

The New Geopolitics of Energy: Challenges and Opportunities

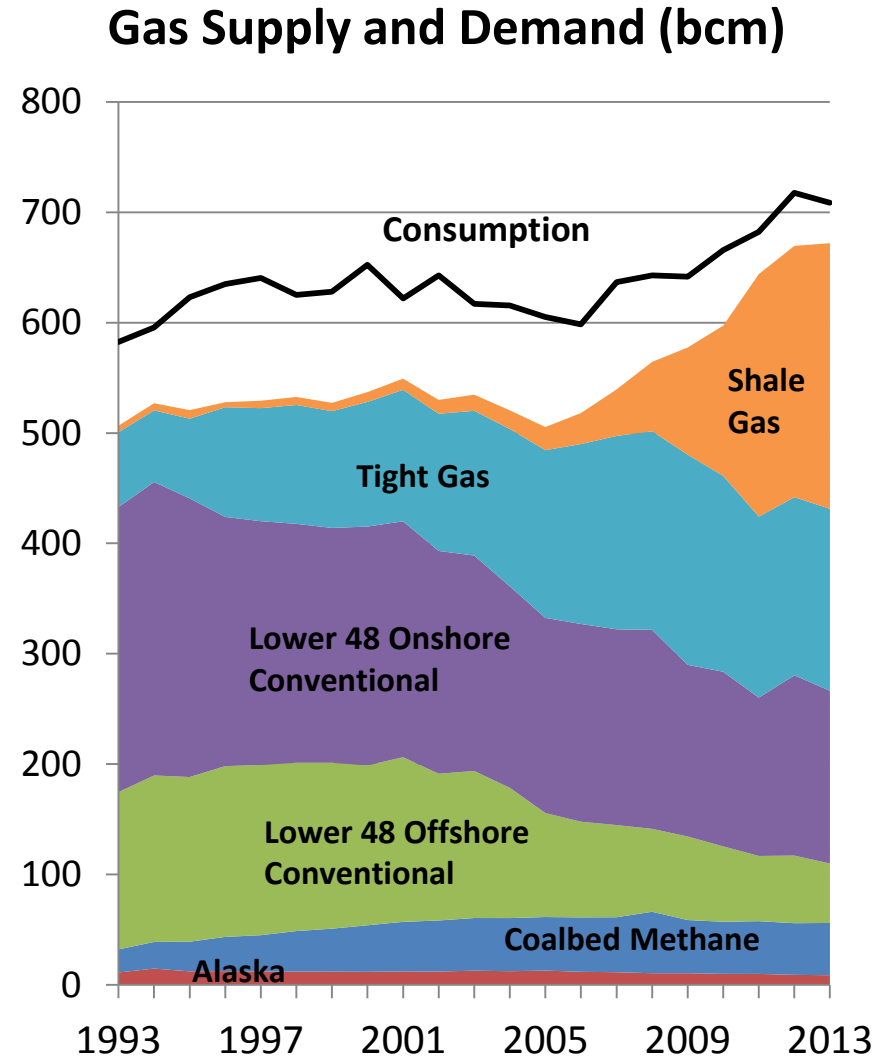
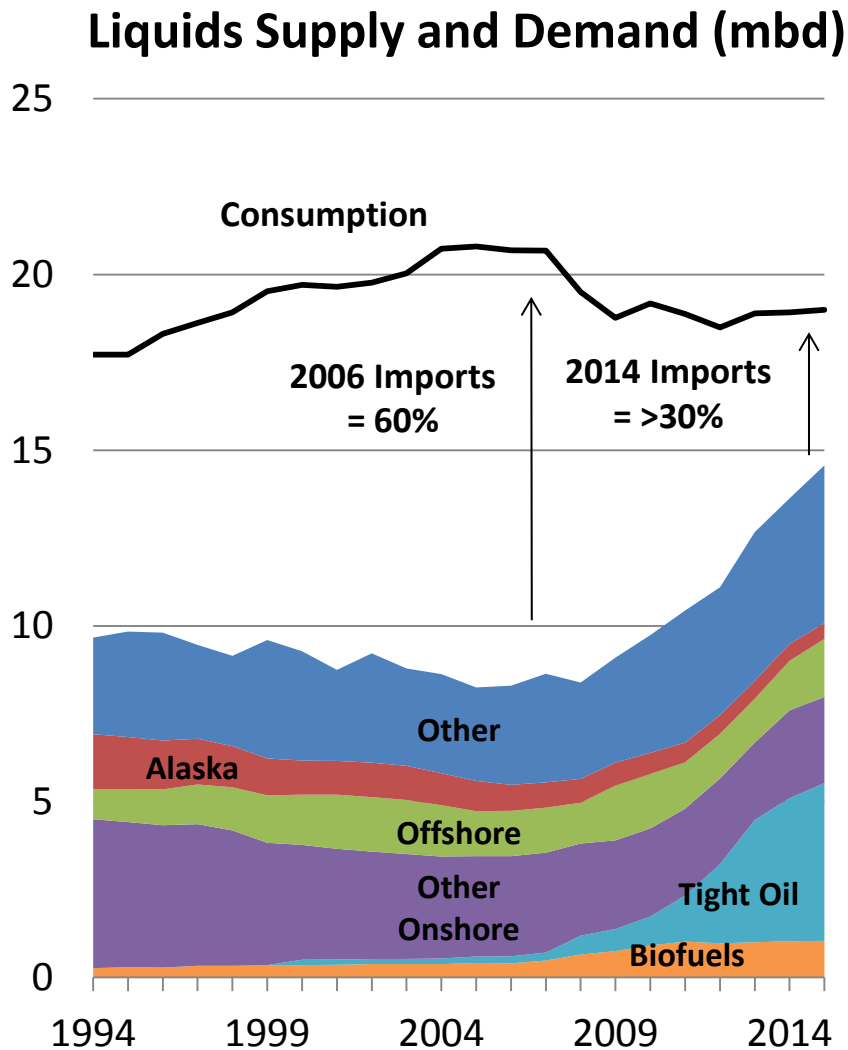
July 24, 2014



