

Energy Security



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Energy Security, National Security, and Geopolitics

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Outline

- Introductions
 - Me, and
 - My perceptions
- Methodology for energy and national security: geopolitics, geo-economics and geo-technology
- Disruptions of 2020
- Six “Marks” of Energy Security
- Toward a broader concept of Energy Security

Introduction

- [Who am I?](#) What's my background?
 - Department of State: Foreign Service Officer (Econ cone) 32 years
 - US Ambassador to Azerbaijan and Bosnia and Herzegovina
 - Deputy Assistant Secretary of State for European Affairs, and International Organization Affairs
 - Office of the Director of National Intelligence: Senior intelligence officer almost 8 years – National Intelligence Officer for Europe
 - Think tank scholar
 - US Institute of Peace
 - Brookings Institution
 - Non-resident Senior Fellow Center on United States & Europe
 - GMU Distinguished Visiting Professor
 - POGO 750 (PUBP) Geopolitics of Energy Security (8X)
 - PUBP 570 Advanced Skills for Policy Professionals: Policy Communication for Executive Leadership (7X)
 - PUBP 655 State and Institution Building (1X)

Introductions

- What's my background?
 - Lecturer
 - Foreign Service Institute – Caucasus, European energy
 - National Defense University – Joint Forces Staff College
 - ENCORE Learning – South Caucasus, Balkans, and Energy Security and US Foreign Policy
 - Co-Director GMU Center for Energy Science and Policy (CESP)
- Affects my approach to this topic
 - Analytical and fact-based practitioner
 - Transdisciplinary – especially disciplines beyond my competence
 - Beyond methodology and analysis– “So what?”
 - Prescriptive, not descriptive

My Experience

- On energy security
 - Diplomatic practitioner and intel analyst, NOT an energy academic
 - Accomplishing US energy policy objectives in geopolitical setting.
 - Markets and private sector matter
 - China/Belt and Road Initiative (skeptical), but.... don't forget about India
 - Russia/Saudi Arabia/OPEC/OPEC+
- On national security
 - Broad sense of national security – foreign and domestic
 - Infrastructure – physical and virtual
 - Sustainability and resilience to natural and man-made threats
- US strategic energy interests change
 - Global economic landscape in flux
 - Changes in international energy outlook
- Need new analysis address sustainability and resilience
 - Molecules vs electrons -- electricity matters/technology matters
 - Must think hybrid energy systems

Multidisciplinary Approach – Mind the Silos

“

You have to realize the truth of biologist Julian Huxley’s idea that “Life is just one damn relatedness after another.” So you must have the models, and you must see the relatedness and the effects from the relatedness.

— Charlie Munger

My Approach

- Teaching/learning experience centered on:
 - data/information – knowing where to find it
 - knowledge/expertise – some things but not everything
 - wisdom/experience – connect (carefully) the dots
 - prescriptive analysis
- Understanding [ignorance](#).
 - View “...ignorance as ‘regular’ rather than deviant....”
- Try [Second-Order Thinking](#).
 - Second-order thinkers, “..., think in terms of interactions, time, and system dynamics.”
 - Need multidisciplinary engagement
- All this requires “[active listening](#)”

Farnam Street Learning Community: Learning Things that Don't Change

“And yet when you step back and **look at the information we consume** — what we're using as inputs into our minds — we discover that **most of it doesn't stand the test of time.**

Every incentive in today's world is to **create something that's an immediate hit.** Everything points people in the wrong direction. “Thought leaders” and “experts” **make everything seem so easy.** They tell us how we can “hack” our way to learning a new language, developing habits, acquiring knowledge, and everything else under the sun. They **give us the mental sugar and watch in amazement as our response is to click Like, Share, and Retweet.** They misinterpret this feedback as a **sign that they are doing something amazing.** “

Geopolitics

19th Century Idea Refitted for the 21st Century

Things that Don't Change

Sir Halford John
Mackinder
1861-1947

(Note: Died day before
President Truman
announced what
became the Marshall
Plan)



Geopolitics of Geography – Who was Halford Mackinder?

Victorian

Imperialist



Geographer

Disruptive

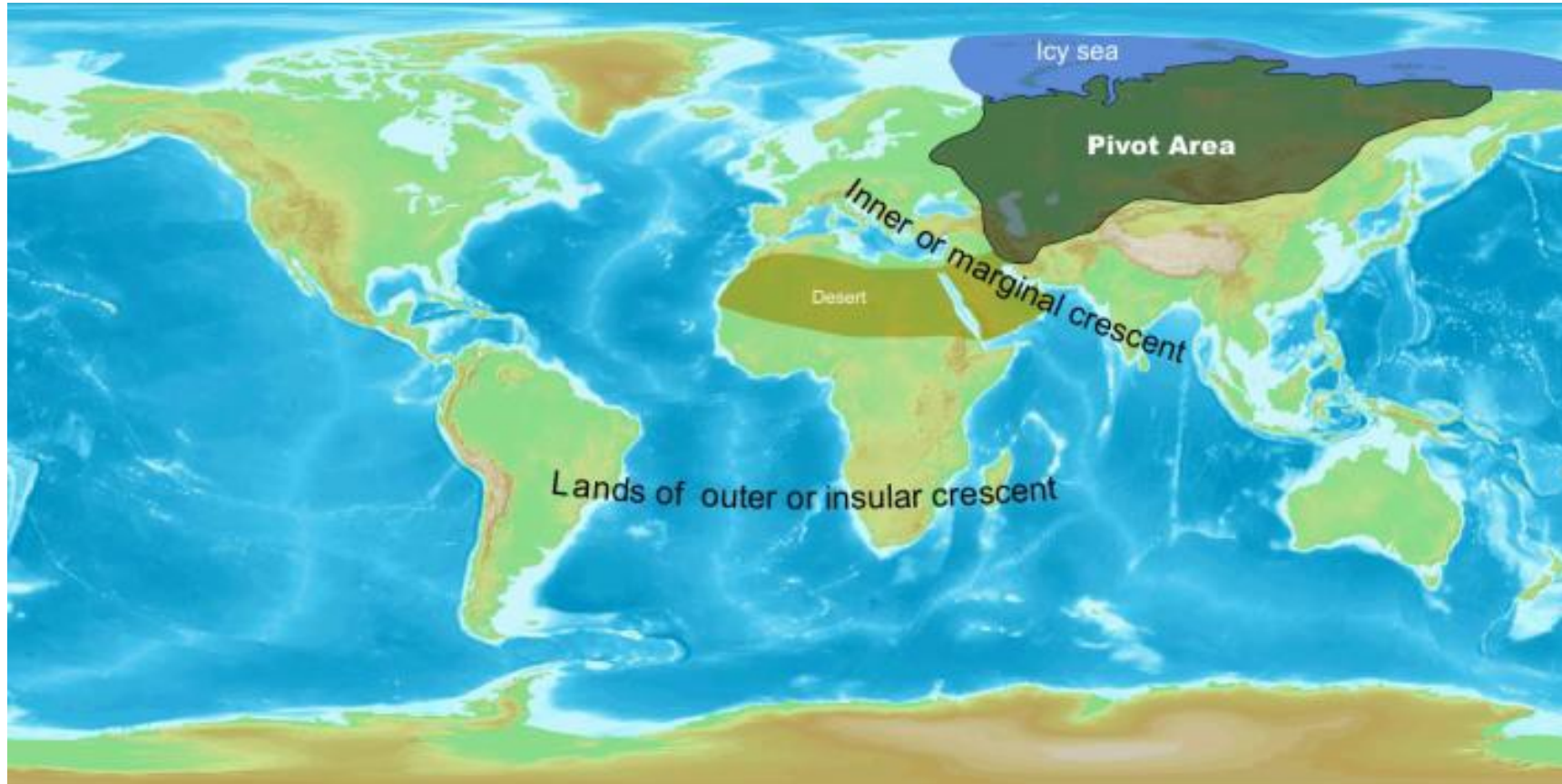
Pre-Mackinder British Imperial Strategy

- Control of the seas
- Strong navy
 - Suez Canal
 - Coaling stations – infrastructure and supply chain.
- Coal as a fuel
 - See “Fueling mobility: coal and Britain’s naval power, c. 1870-1914”
<https://core.ac.uk/download/pdf/83937265.pdf>
- Dominant naval technology

H.J. Mackinder's Framework

- According to Mackinder, the Earth's land surface was divisible into:
 - The **World-Island**, comprising the interlinked continents of [Europe](#), [Asia](#), and [Africa](#). This was the largest, most populous, and richest of all possible land combinations.
 - The **offshore islands**, including the [British Isles](#) and the [islands of Japan](#).
 - The **outlying islands**, (Outer or Insular Crescent) including the [continents](#) of [North America](#), [South America](#), and [Australia](#).
- The **Heartland** lay at the center of the world island, stretching from the [Volga](#) to the [Yangtze](#) and from the [Himalayas](#) to the [Arctic](#).
- [Mackinder's Heartland was the area then ruled by the Russian Empire and after that by the Soviet Union, minus the area around Vladivostok.](#)
 - Last sentence of 1904 article discusses the possibility that China replaces Russia
- See Mackinder Forum: A Forum for Geopolitics <http://mackinderforum.org/>

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."¹

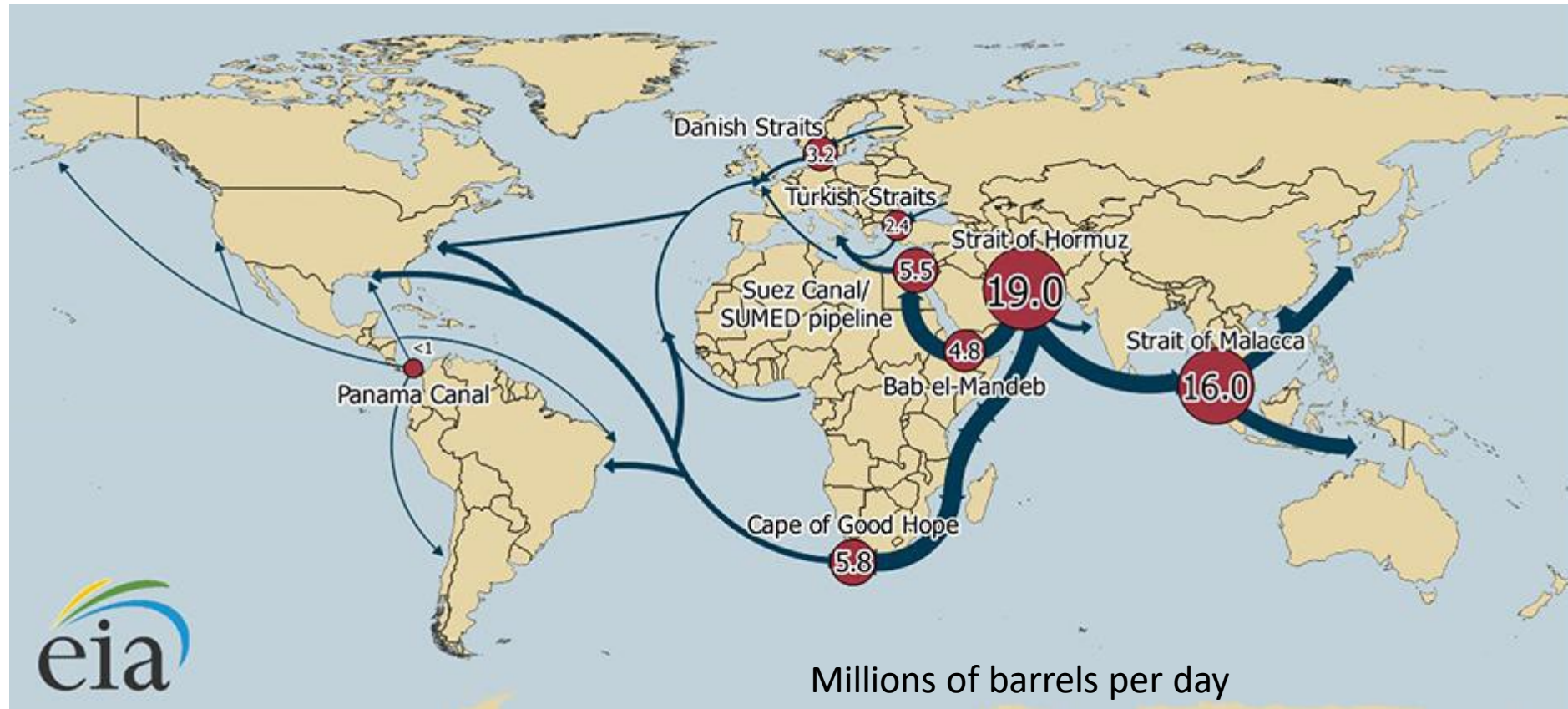
Insights Mackinder “Geopolitical Pivot of History”

