

# The National Security Implications of the Changing Global Energy Picture

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# Energy Security is the assured supply of adequate energy at a reasonable price

## Elements of Energy Security:

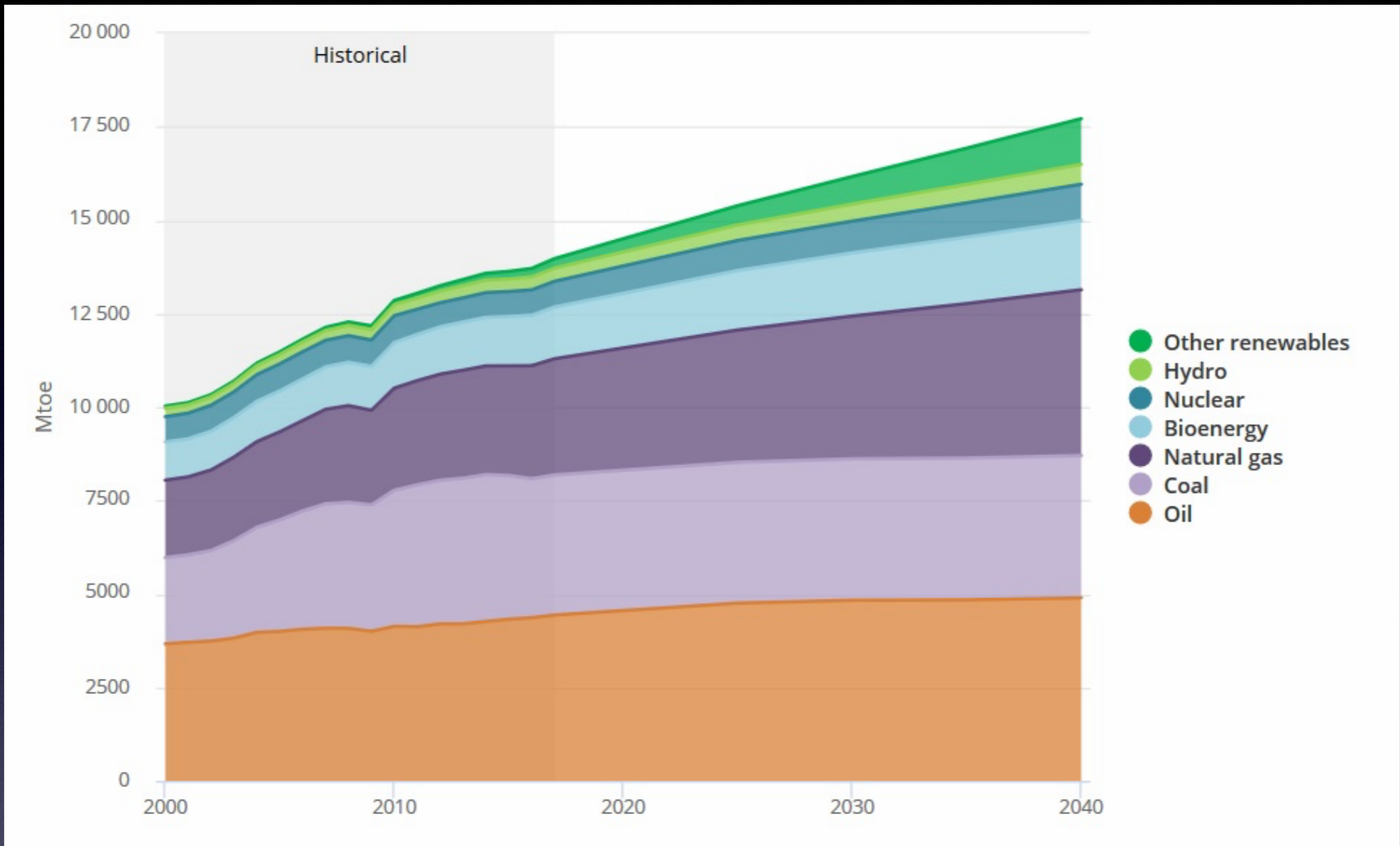
Domestic supplies

Diversity of types and sources of supply

Benign, predictable suppliers whose willingness and ability to continue to supply is assured