Carlos Pascual

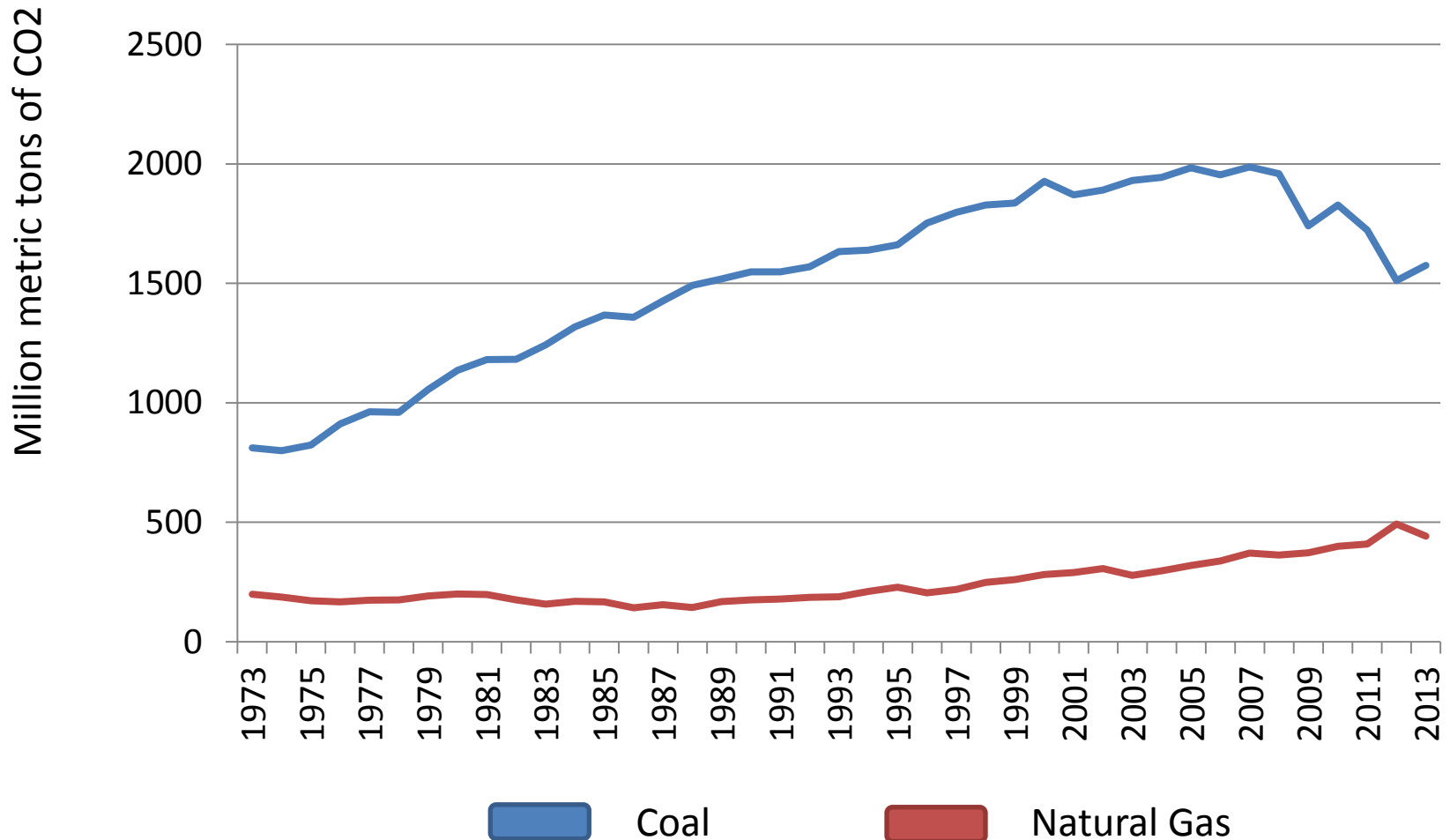
Special Envoy and Coordinator for International Energy Affairs
U.S. Department of State
Bureau of Energy Resources

U.S. Oil and Gas Production Growth



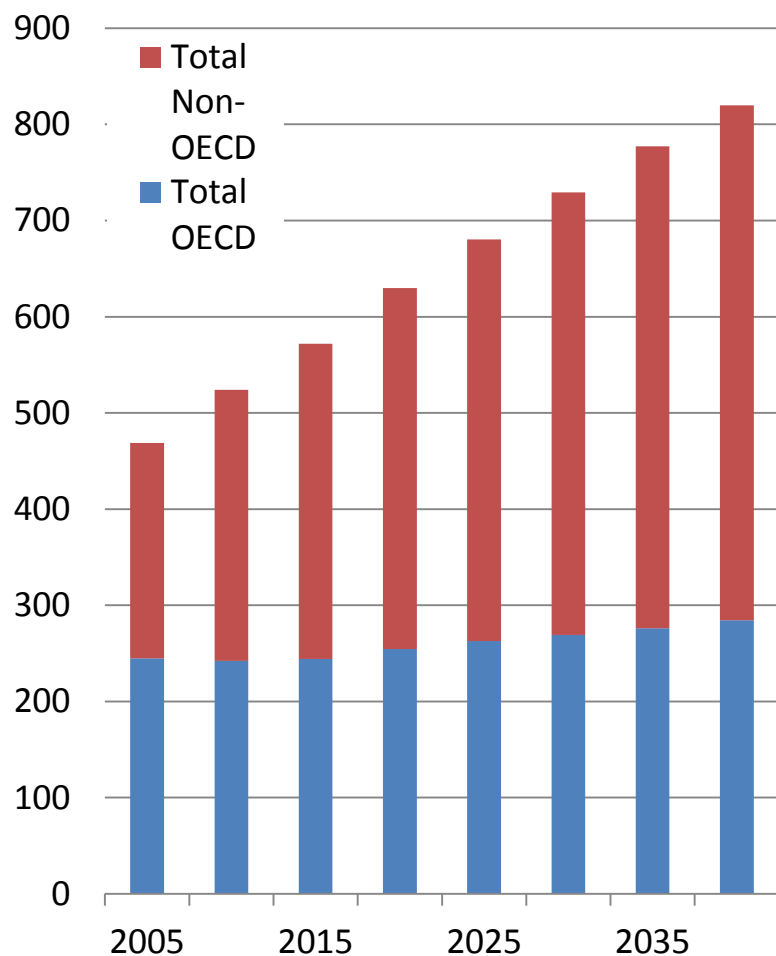
U.S. CO₂ emissions in 2012 dip as gas beats coal