- Historical sweep of mobility on land and sea
 - “The revolution commenced by the great mariners of the Columbian generation endowed Christendom with the widest possible mobility of power, **short of winged mobility.**” pg. 432
 - “...the century will not be old before all of Asia is covered with railways.” pg. 434
 - Russia: “The full development of her modern railway mobility is merely a matter of time. Nor is it likely that any possible social revolution will alter her essential relations to the great geographical limits of her existence.” pg. 436
- China: “Were the Chinese, for instance, organized by the Japanese, to overthrow the Russian Empire,” pg. 437

20th Century "Pivot Area/Heartland"



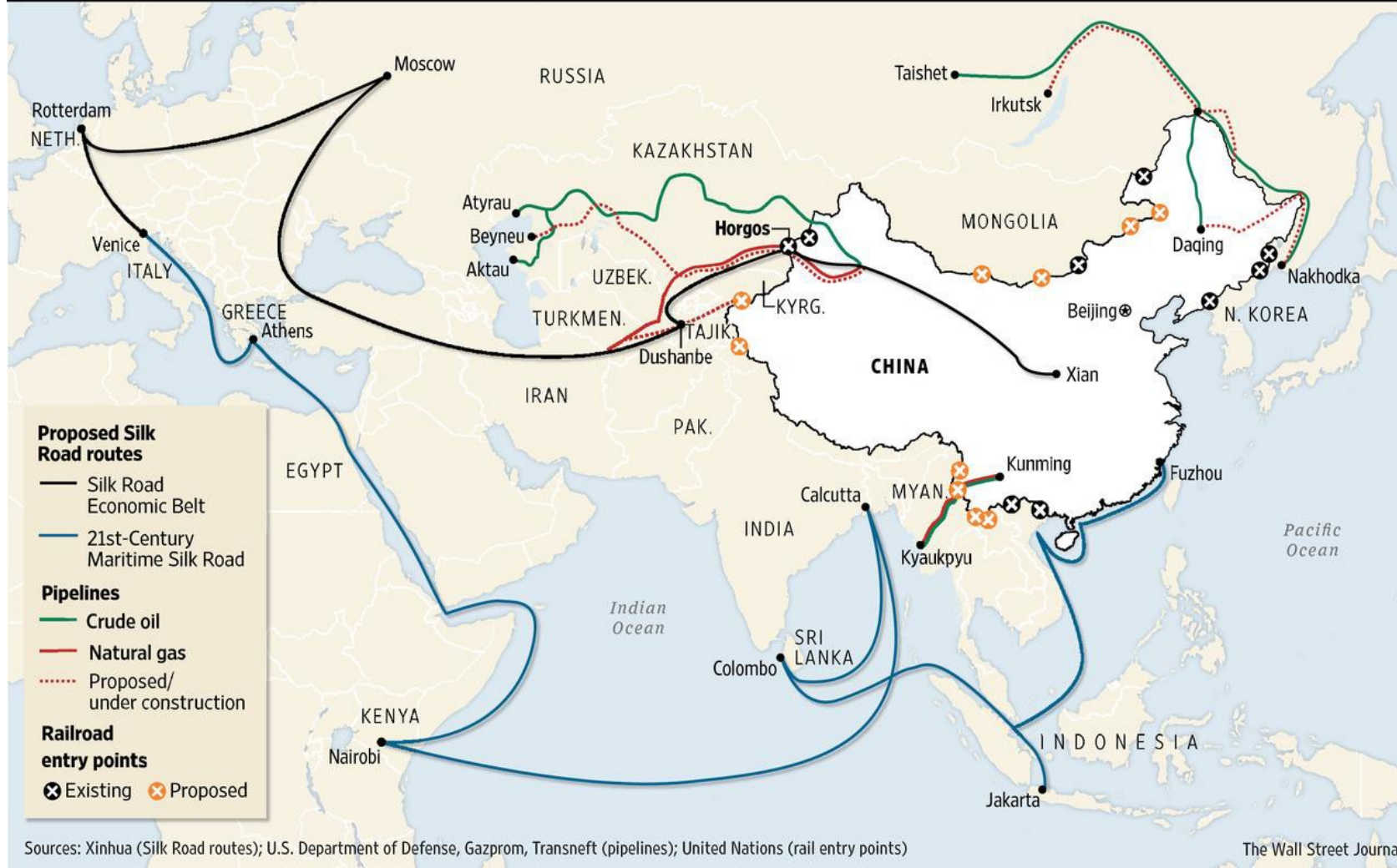
Petroleum Transit Volumes: 20th Century Mackinder



<https://www.brinknews.com/world-oil-trade-hinges-on-these-8-vulnerable-chokepoints/>

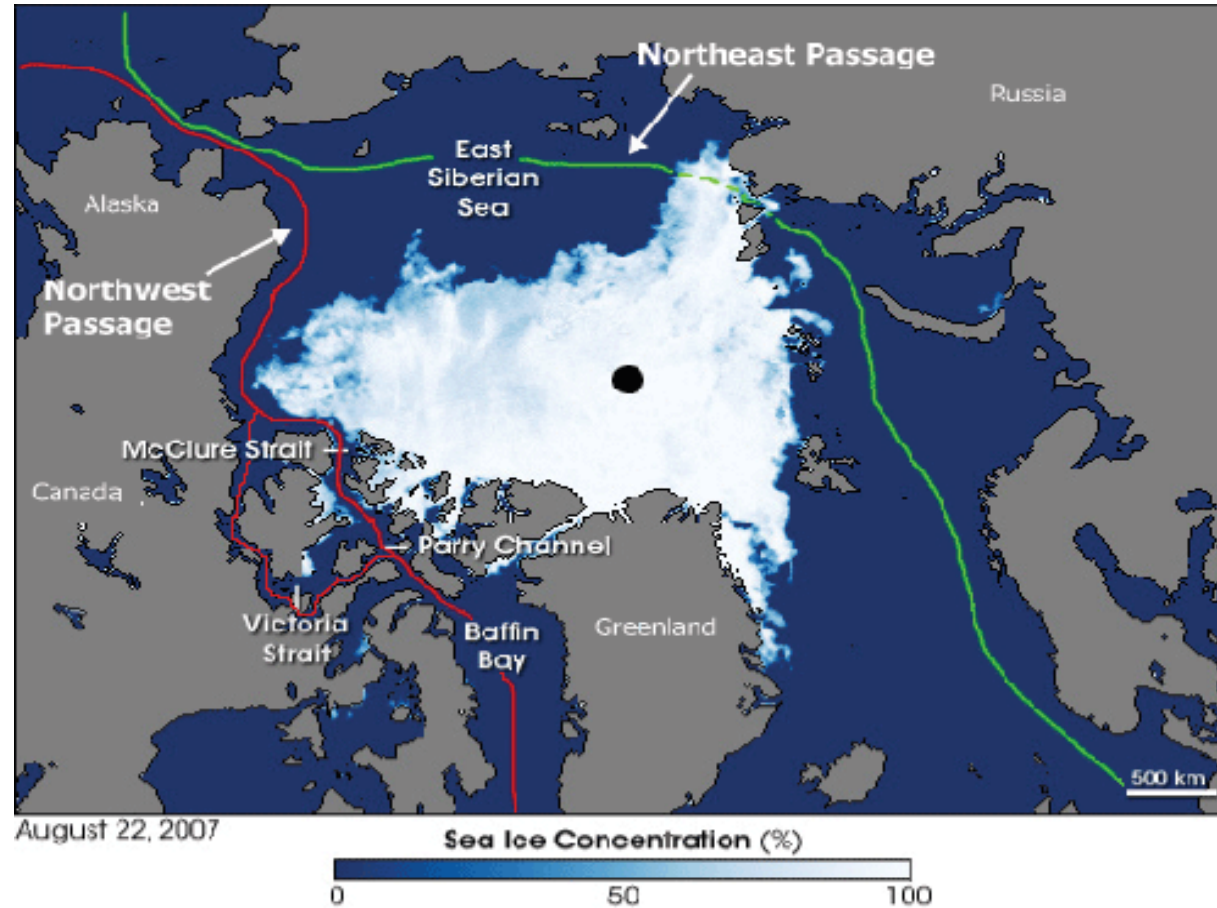
Belt and Road Initiative: 21st Century Mackinder

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



Northwest and Northeast Passages

Northern Sea Route: 21st Century Mackinder



Geopolitics of Renewable Energy

Key Points:

Impact on global politics and state power

Share of renewables of total primary energy is

between 30-45% in 2035/2040, and
between 50-70% in 2050

New World of Geopolitics

- Critical Materials Supply Chains
 - OPEC for cobalt/rare earths/other minerals?
 - Raw vs. processed materials
- Technology and finance
 - Different sources/uses of finance
 - Stricter controls on advanced renewable technology
- New “resource curse”
 - Producers of rare earth materials
 - Exporters renewables-based energy

New World of Geopolitics

- Electrical grids – super grids or micro grids
 - Cross border trade in electricity
 - Vulnerability to cyber attack – era of “perpetual cyber conflict”
- Reduced demand for oil and gas
 - Good for importers
 - Bad for exporters
- Avoid climate change dangers, esp. in Africa
- Sustainable energy access → sustainable dev

Bottom Line

“...it is worth noting that uncertainty does not necessarily mean conflict. There are reasons to believe that at least in the long term, **a global energy system dominated by renewable energy** will be more stable, peaceful and just than one dominated by fossil fuels and nuclear technology. **The geopolitical path towards this end state is, however, unknown.**”