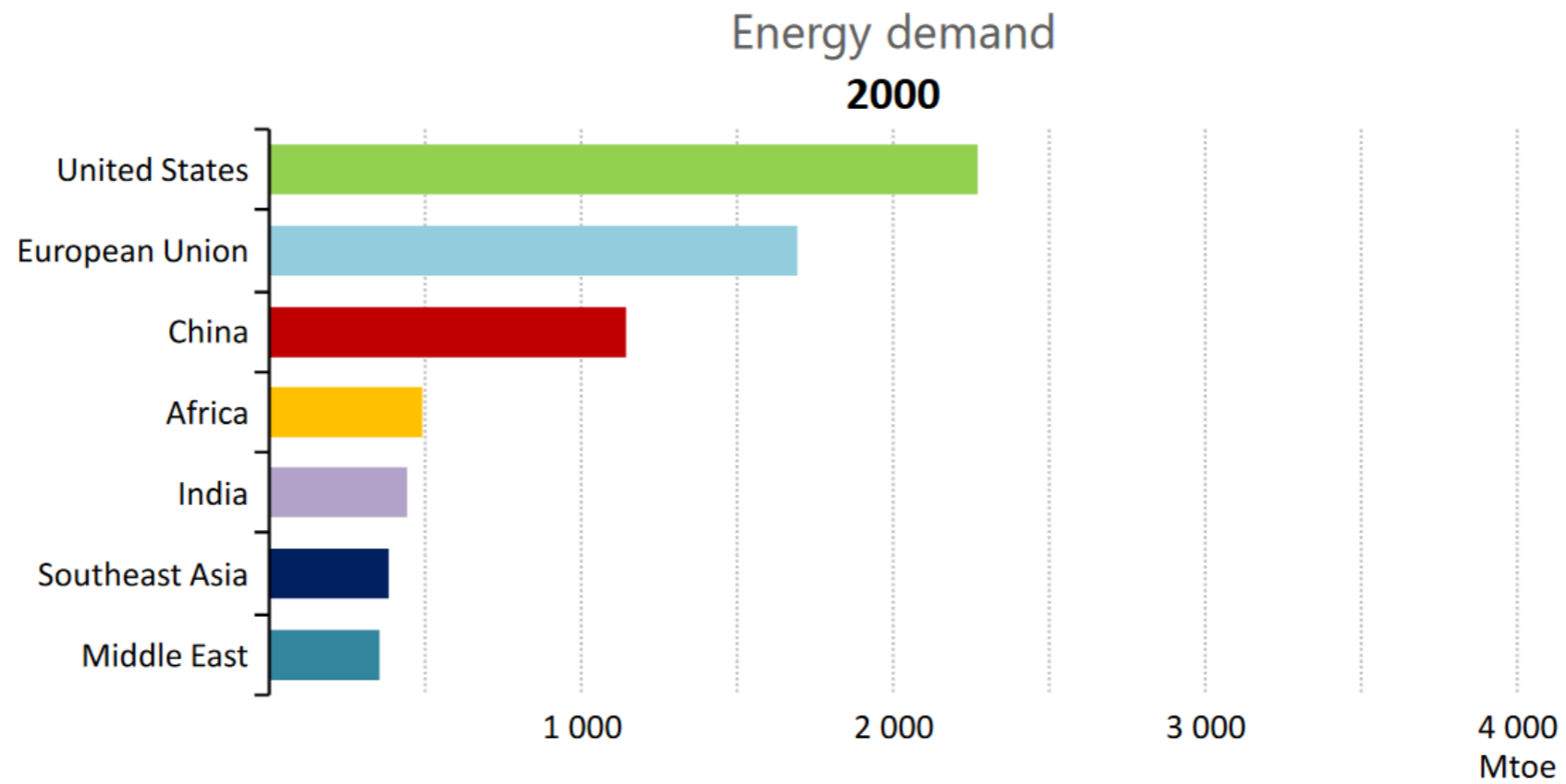
Technologies, R&D, and the ability to finance and apply new ideas