U.S. Carbon Dioxide Emissions in the Electric Power Sector, 2004-2013

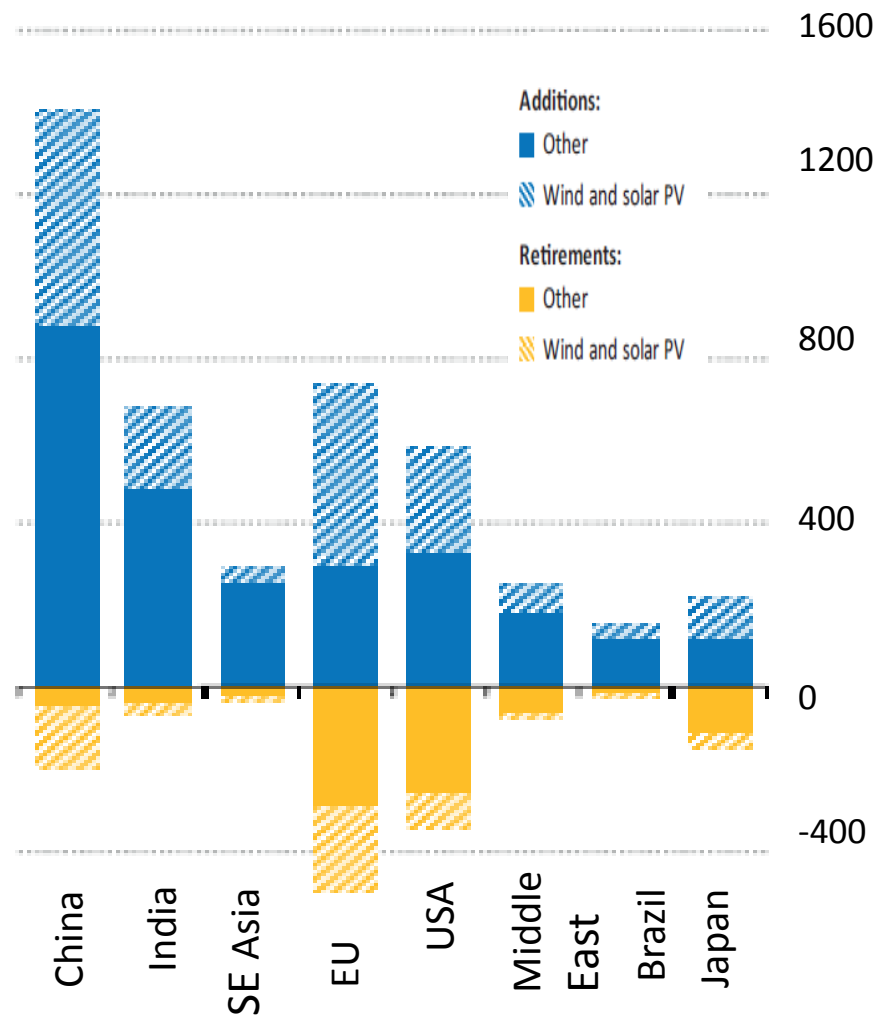


World Energy Consumption Forecast

Total Primary Energy (Quads)

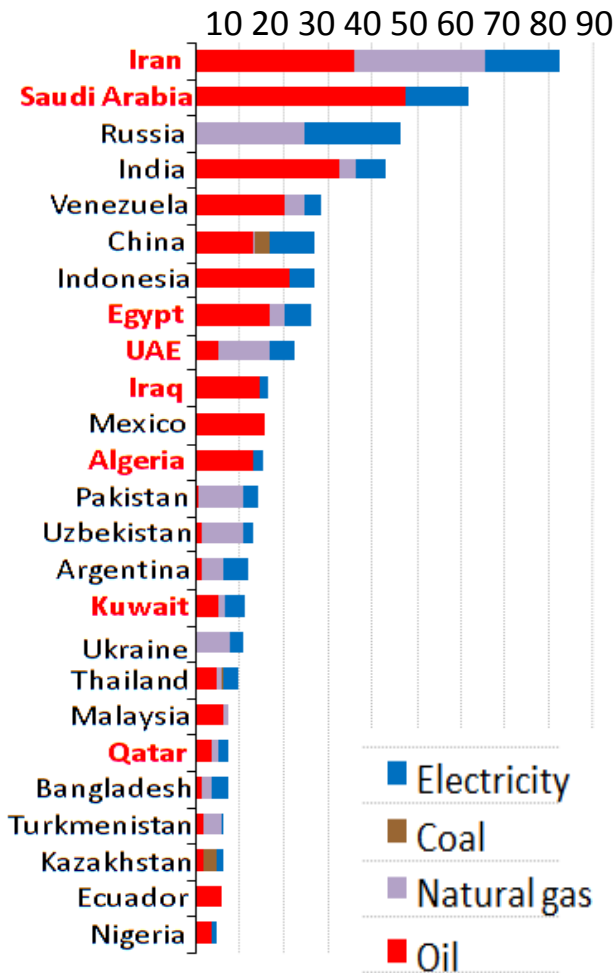


Power investment in Asia (GW)