-- from Geopolitics of Renewable Energy pg. 37

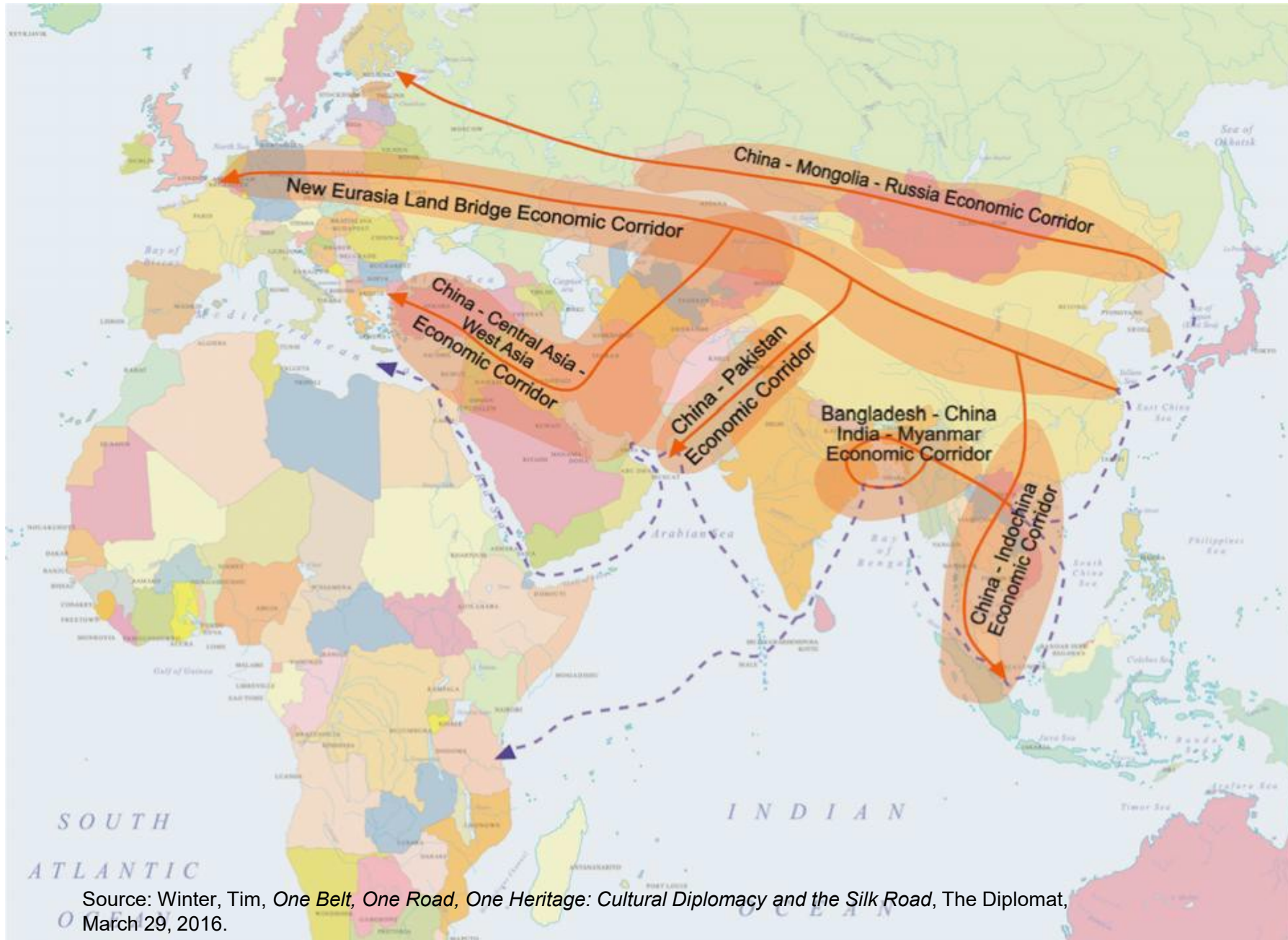
Geo-economics

From the 20th to the 21st Century

Belt and Road Initiative (BRI)

And

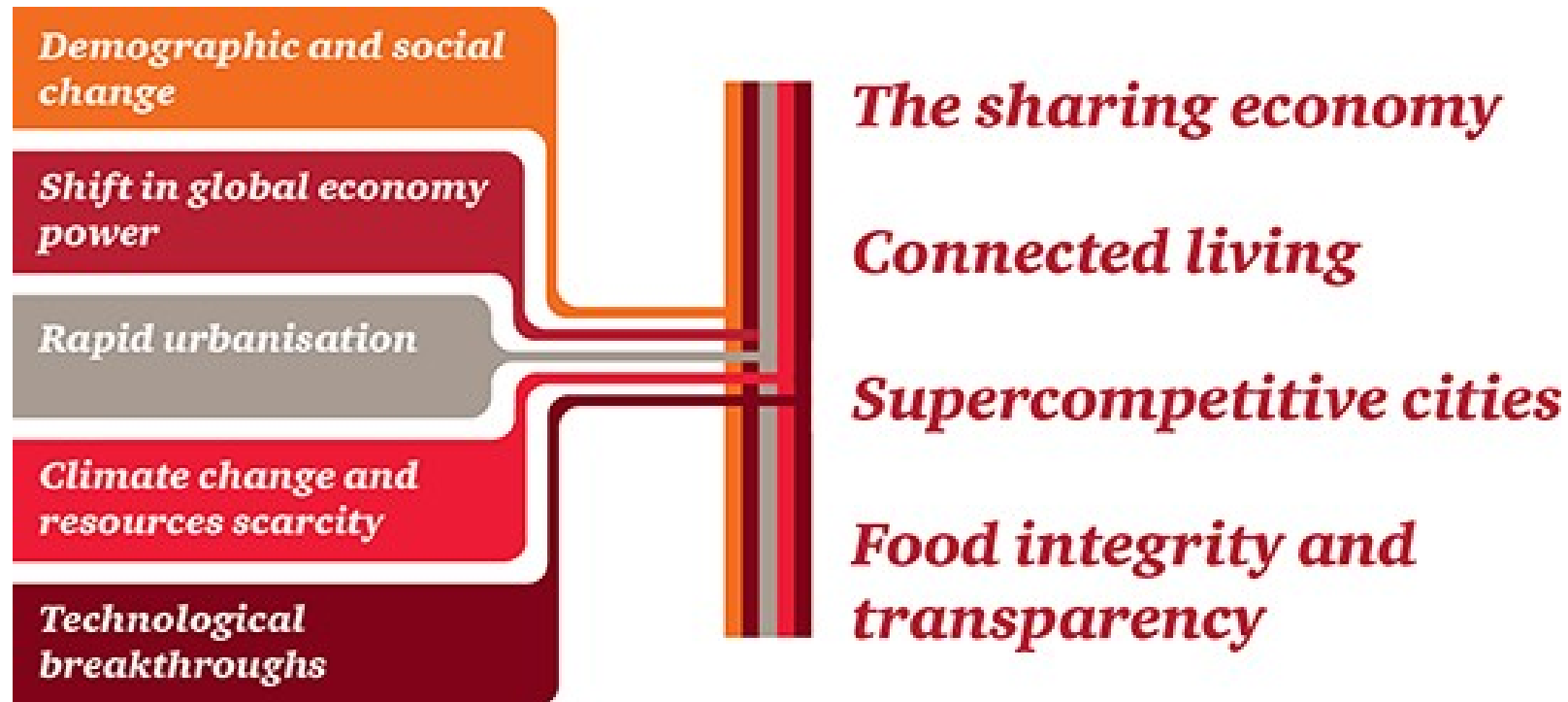
Megatrends



Source: Winter, Tim, *One Belt, One Road, One Heritage: Cultural Diplomacy and the Silk Road*, The Diplomat, March 29, 2016.

Megatrends Help Define Geo-Economics

(World Economic Forum)



National Security Threats According to 2016 National Intelligence Council (NIC) Study

- Extreme weather events and defense infrastructure
- Interstate conflicts over water and food
- Renewable energy (cyber) risks to decentralized power grids
- Cost of (military) base relocation due to rising sea levels
- Arctic ice melt requires naval presence in “high north”
- My adds:
 - Instability in rentier states deprived of oil and gas earnings
 - Instability in rentier states benefiting from minerals (especially rare earth minerals) necessary for renewables

Consequences of NIC Assessment

- Threats to the stability of countries (water disputes).
- Heightened social and political tensions → migration
- Adverse effects on food prices and availability.
- Increased risks to human health.
- Negative impacts on investments and economic competitiveness
→ geoengineering
- Stress on military ops and basing – Arctic warming

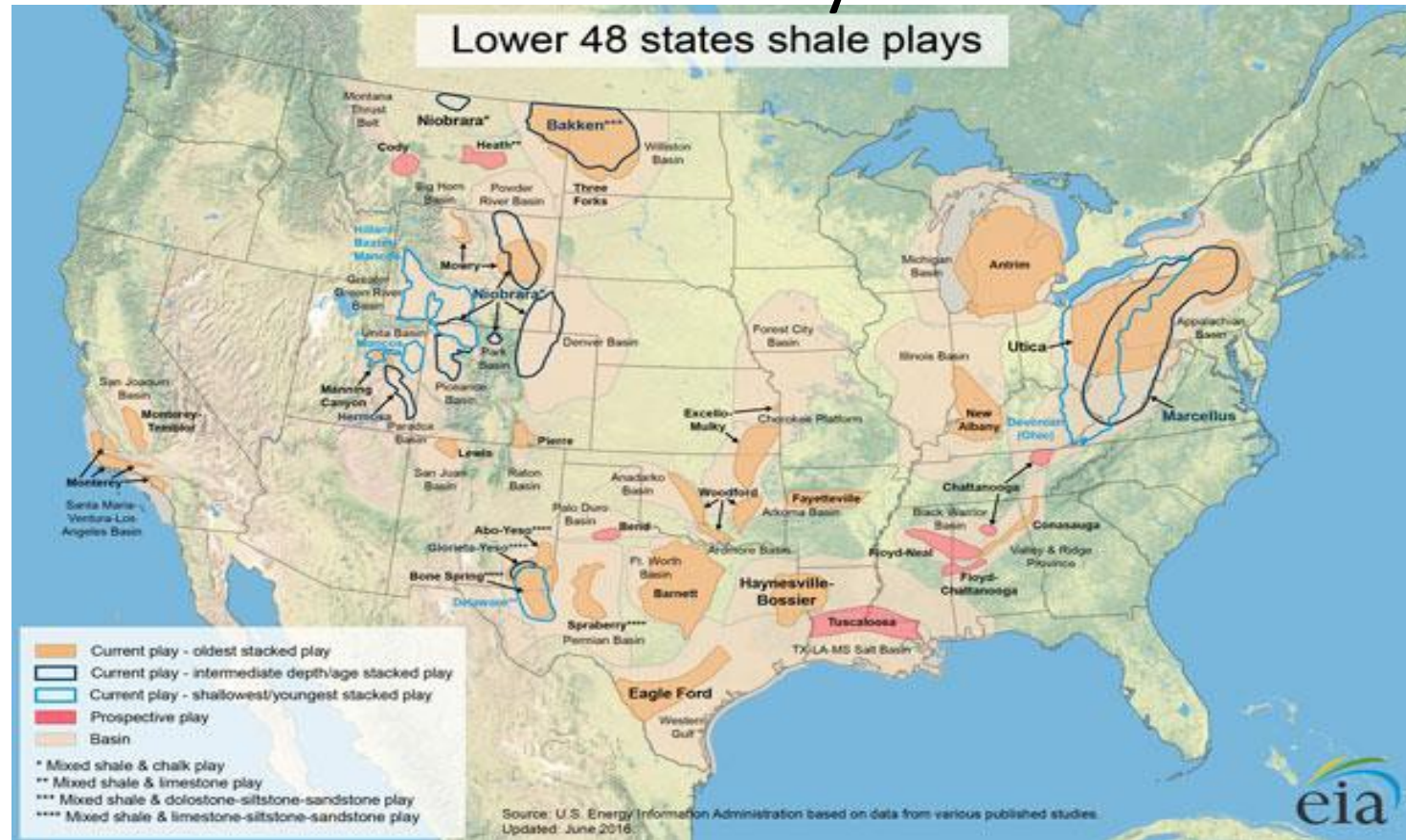
From “Implications for National Security of Anticipated Climate Change” 21 September 2016