# The Global Energy Picture: Energy Demand Continues To Rise



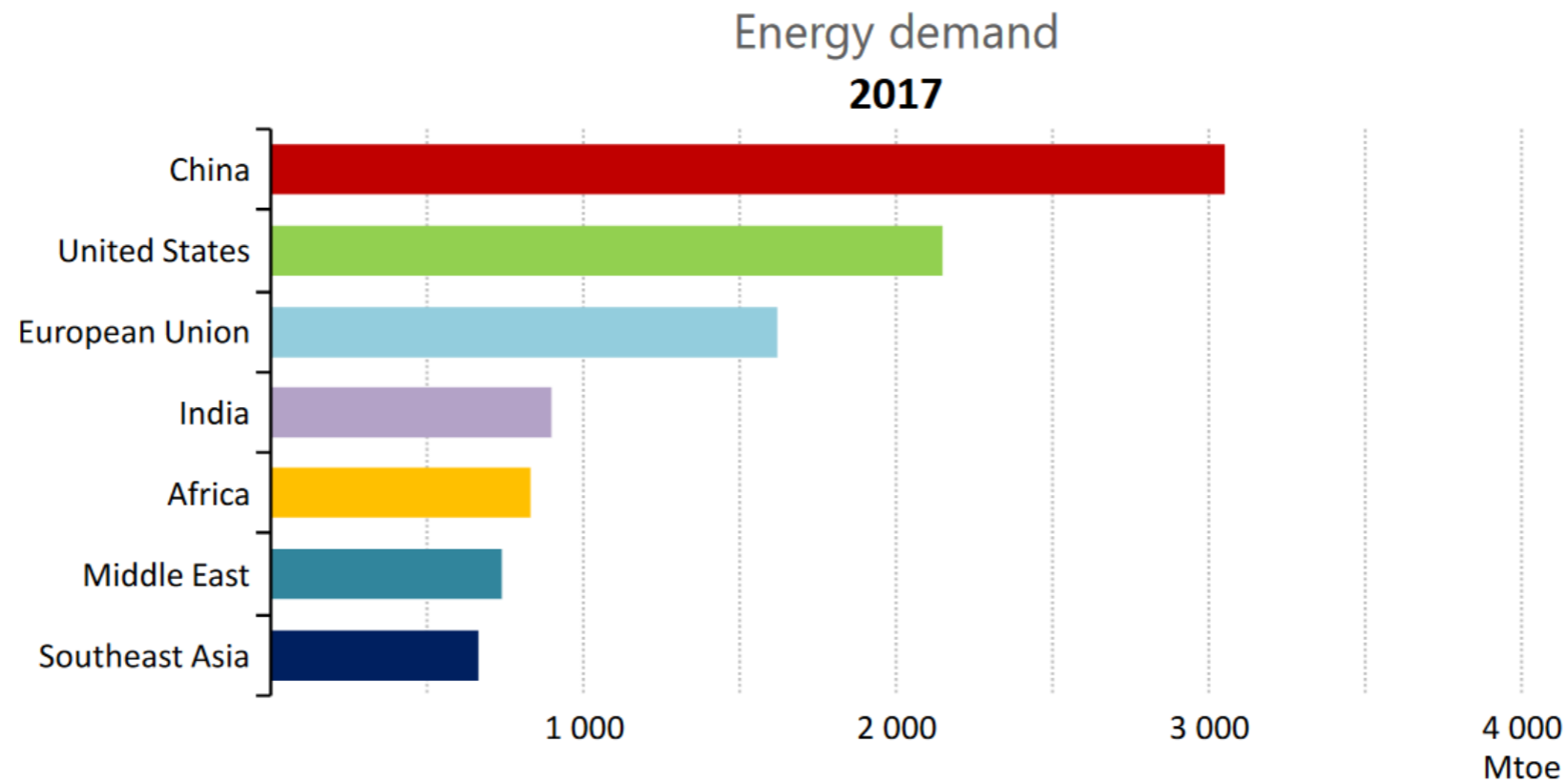
Global Energy Demand Expected to Continue Its Rise