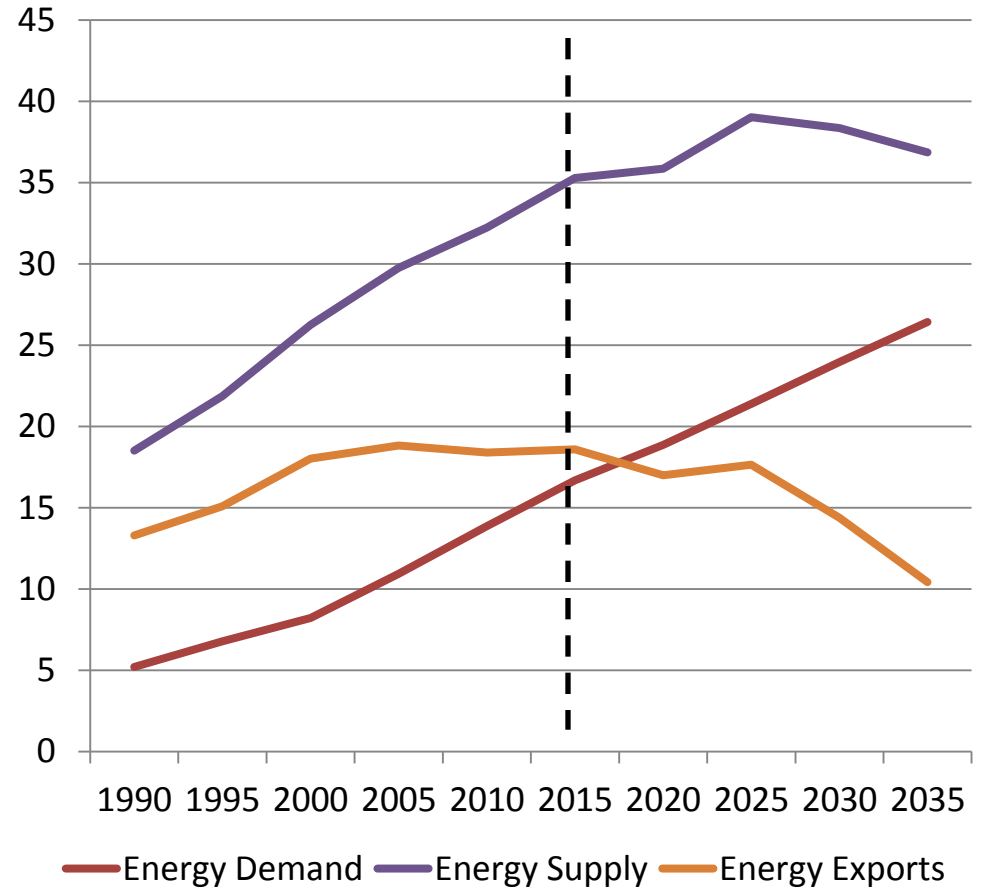


Fossil Fuel Subsidies Distorting Signals for Demand and Supply

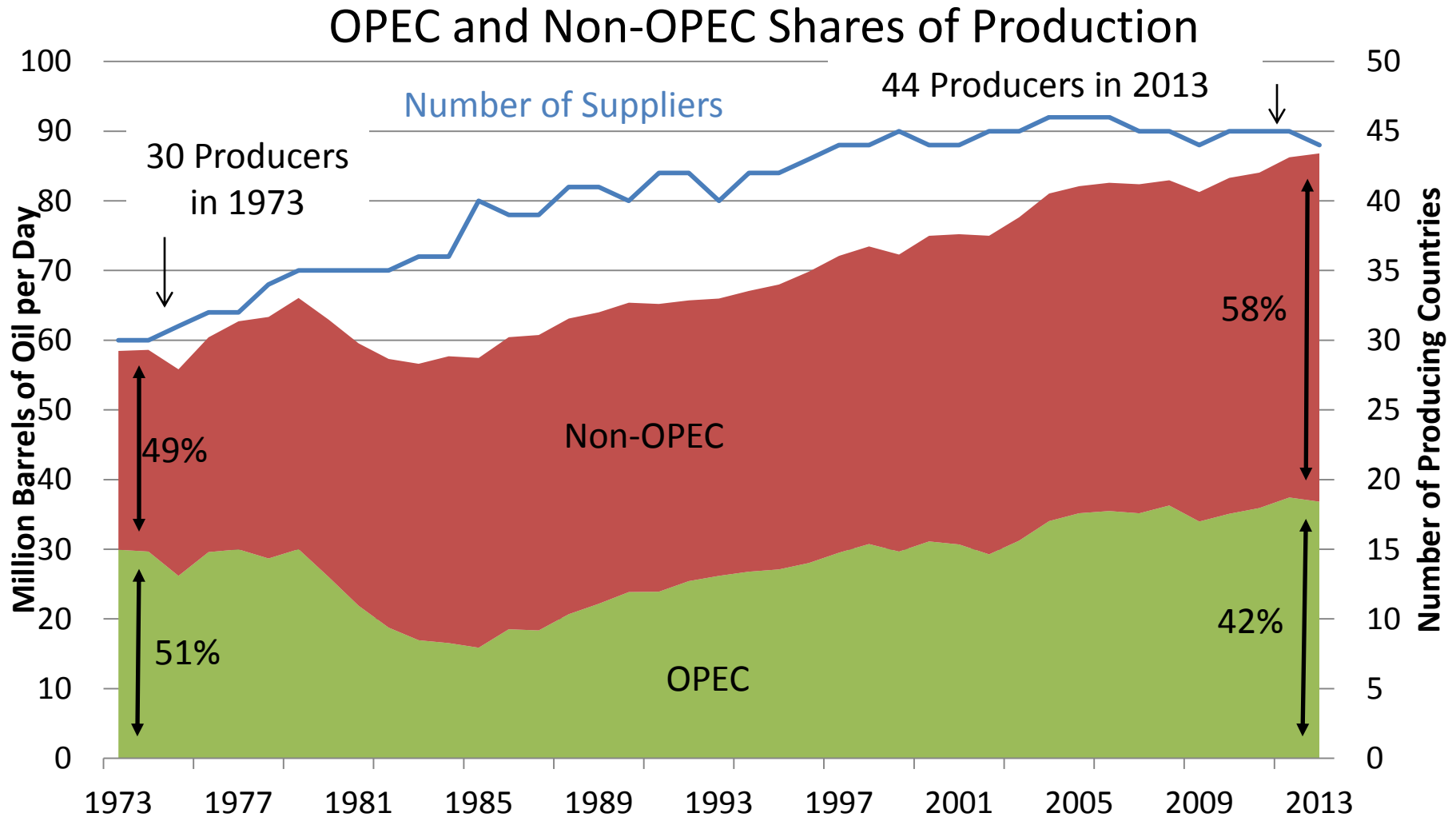
Fossil fuel subsidies by fuel (USD billion)



Fossil fuel production and exports in the Middle East (mboe/d)



Oil production is diversifying

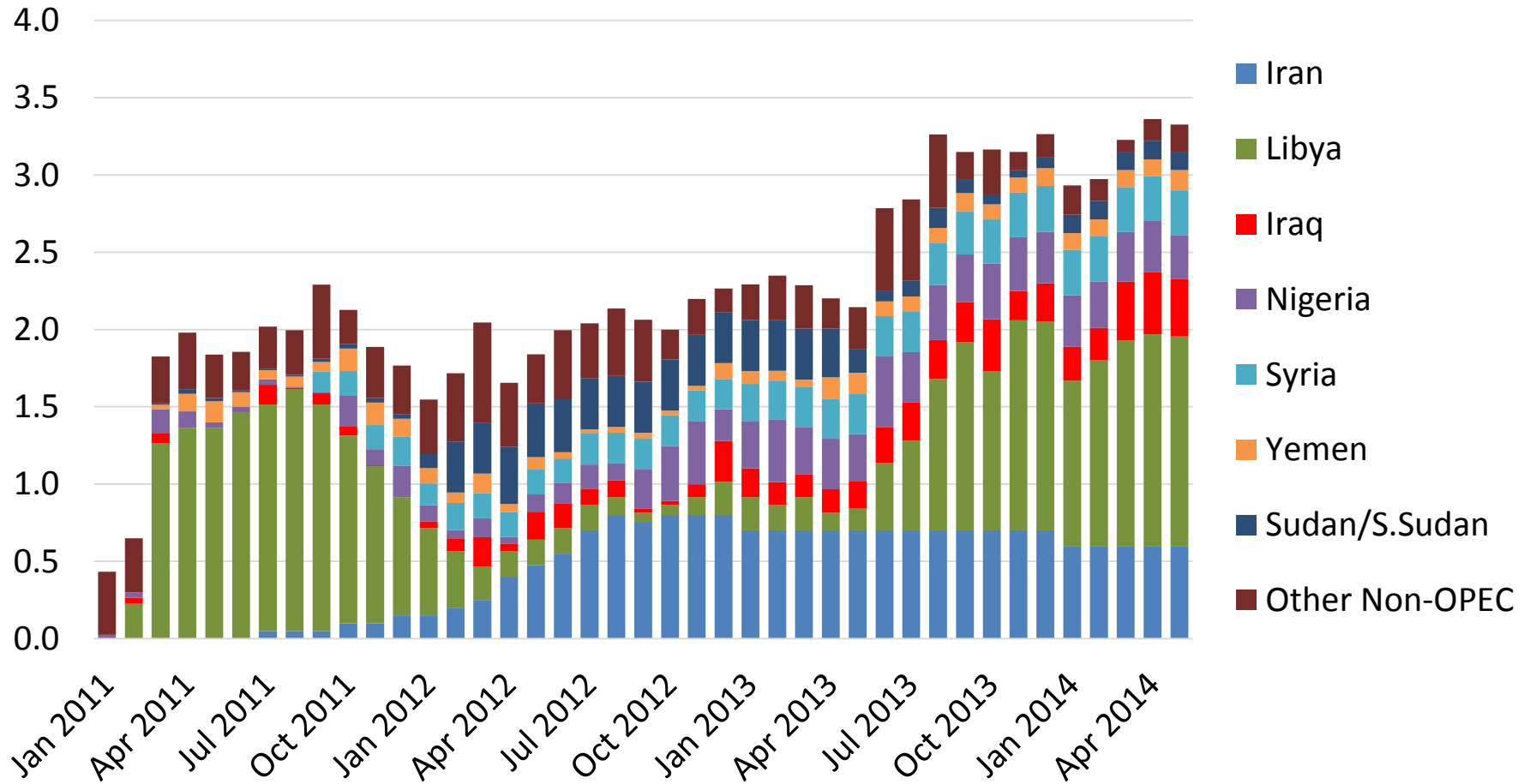


Source: BP Stat Review 2014.