Geo-technology

Importance of time, financing and appropriate technology

Geo-technology in 20th Century



“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

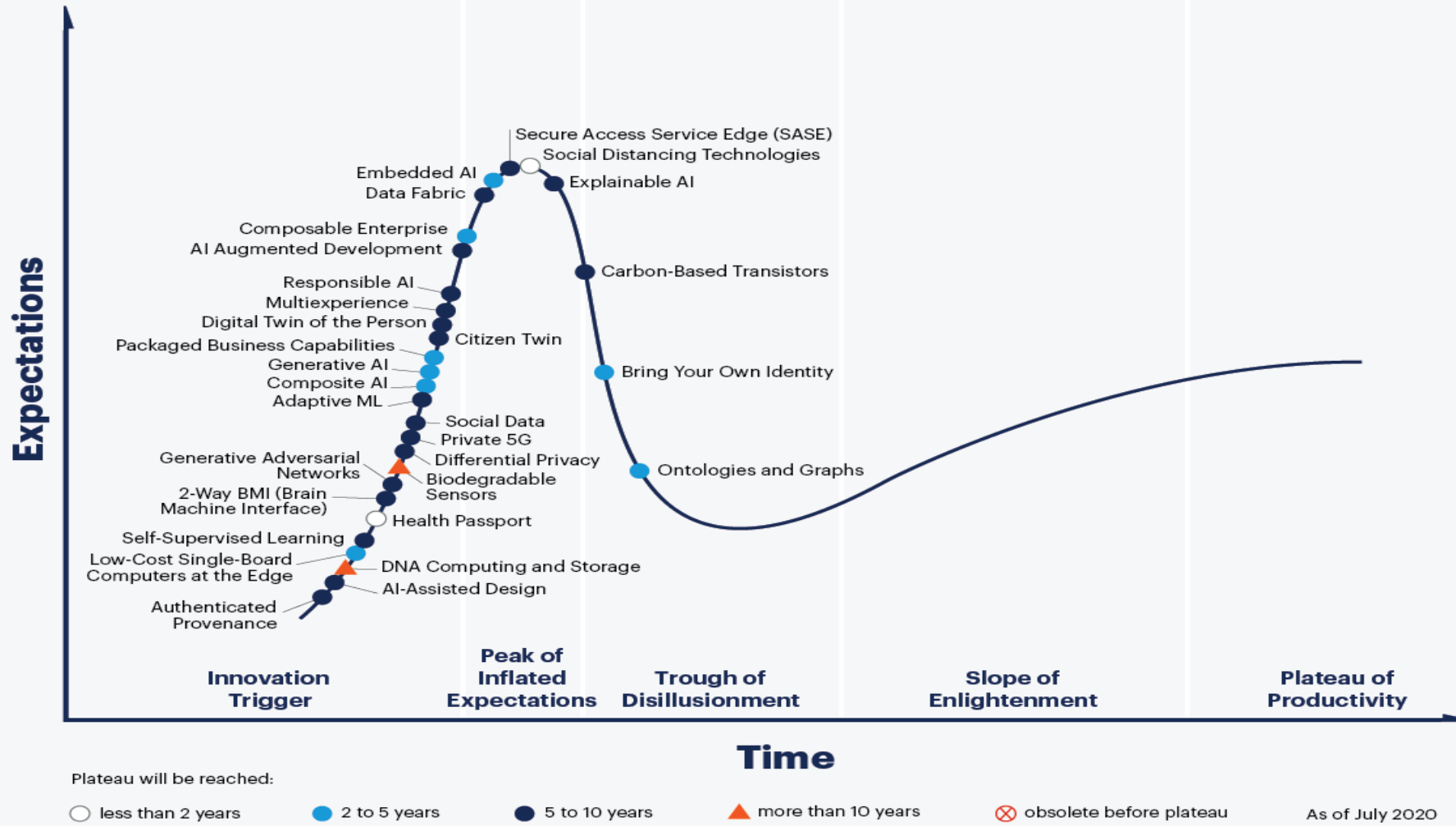
Technological Change

- Non-conventional oil and gas – stage II -- biofuels
- Renewables – wind and solar – storage & integration
- Efficiency gains – production and consumption
- Nuclear – move from unacceptable → acceptable
- Feasible carbon capture storage (sequestration)
 - De-carbonization – removing carbon from atmosphere
 - Enough to save coal?
- “Desalination”
- Black swans
 - Hydrogen
 - Disruptive fracking technologies
 - Non-transportation uses of petroleum – biofuel substitutes
- Cyber and AI → Vulnerabilities in energy grids

Critical Infrastructure Cyber Vulnerabilities

- More hybrid the energy system, the greater the cyber vulnerability
 - Coordination with the private sector
 - For private sector – tradeoff between efficiency vs security
- Need to be sensitive to degree of risk
 - Risk= threat X own vulnerability X consequences
- Adjust focus to supply chain
 - Look beyond the perimeter – gates, guns and guards
 - Need a multi-layer approach
- What's the backup -- need manual back-up

Hype Cycle for Emerging Technologies, 2020



gartner.com/SmarterWithGartner

Technology Shapes Vision for the Future (CSIS report)

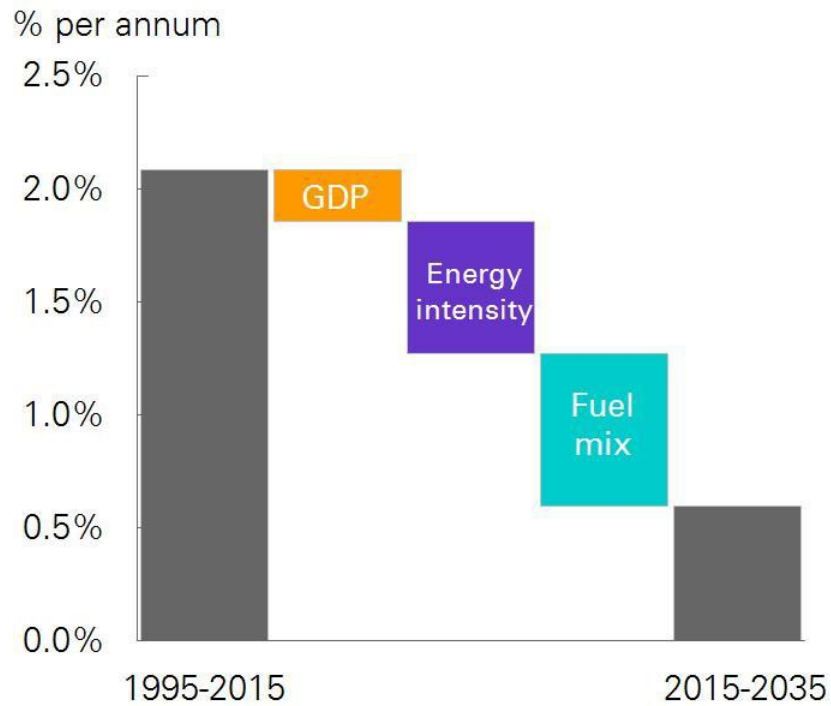
- Secure, low-carbon energy system
 - Long-term — decades
 - Policies that are effective and politically feasible
- Energy produced/delivered/consumed
 - Without releasing harmful greenhouse gases
 - Diversity of energy sources and suppliers
- **Alleviate geopolitical tensions**
 - Associated with competition for fossil fuel
 - Role of US “self-sufficiency” in this – positive or negative?
- Integrate energy security/climate change priorities
 - NB How to assist energy producing countries transition to low-carbon future?
 - Where is the private-sector [financing for low-carbon energy?](#)

The Public Policy Conundrum: Emissions + CO2 in Atmosphere

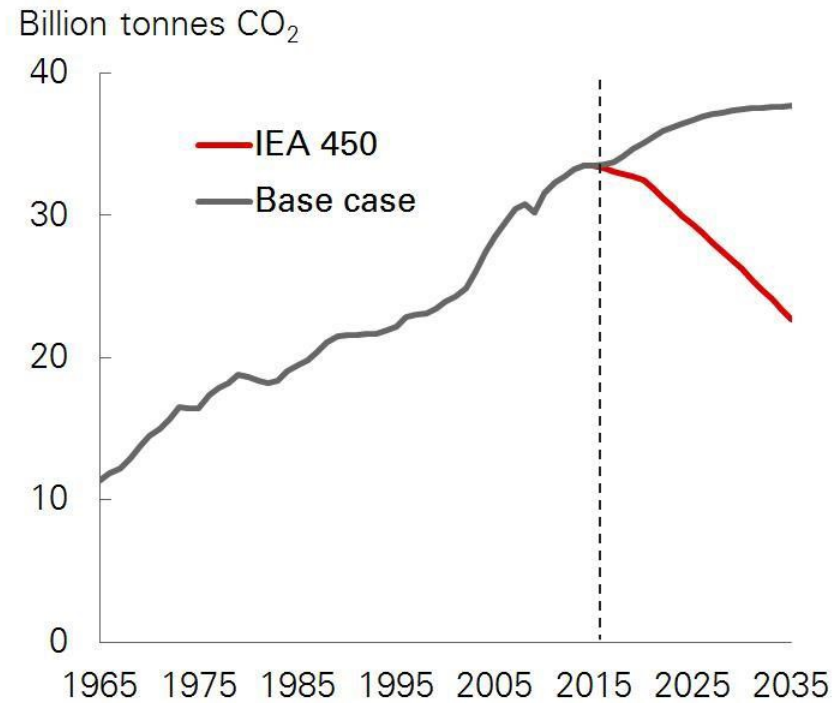


Carbon emissions

Contributions to slower growth of carbon emissions



Carbon emissions

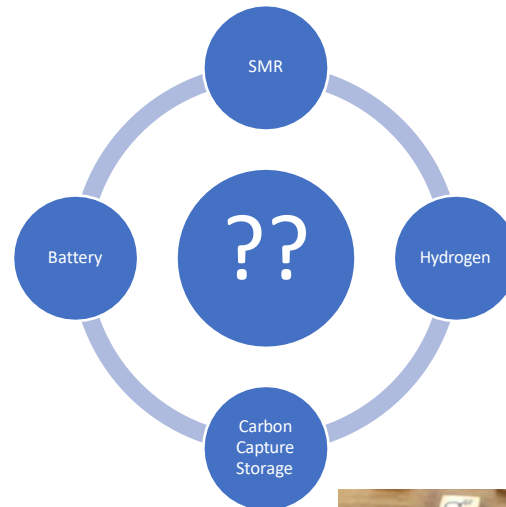


Time, Technology, Financing

“Give me a lever long enough and a fulcrum on which to place it, and I shall move the world.”



Archimedes



Disruptions in 2020

Understanding the World as It Is

Global Trends

Learning to Manage the Risks



Top 10 emerging risks

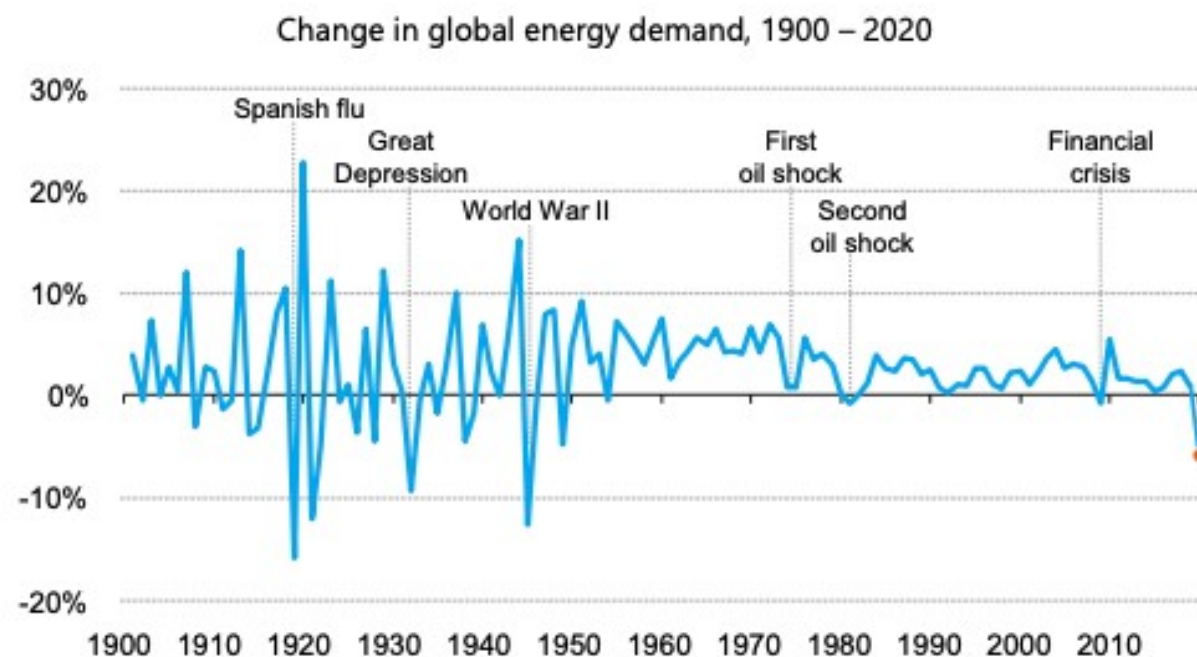


1. **Pandemics and infectious diseases (+7)**
2. Climate change (-1)
3. Cybersecurity risks (-1)
4. Geopolitical instability (-1)
5. Social discontent and local conflicts (-1)
6. New threats to security (+3)
7. Macroeconomic risks (+3)
8. Natural resources and biodiversity risks (-2)
9. Financial risks (+2)
10. Pollution (-3)