# The new geography of energy



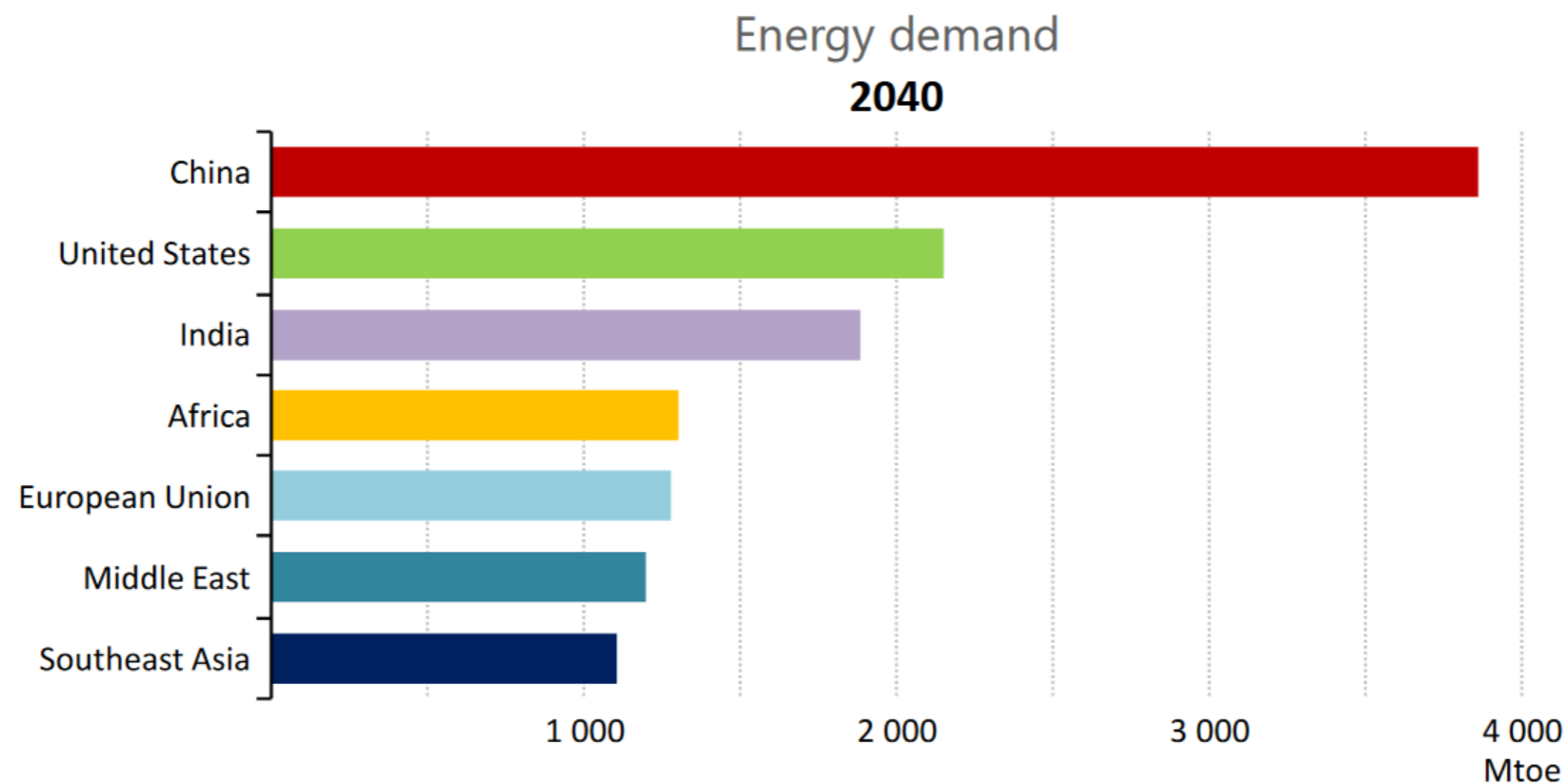
*In 2000, more than 40% of global demand was in Europe & North America and some 20% in developing economies in Asia. By 2040, this situation is completely reversed.*