Note: Prior to 1989, Russia, Turkmenistan, Azerbaijan, Uzbekistan were counted together as the Soviet Union

Disruptions at Historic Highs

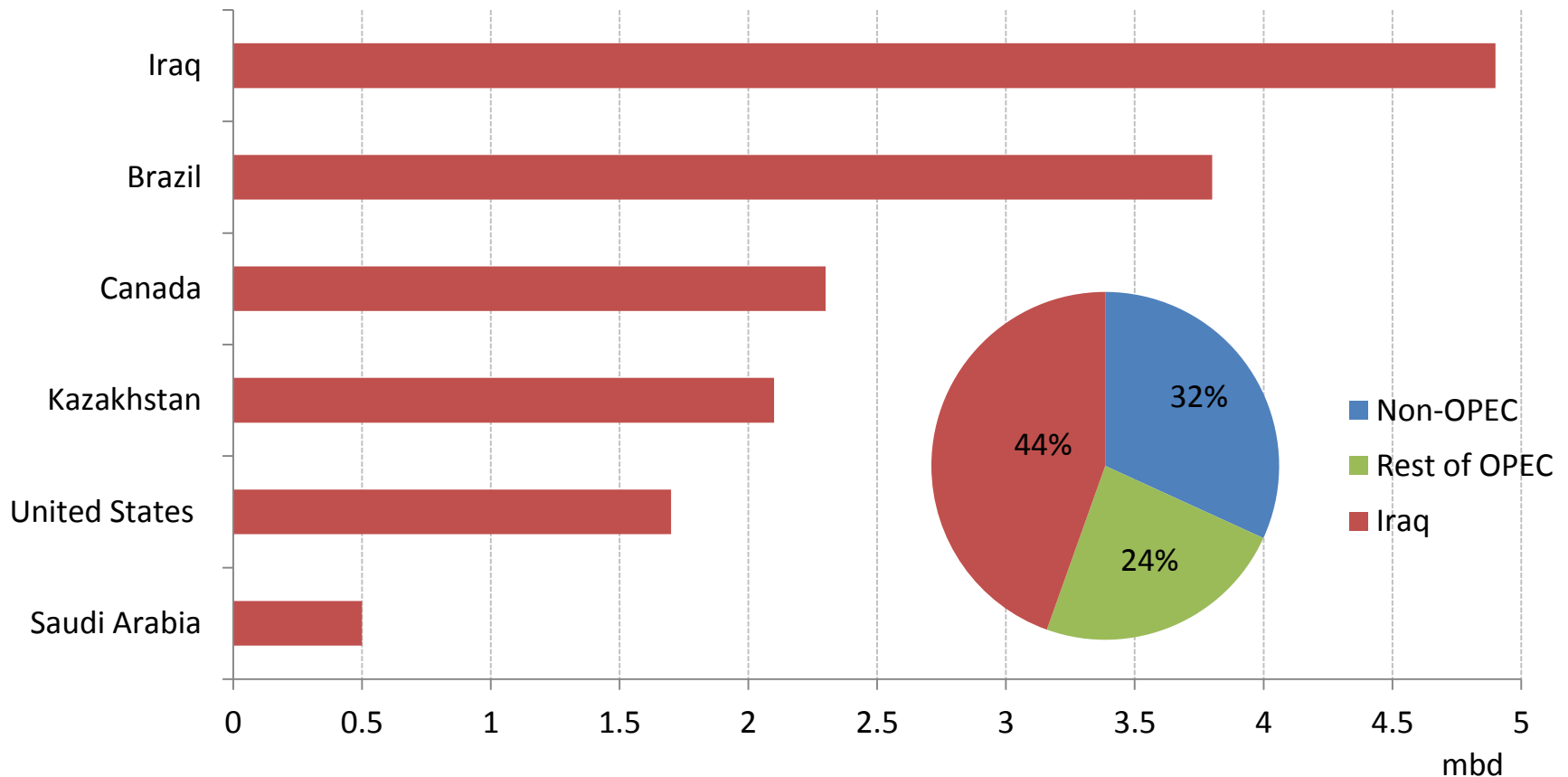
Unplanned Global Oil Supply Disruptions (mbd)