(Rank change on 2019)

Source: AXA 2020 Future Risks Report

Coronavirus: a once in century event for energy demand

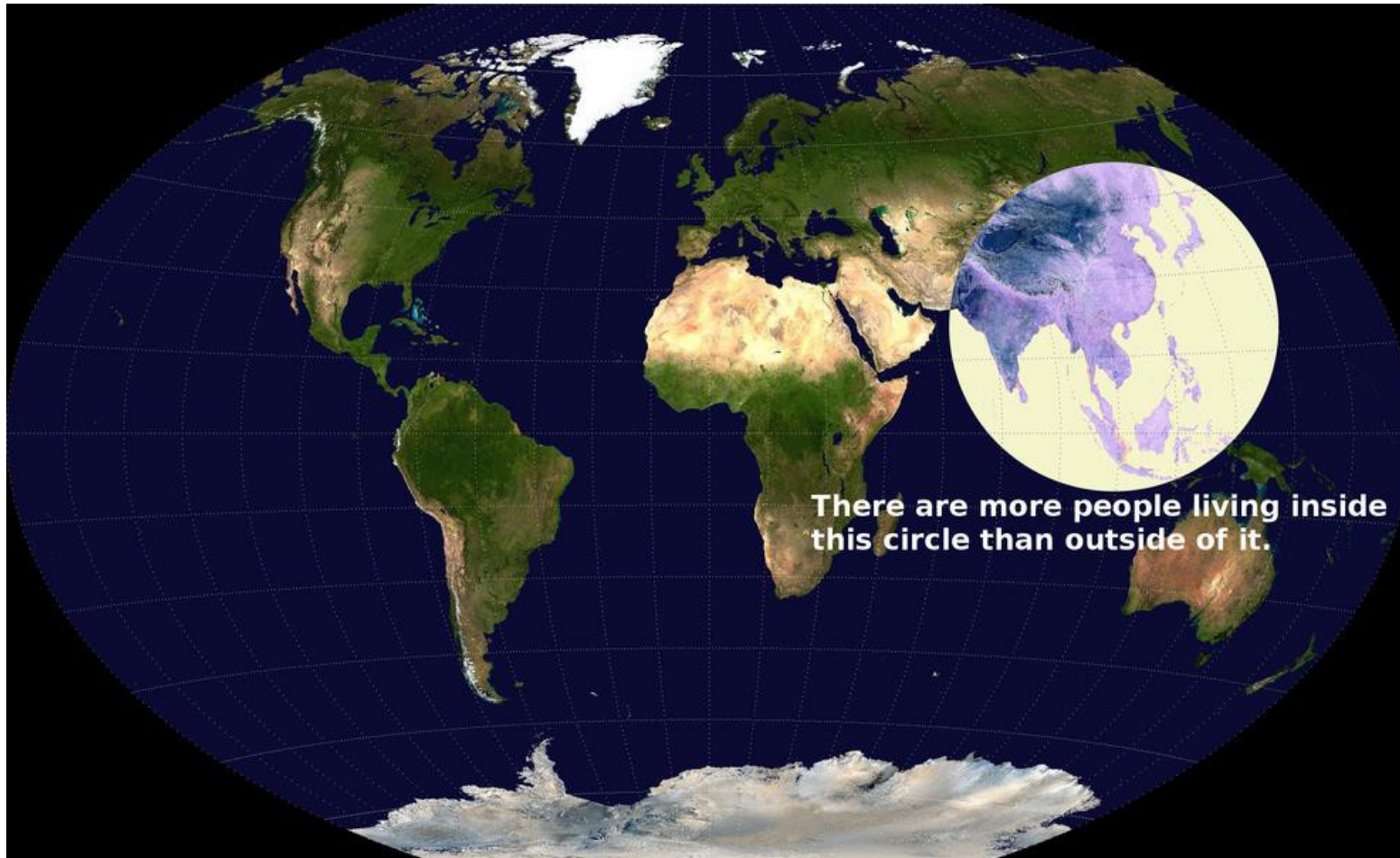


The shock to energy demand in 2020 is set to be the largest in 70 years. In our estimate, global energy demand declines by 6%, a fall seven times greater than the 2009 financial crisis.

Six “Marks” of Energy Security Today – and Outlook for 2021

(Learning Things That Don't Change)

#1 What Does This Say About Energy Security, National Security, and Geopolitics?

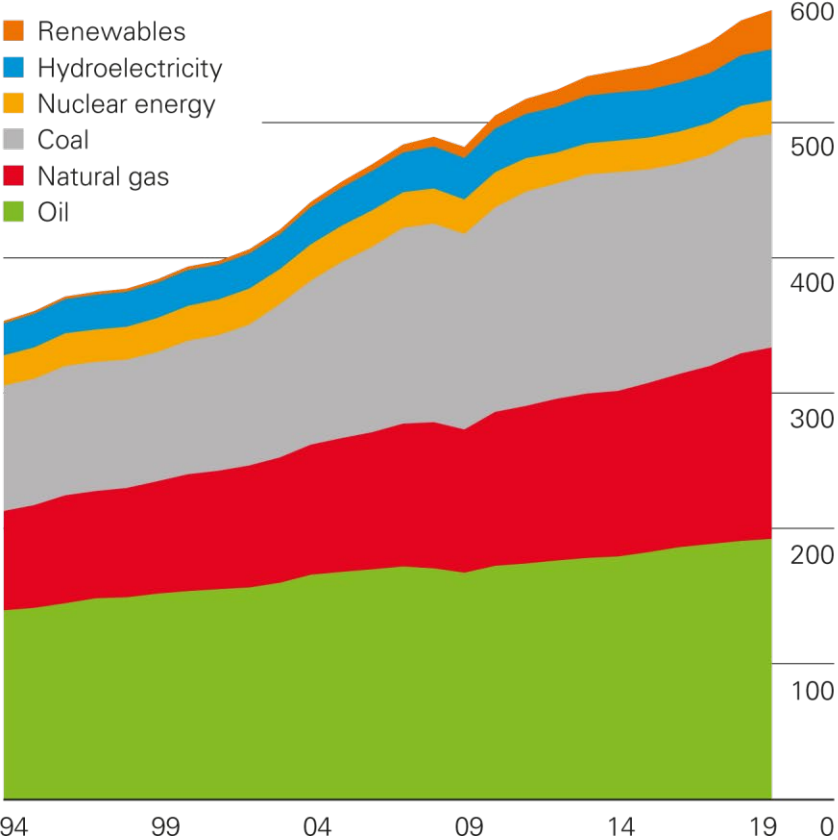


If the world were a village of 100, 61 would be Asians from Statoil Energy Perspectives

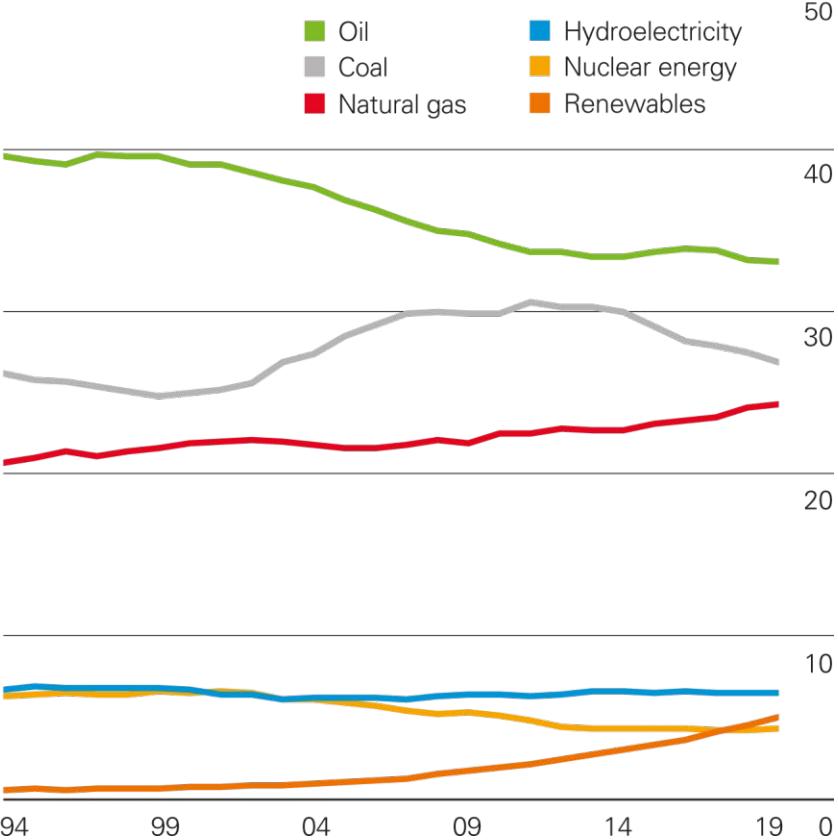
#2 Primary energy– It's a Carbon-based System

