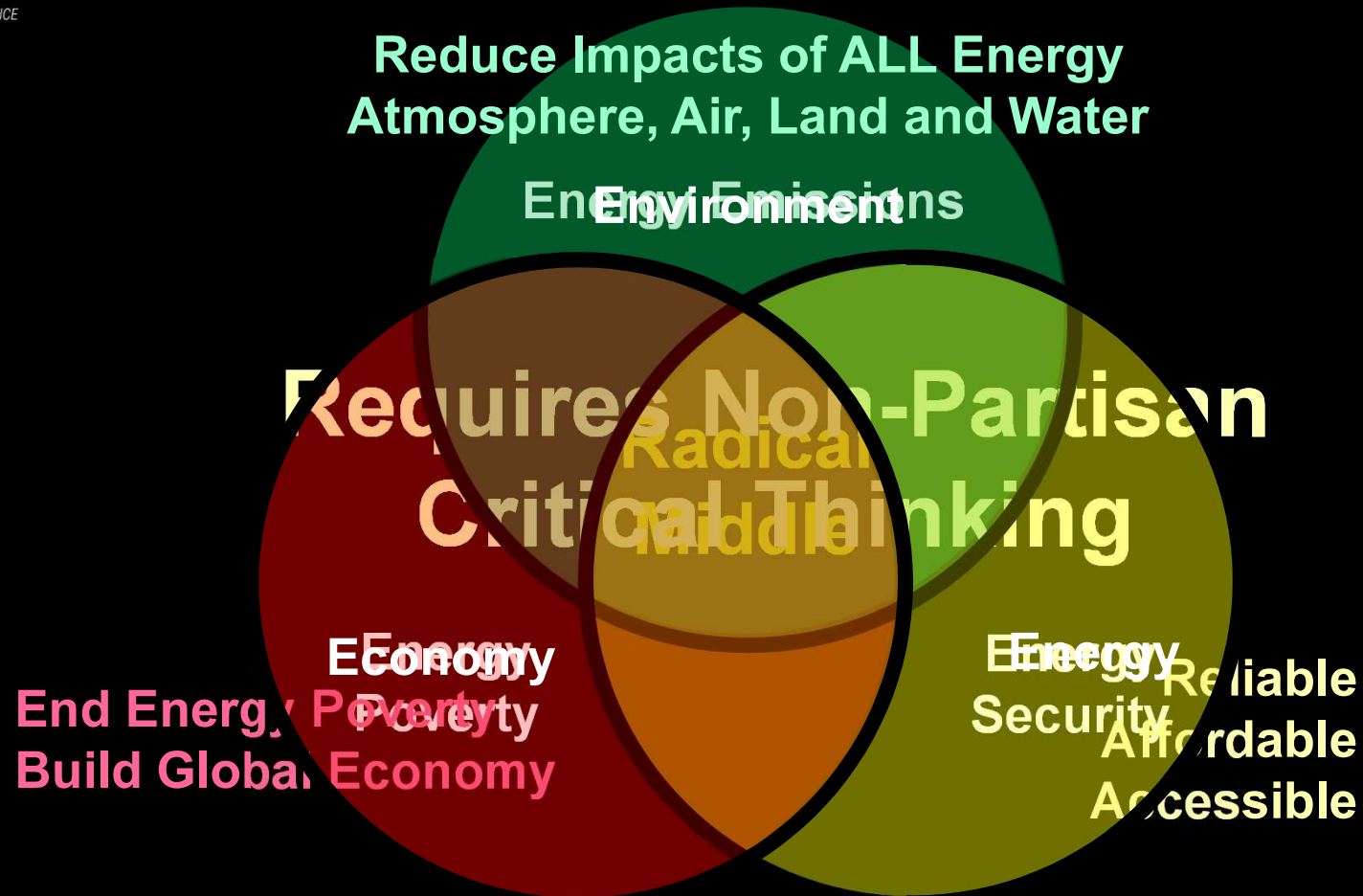
25% Renewable



Biggest Oil and Gas Producers 2021

■ NOCs*
■ IOCs





TEDx The Dual Challenge

Energy and Environment



<https://www.youtube.com/watch?v=hnT-PYHaSxA>

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PBS *Energy Switch*

An Energy and Climate Talk Show



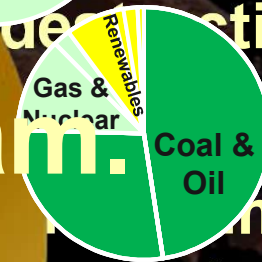
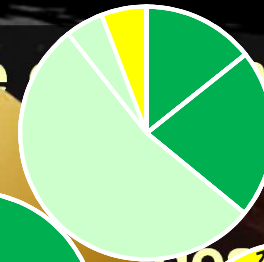
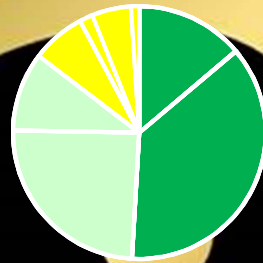
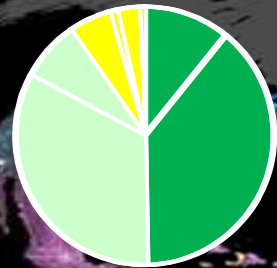
The Energy and Climate Talk Show with America's Leading Experts

WATCH FULL EPISODES
ON PBS.ORG

Streaming September 4, 2022 on PBS.org



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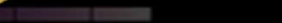
...we act as one team.
Together, we better the world.



Emerging



Developing



Developed



BUREAU OF
ECONOMIC
GEOLOGY

*Where Energy, Environment
and Economy Converge*

www.beg.utexas.edu

Switch Energy Alliance

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**Thank you
for what
you do**