Source: EIA

Iraq Leads Global Oil Production Growth

Major contributions to global oil supply growth to 2035

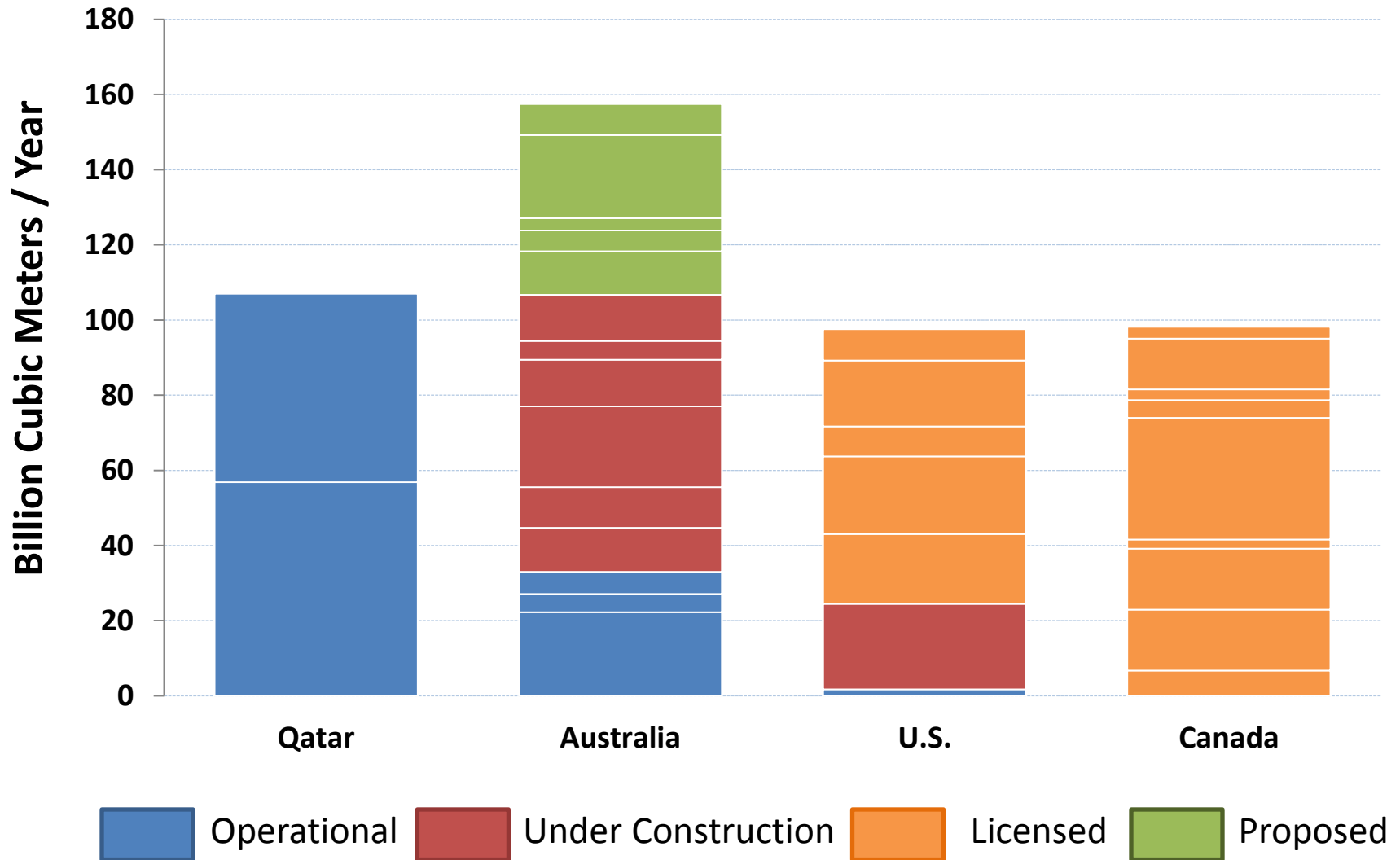


Source: IEA 2013 WEO, New Policies Scenario

Sub-Saharan Africa energy access and hydrocarbons production

	Oil Production (kbd)	Gas Reserves (tcm)		Electrification Rate
	2013	2008	2013	
Nigeria	2,370	5.1	5.1	48%
Angola	1,830	0.27	0.37	38%
Mozambique	0	0	2.8	20%
Tanzania	0	0	0.57	15%