What it is

World consumption
Exajoules

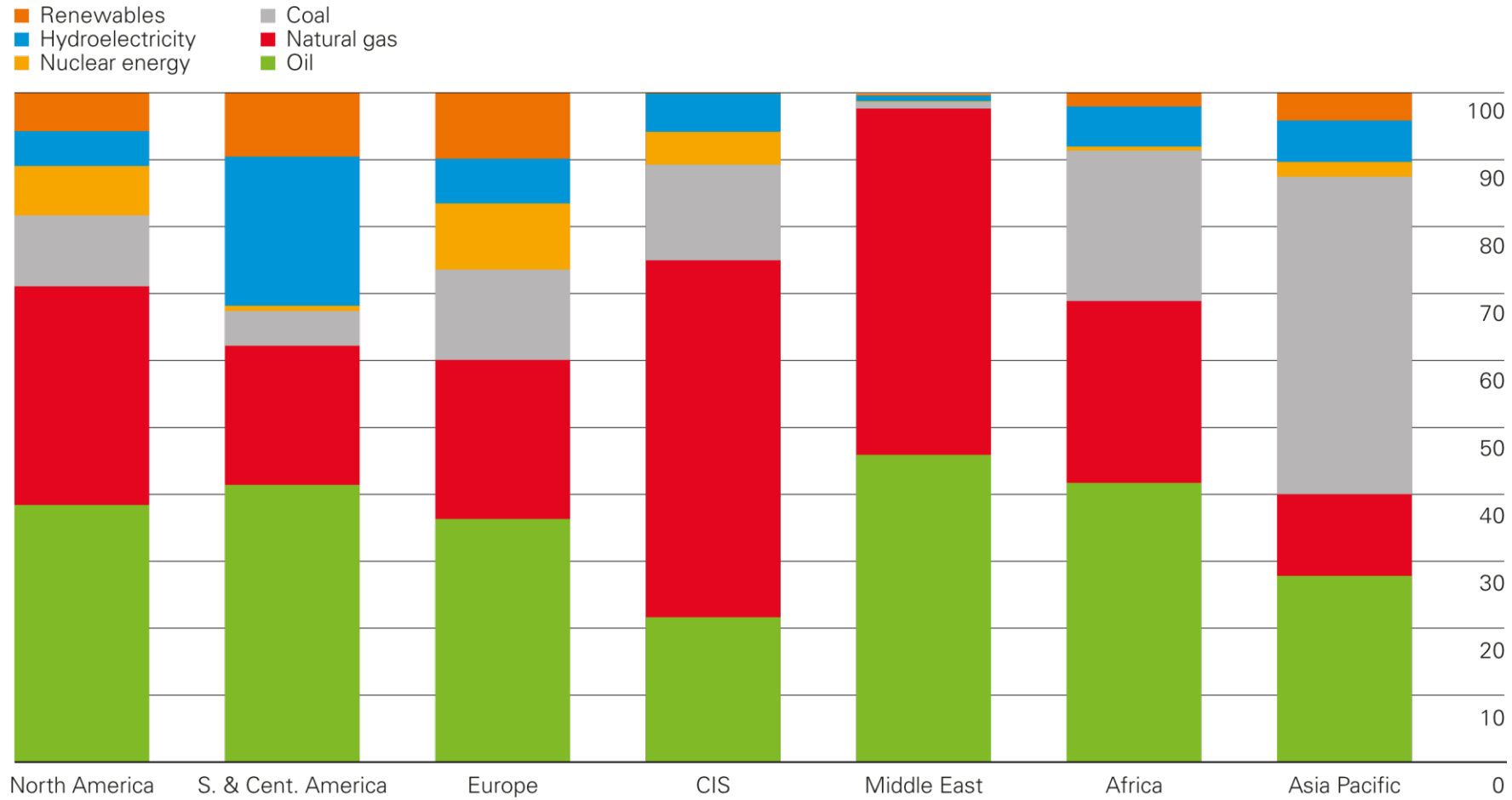


Shares of global primary energy
Percentage



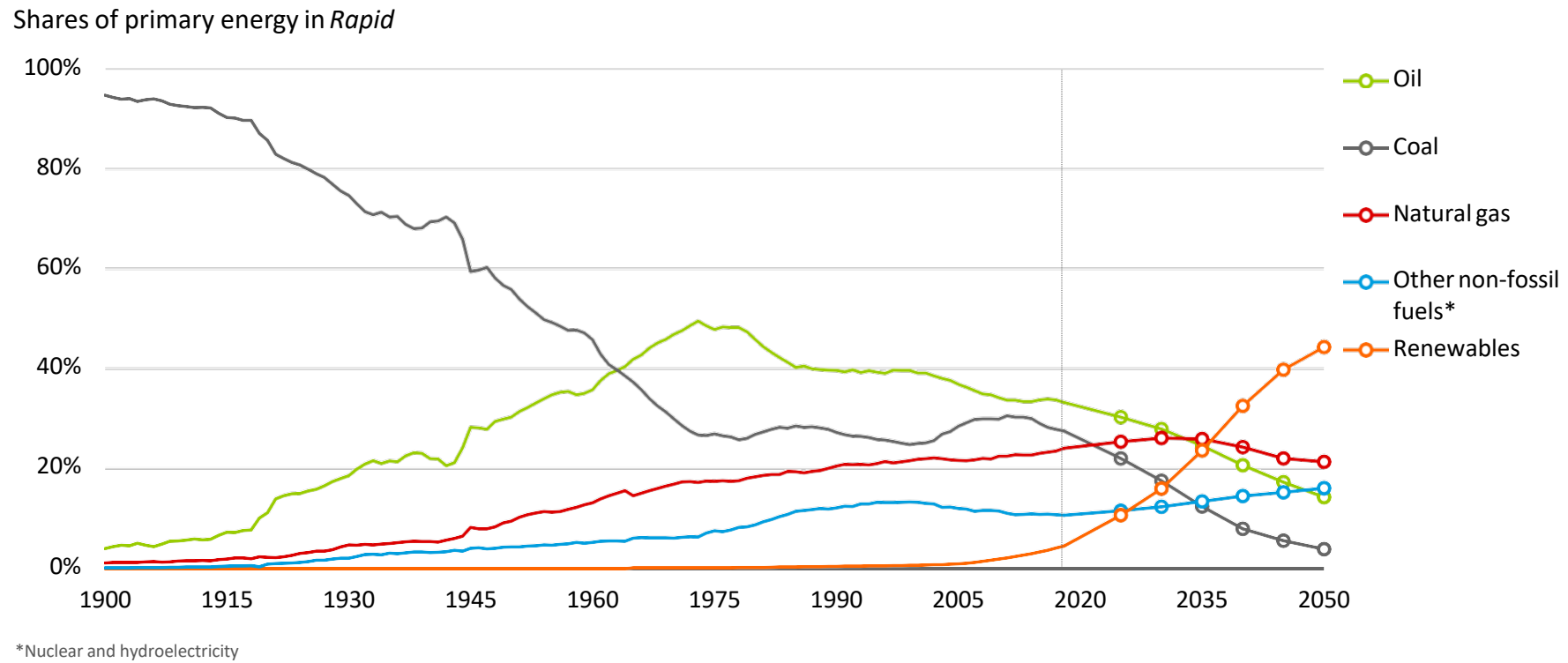
Regional consumption pattern 2019

Percentage



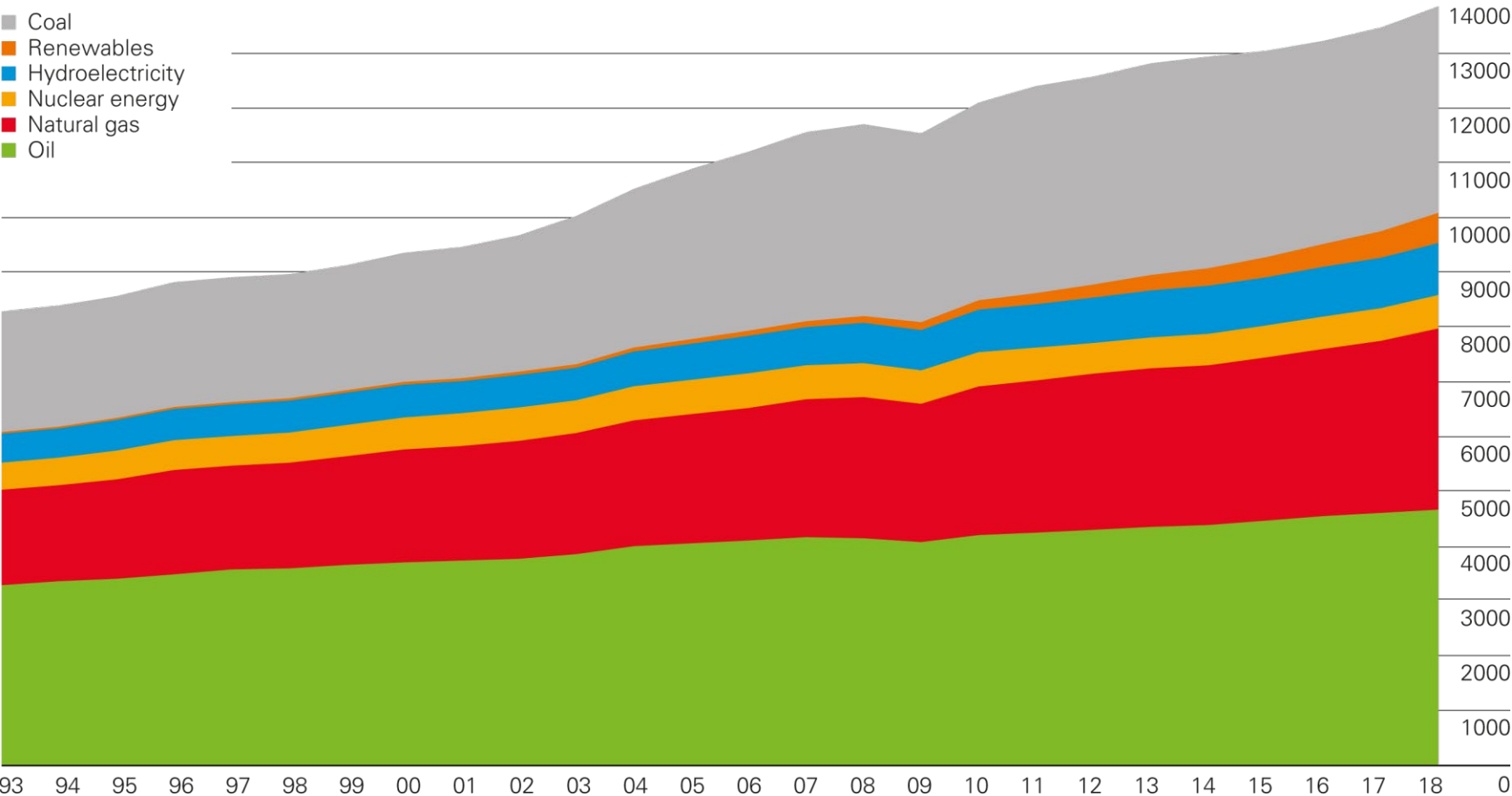
Changing structure of global energy system

What we
want it
to be



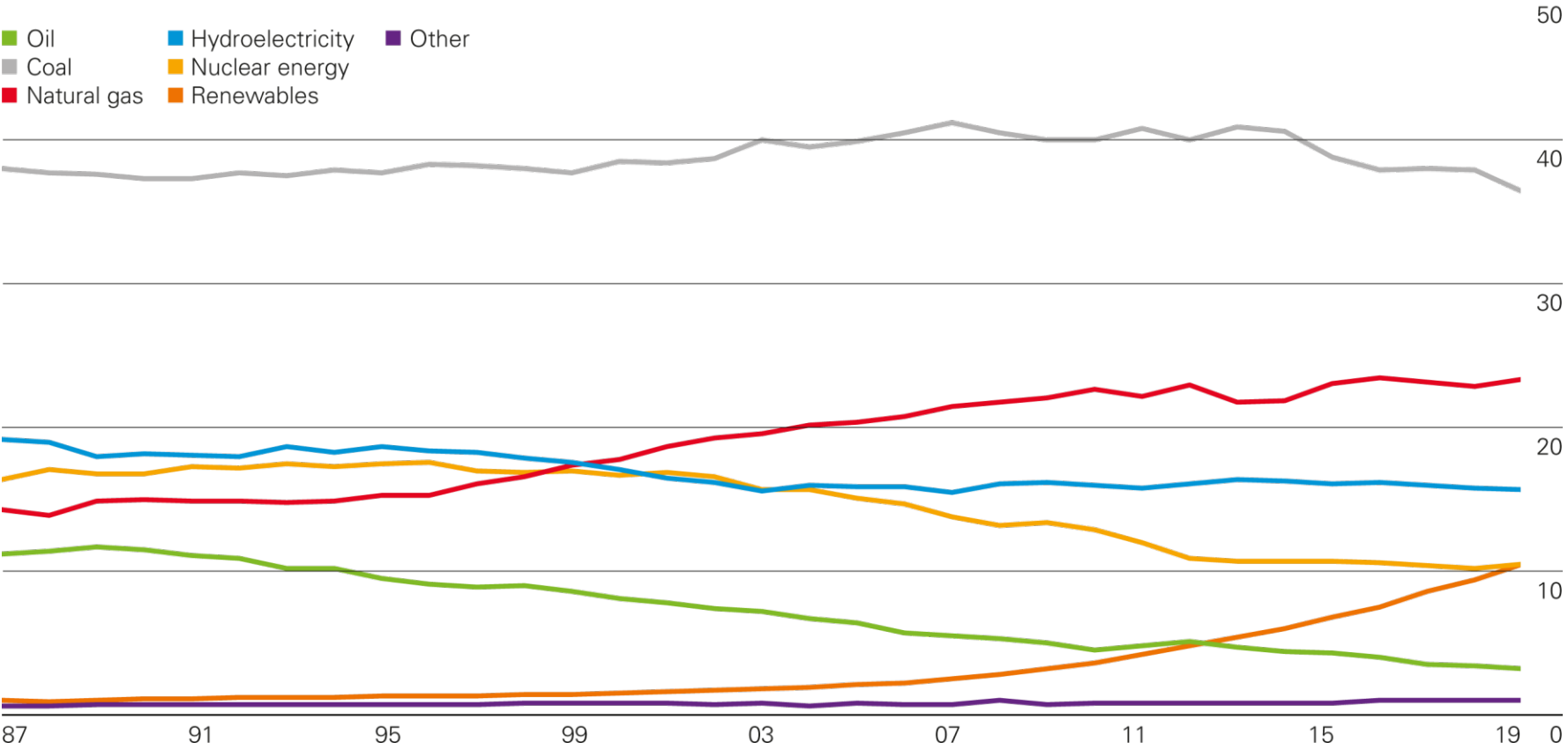
#3 – Focus on Gas Primary energy world consumption