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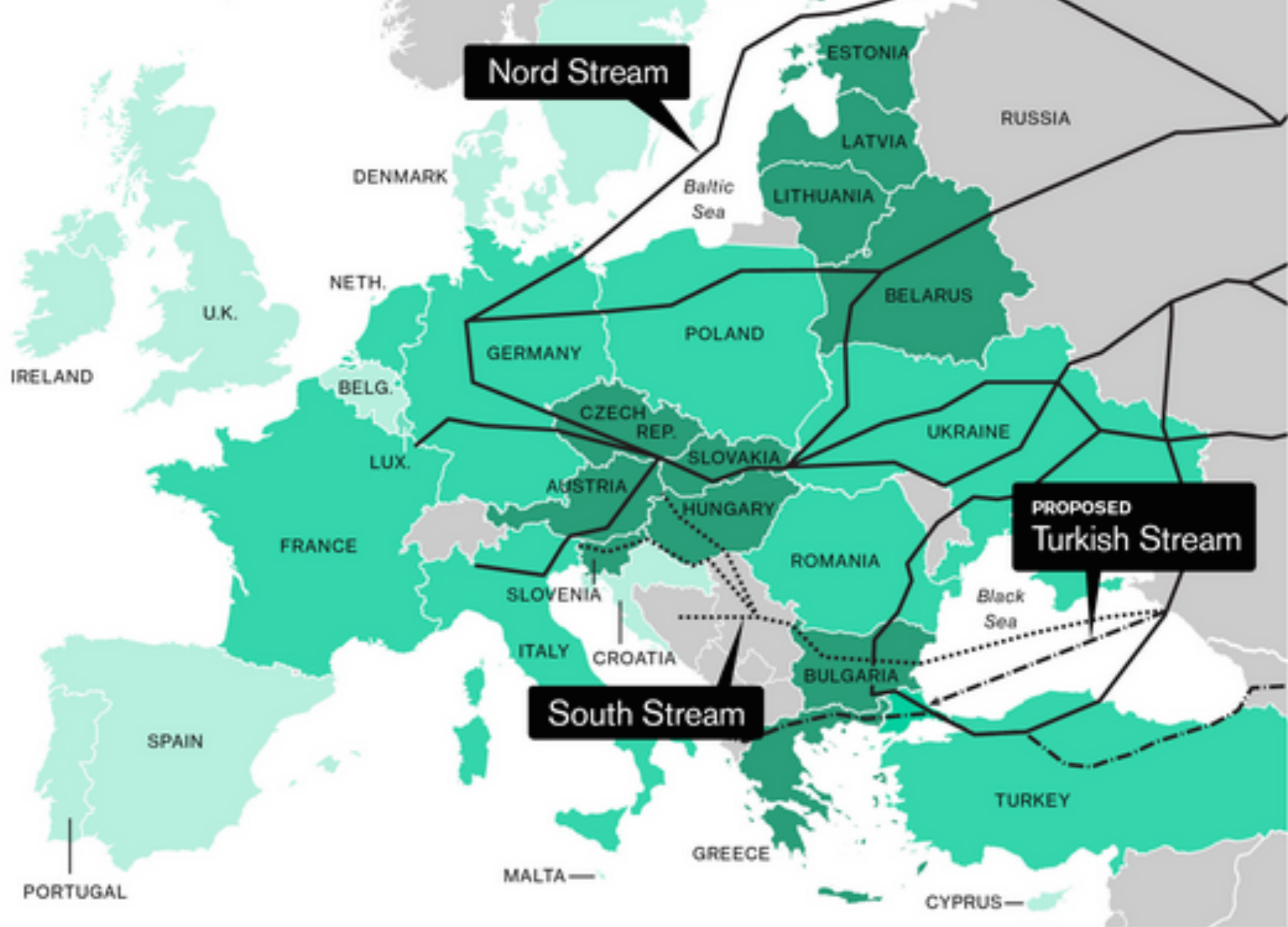