Additional LNG Export Capacity by 2020

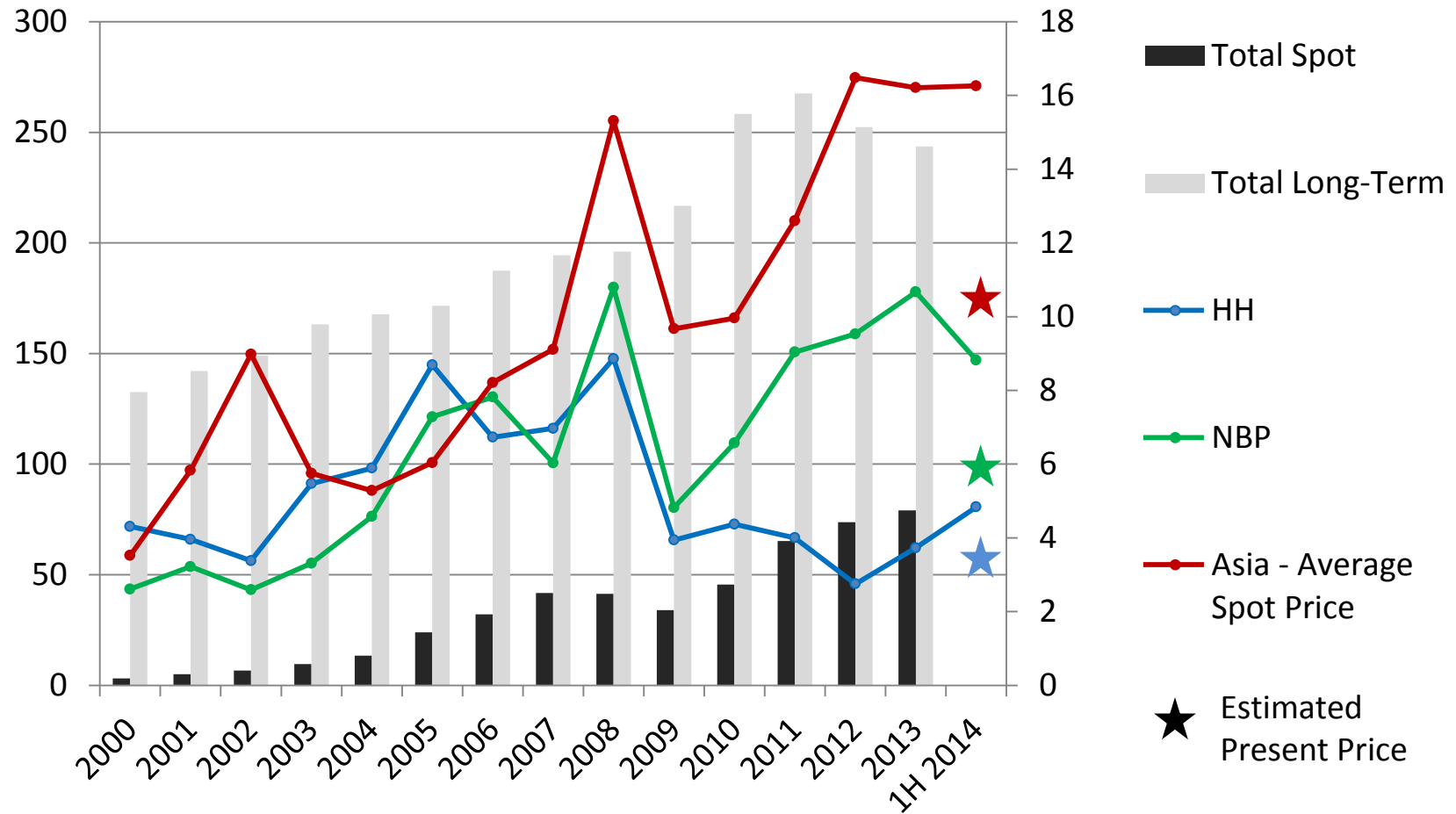


Source: PIRA, BNEF, University of Calgary

Diverging Gas Prices, Spot Deals Lead Growing LNG Trade

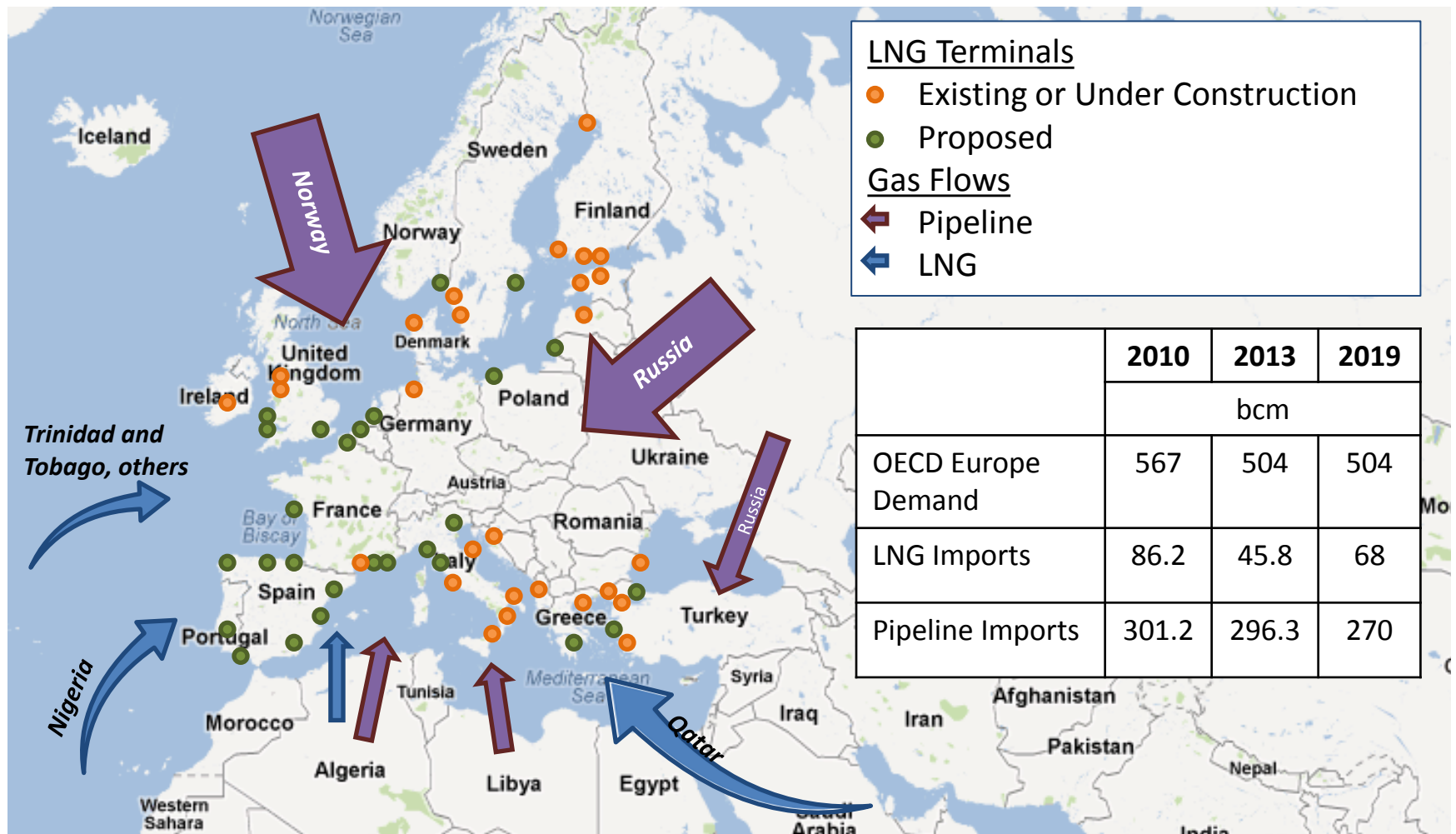
LNG Imports (bcm)

Price (\$/mmbtu)



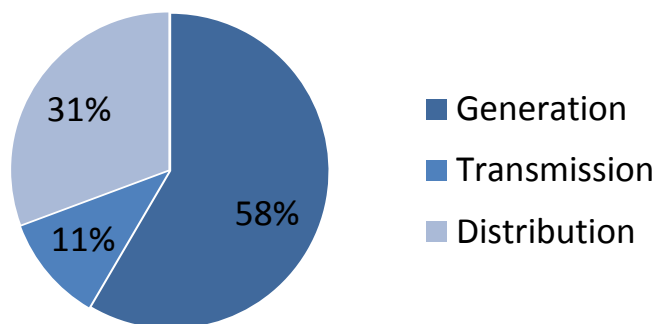
Source: EIA, PIRA, GIIGNL. Spot cargos are defined as deals that are done for four years or less.

Europe gas imports by pipeline and LNG



Global Power Sector Investments, Cumulative (2014-2035)

Power: \$16.4 Trillion



- More than 40% of global investment in the power sector goes to transmission and distribution.
- Nearly two-thirds of investment is in the non-OECD to meet growing demand.

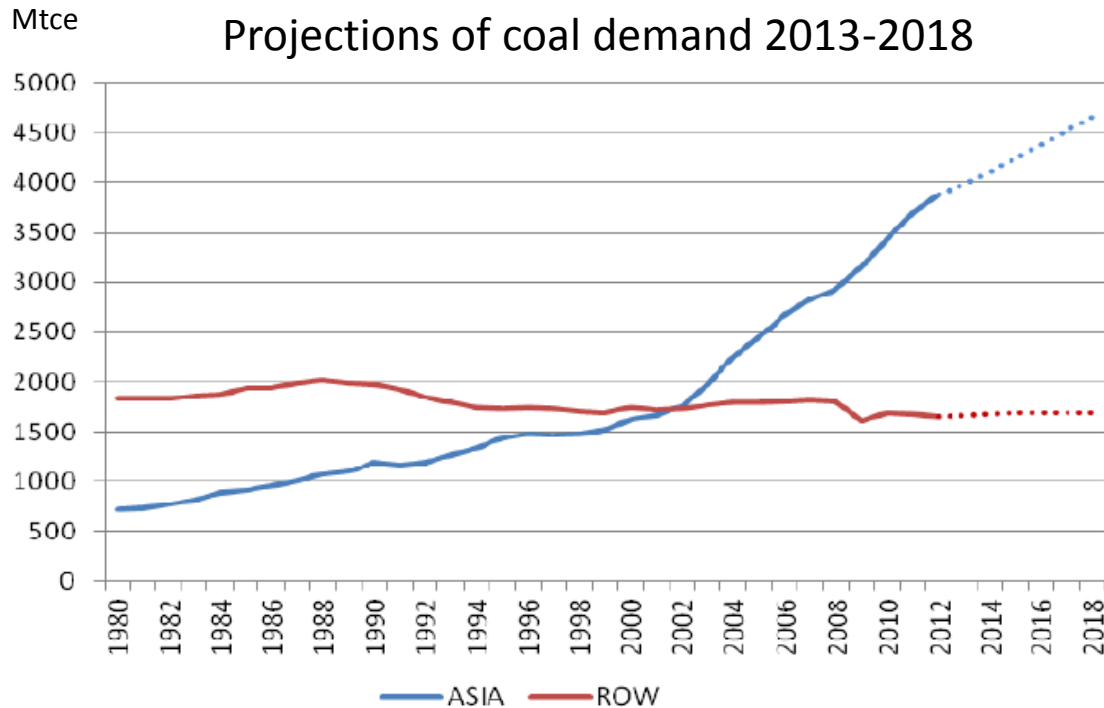
New Investment in Electricity Generation, 2014-2035 (\$ billion)