Million tonnes oil equivalent



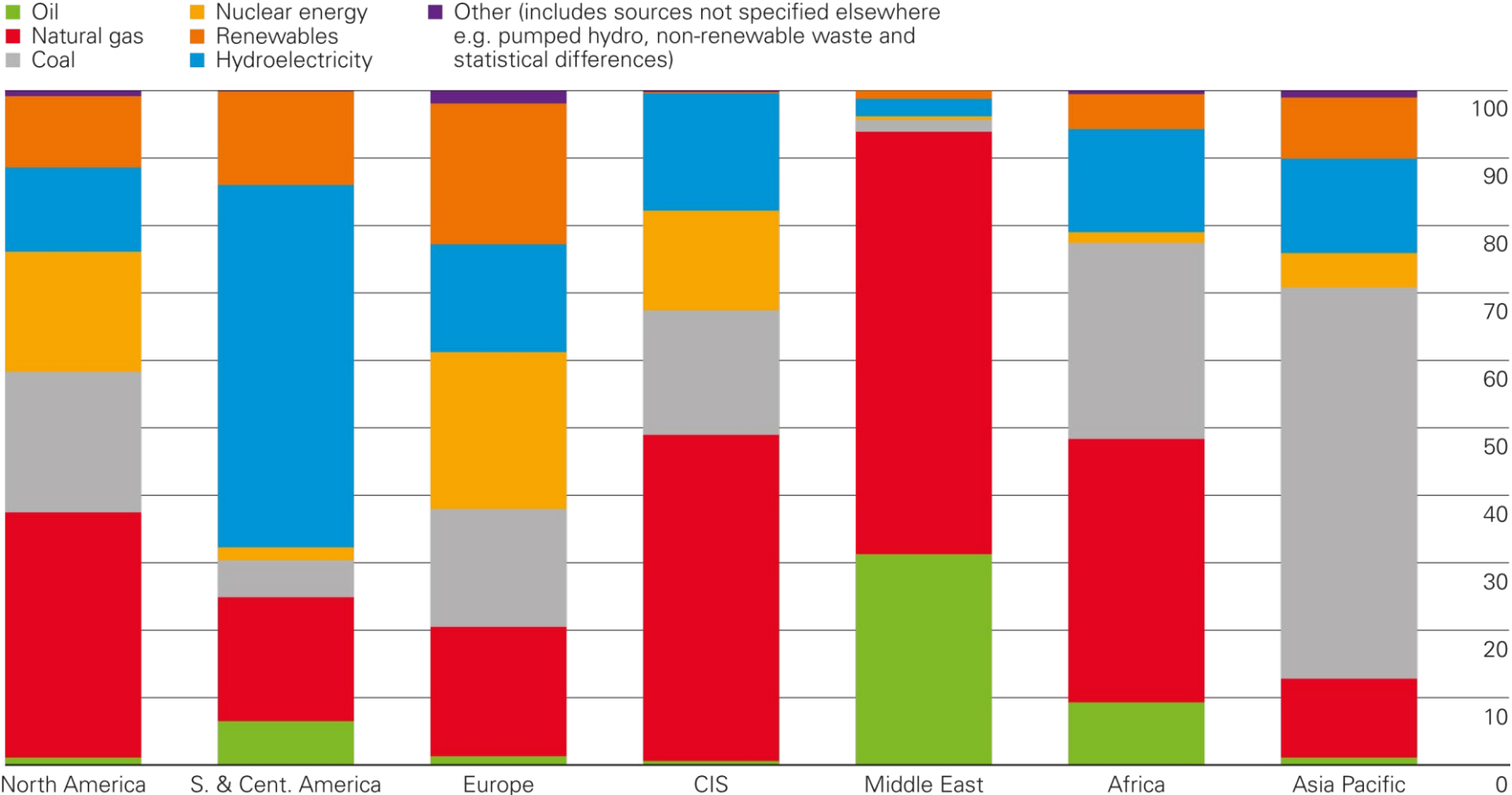
#4 Share of global electricity generation by fuel

Percentage



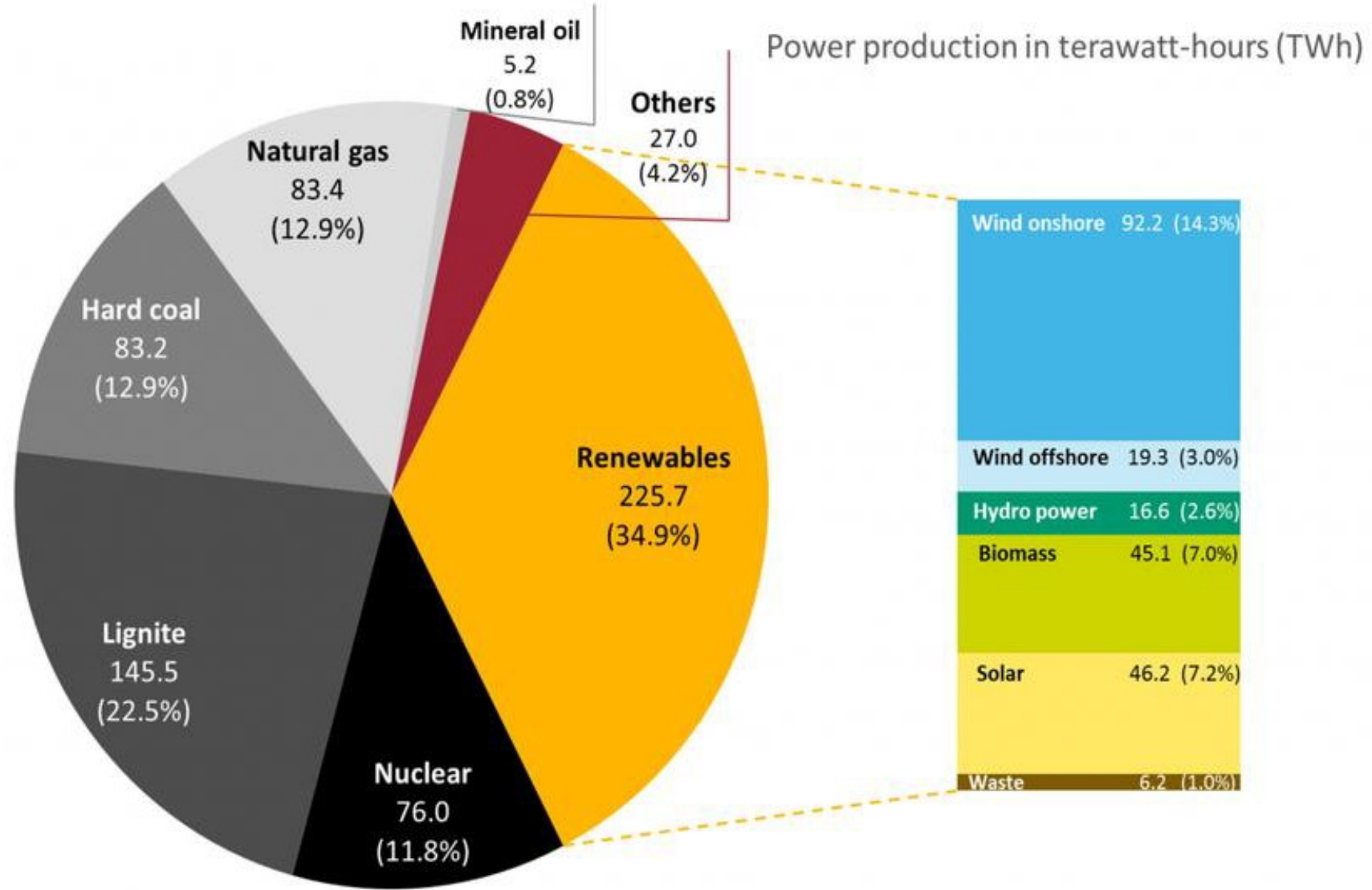
#5 Regional electricity generation by fuel 2019

Percentage



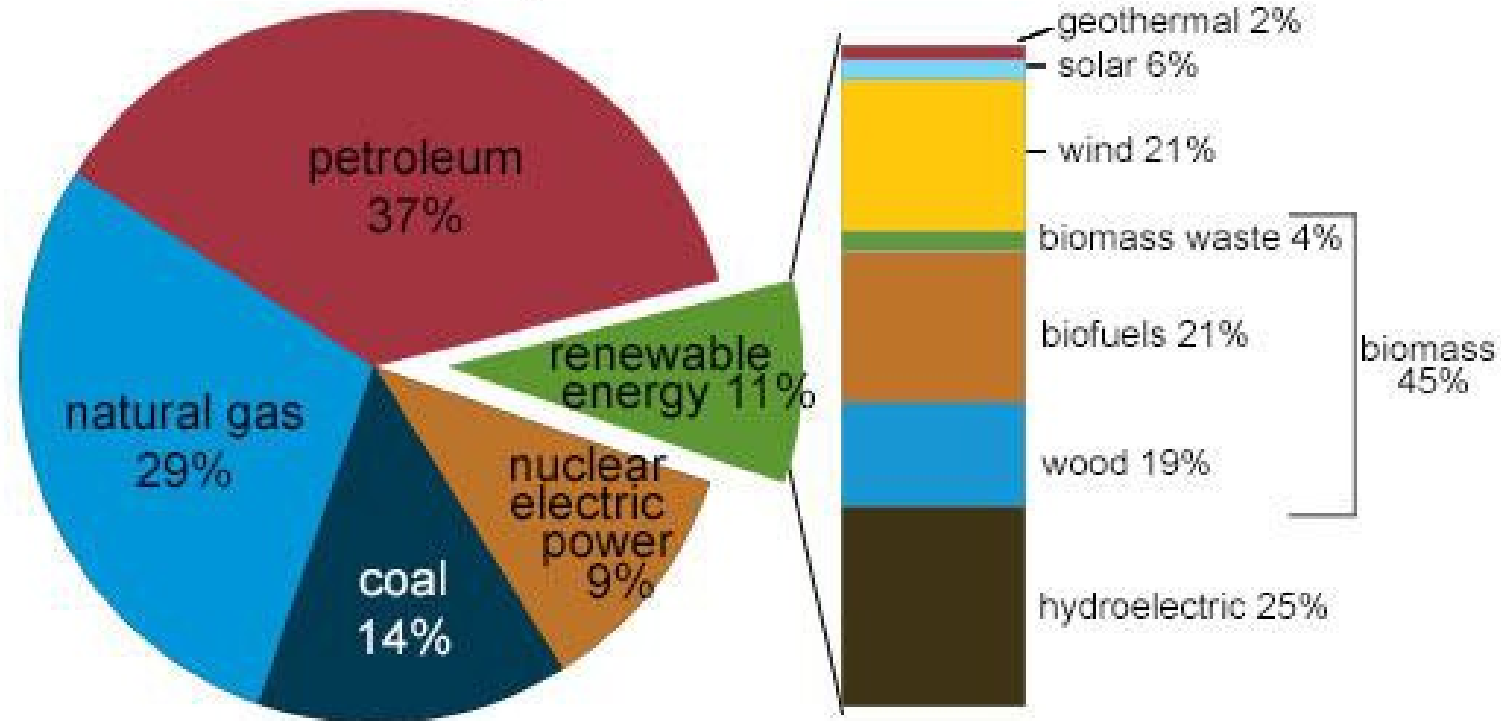
Share of energy sources in gross German power production in 2018.