Sources: Nextzen, OSM, Nord Stream 2

Paul Duginski / @latimesgraphics



% of 2013 gas supply from Russia

Less than 5%      5% - 59%      60% - 100%



**Major Energy Companies in the Caspian Region**

Company	Country of Origin	Company	Country of Origin	Company	Country of Origin
ACR	US	Grinwald	Germany	Paflex	Portugal
Agip	Italy	GWDF	Germany	Petrol	Turkey
Albina	US	Inpex	Japan	Platrom	Romania
Alberta Energy	Canada	JXCC	Japan	Petromas	Malaysia
Anadarko	US	JKC	UK	Preussag	Germany
Anglo Dutch	US	JNOC	Japan	Rumco	UK
Atilla Dogan	Turkey	KazakhOil	Kazakhstan	Repsol	Spain
BP	UK	Karr McOdie	US	Shell	Netherlands/UK
British Gas	UK	Land & General	Malaysia	SOCAR	Azerbaijan
Burnen Energy	UK	LUKAgp	Russia/Italy	Sooner	US
Cairn Energy	UK	LUKoil	Russia	Statoil	Norway
CAP	UK/Norway	Maersk	Denmark	Tekoku	Japan
Chaparral	US	Mitsui	Japan	Tenaco	US
Chevron	US	Monreal	US	Total/FinEif	France
CNPC	China	Lasmo	UK	TPAO	Turkey
Commonwealth	Canada	Nations Energy	Canada	Turkmenneft	Turkmenistan
Conoco	US	Nelson Resources	Norway/Canada	Veolia	Germany
Dragon	UAE	Nimir	Saudi Arabia	Whitehall	US
Enterserve	UK	NIPD	Switzerland	Whitehall	US
ExxonMobil	US	OIEC	Iran	XCL	US
Frontier	US	Oman Oil	Oman		
		Panama	Panama		

Major Consortiums	Members
Azerbaijan International Operating Company (AIOC)	BP, Unocal, SOCAR, LUKoil, Statoil, ExxonMobil, TPAO, Devon Energy, Inocho, Delta Hess
Offshore Kazakhstan International Operating Company (OKIOC)	Agip, BG, ExxonMobil, Shell, Total/FinEif, BP, Phillips, Inpex, Statoil
Tengizchevroil (TCO)	Chevron, ExxonMobil, KazakhOil, LUKArco

**Oil and Gas Infrastructure in the Caspian Sea Region**  
March 2001

<ul style="list-style-type: none"> <li><span style="color: green;">—</span> Major crude oil export pipeline</li> <li><span style="color: red;">—</span> Other crude oil pipeline</li> <li><span style="color: blue;">—</span> Major natural gas export pipeline</li> <li><span style="color: orange;">—</span> Other natural gas pipeline</li> <li><span style="color: green;">- - -</span> Oil pipeline planned or under construction</li> <li><span style="color: red;">- - -</span> Gas pipeline under construction</li> <li><span style="color: blue;">- - -</span> Pipeline diameter (inches)</li> <li><span style="color: orange;">- - -</span> Oil pipeline capacity (barrels per day)</li> <li><span style="color: green;">- - -</span> Combined capacity of multiple pipelines</li> <li><span style="color: red;">- - -</span> Tanker terminal</li> <li><span style="color: blue;">- - -</span> Gas processing plant</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">●</span> Oilfield</li> <li><span style="color: red;">●</span> Gasfield</li> <li><span style="color: blue;">●</span> Oil, gas, and condensate field</li> <li><span style="color: orange;">●</span> Offshore prospects</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> National block/grid system</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Oil company or consortium</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Azeri Selected joint venture or prospect name</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Hypothetical median or equidistant line between littoral countries</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Selected administrative boundary</li> <li><span style="border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> Railroad</li> </ul>	<ul style="list-style-type: none"> <li><span style="border: 1px solid black; padding: 2px;"> </span> Contract Blocks</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Active</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Available</li> </ul>
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**Water Depth**

	20 meters
	50 meters
	100 meters
	200 meters
	500 meters
	1000 meters
	2000 meters

Scale: 1:2,400,000  
Lambert Conformal Conic Projection, SP 47N/E2H

Boundary representation is not necessarily authoritative.



**South Caucasus Pipeline and its expansion (SCPX)**

**Trans Adriatic Pipeline (TAP)**



**BULGARIA**

Sofia

**ALBANIA**

Tirane

**GREECE**

Athens

Black Sea

Interconnection with TANAP

**GEORGIA**

Tbilisi

Compressor Stations

**AZERBAIJAN**

Baku

Sangachal Terminal

Shah Deniz Gas Condensate Field



Ankara

Eskisehir

**TURKEY**

**Trans-Anatolian Natural Gas Pipeline (TANAP)**



**ITALY**

Adriatic Sea

Caspian Sea

Mediterranean Sea

# Energy Security Also Includes the Electricity Generation & Transmission Infrastructure

Equipment ages & is subject to disruption by nature and man-made-forces

The growing links between IT and Energy Systems create new vulnerabilities