Data: AG Energiebilanzen 2019, preliminary.



U.S. energy consumption by energy source, 2017

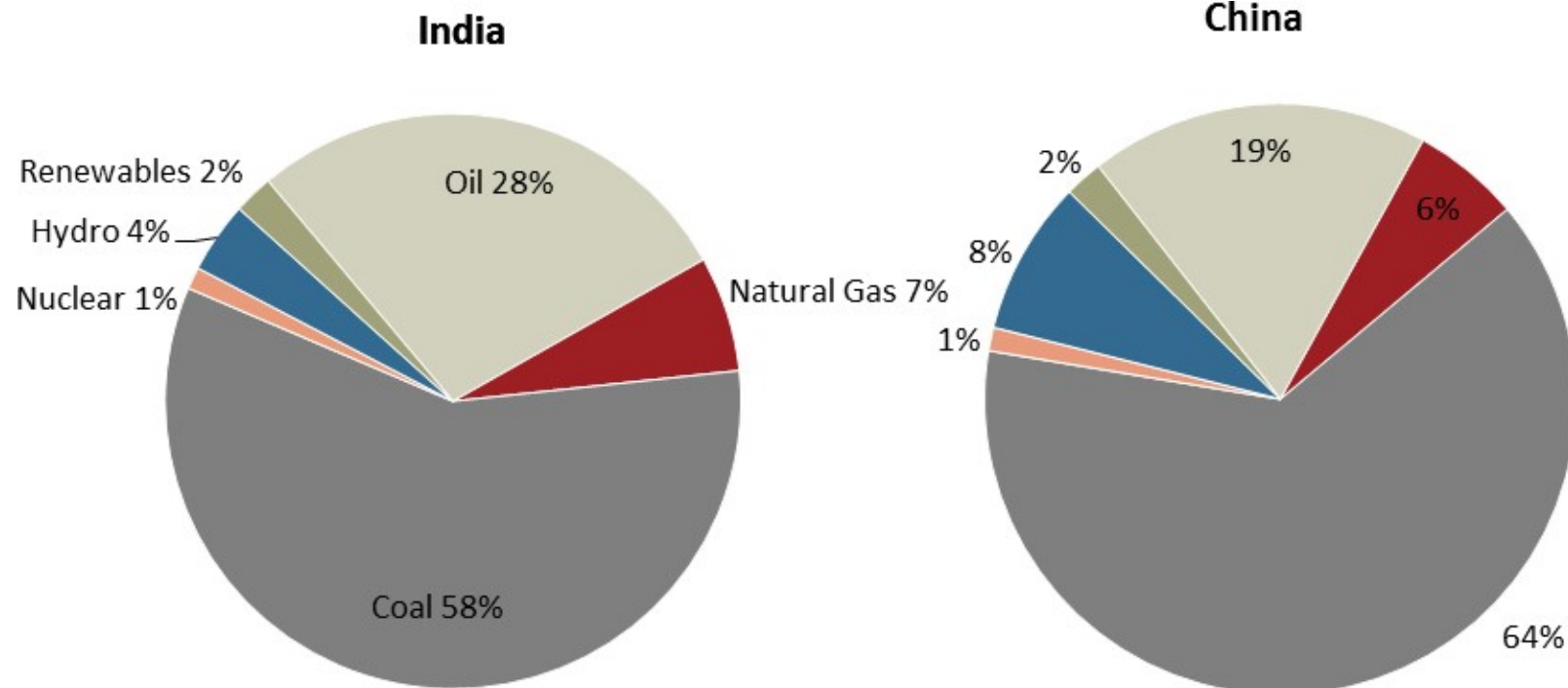
Total = 97.7 quadrillion
British thermal units (Btu)



Note: Sum of components may not equal 100% because of independent rounding.
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2018, preliminary data



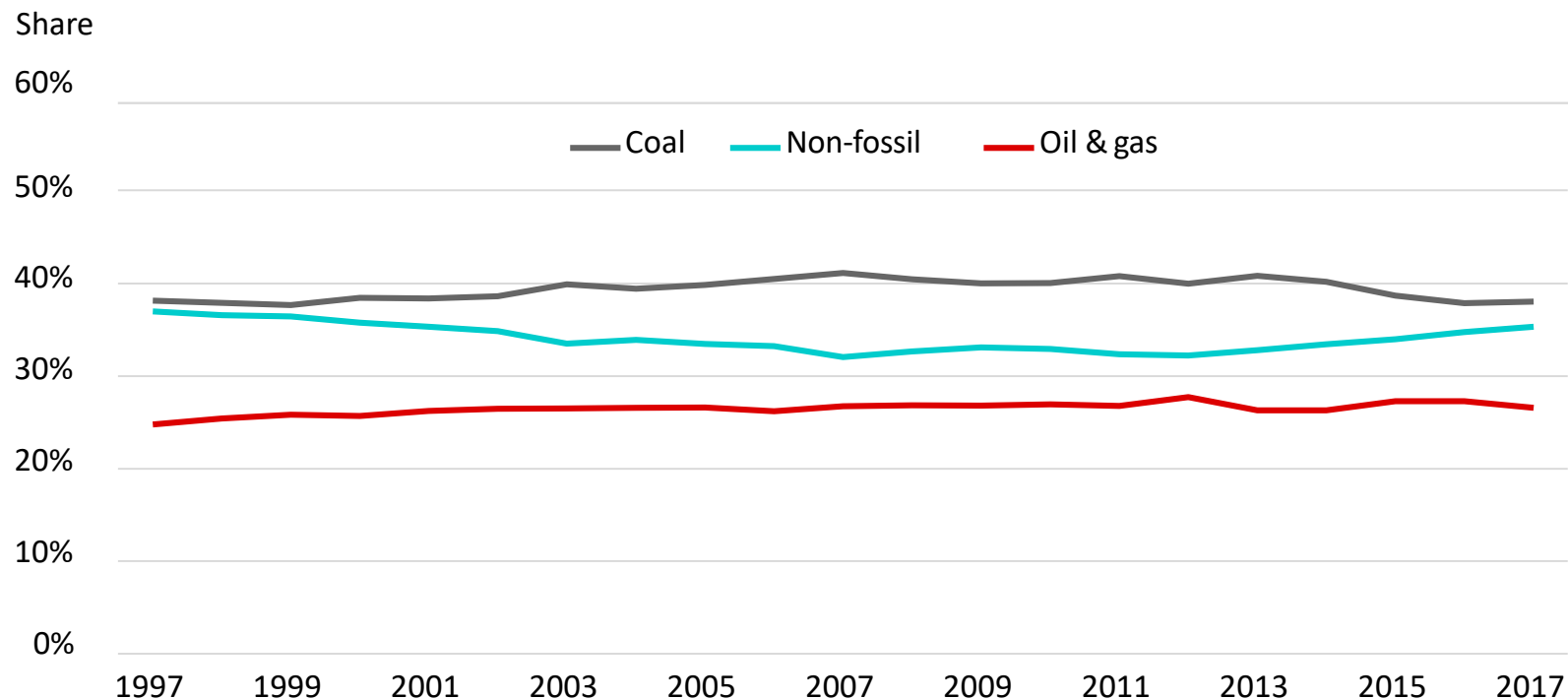
India and China Primary Energy Consumption (2015) Compared



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

#6 Fuelshares in powergeneration

from BP energy statistical review of 2018



Power sector – absorbs more primary energy than any other

“...no improvement in the mix of fuels feeding the global power sector over past 20 years...the share of coal in 2017 was exactly the same as in 1998.”

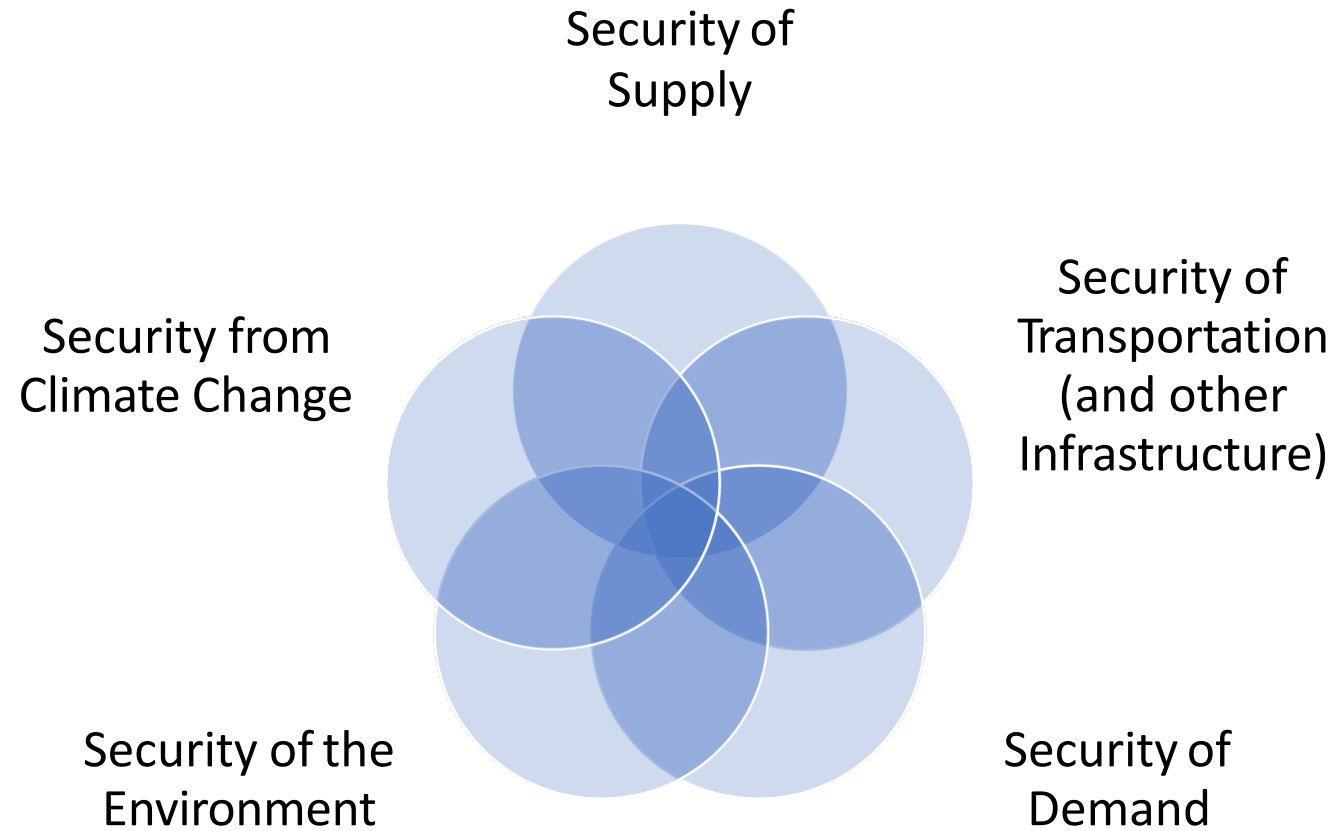
A Broader Concept of Energy Security

More than Security of Supply

Demand: How Do We Want Our Energy?

- A. Abundant supply -- sustainability
- B. Reliable — accessible on demand
- C. Clean — environment and climate
- D. Affordable — social justice
- E. Resilient — survive disasters; Plan B
- F. Diverse sources — especially [oil](#)

What Is Energy Security?



What to Watch for in 2021

- Russia/Saudi Arabia cooperation in OPEC+
 - 13 OPEC members + 11 non-OPEC oil producers
 - Saudi trying to play swing producer role – how long can reductions hold?
- US LNG exports – Asia or Europe?
 - Impact of EU energy policies on US LNG exports
 - Asia grid vulnerability
- Impact on electrical grid of decentralized electricity producers
- China and India energy demand
- EU and Russian sanctions
- Cyber attacks of US energy grid

Questions?

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