	OECD	Non-OECD	World
Coal	367	1,162	1,528
Gas	471	583	1,054
Oil	14	38	295
Total Fossil	852	1,783	2,635
Total Nuclear	389	672	1,061
Bio-energy	371	268	639
Hydro	303	1,204	1,507
Wind	1,112	876	1,989
Solar PV	720	556	1,276
Other*	230	218	446
Total Renewable	2,736	3,122	5,857
TOTAL GENERATION	3,977	5,577	9,553

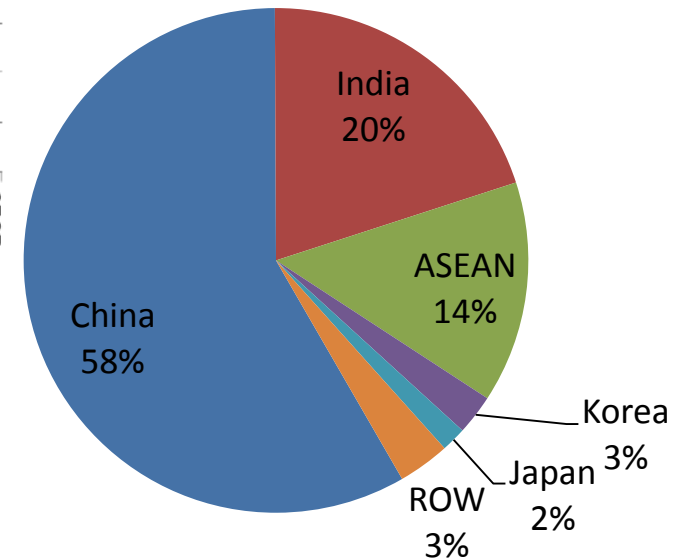
Source: IEA, WEO 2014, New Policies Scenario

* Includes geothermal, concentrated solar, and marine

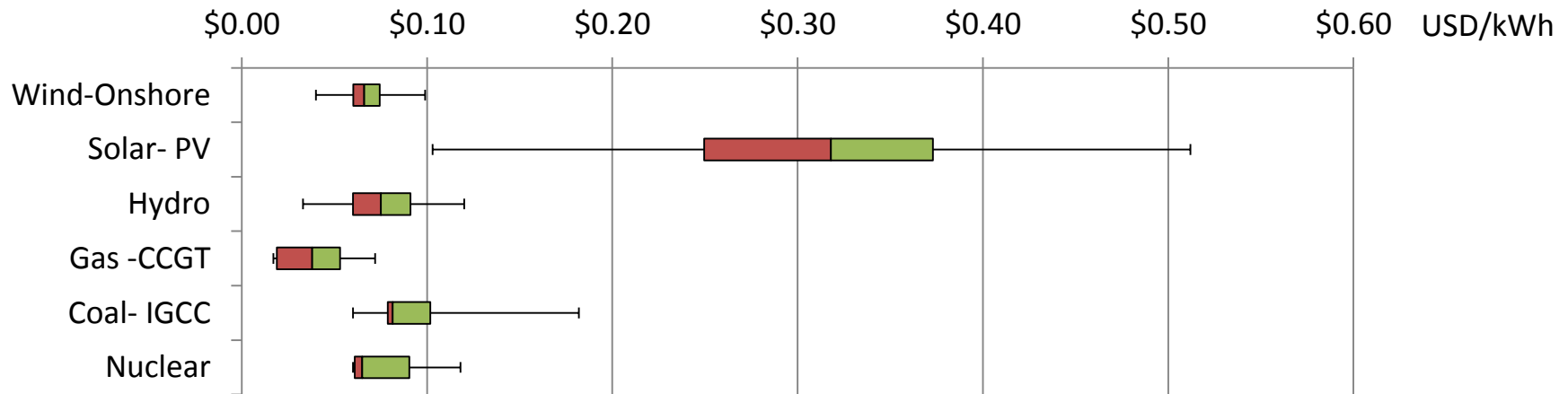
Global growth in coal demand from 2013 to 2018 is dominated by Asia



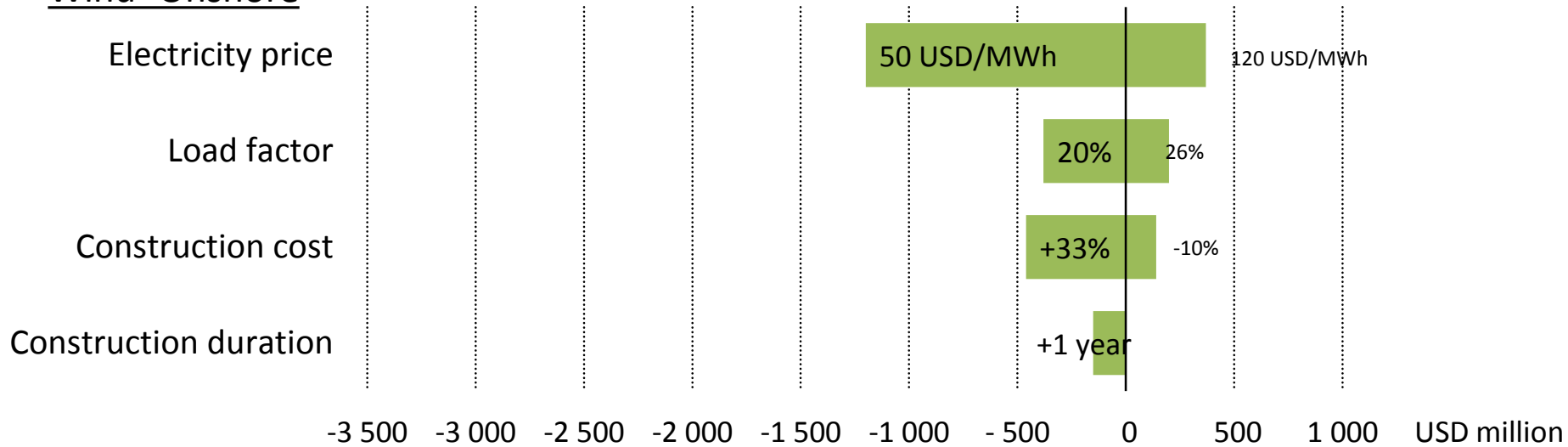
Growth in global in coal demand 2013-2018 (817Mtce)



Levelized Cost of Energy: Capital Costs, O&M, Performance and Fuel

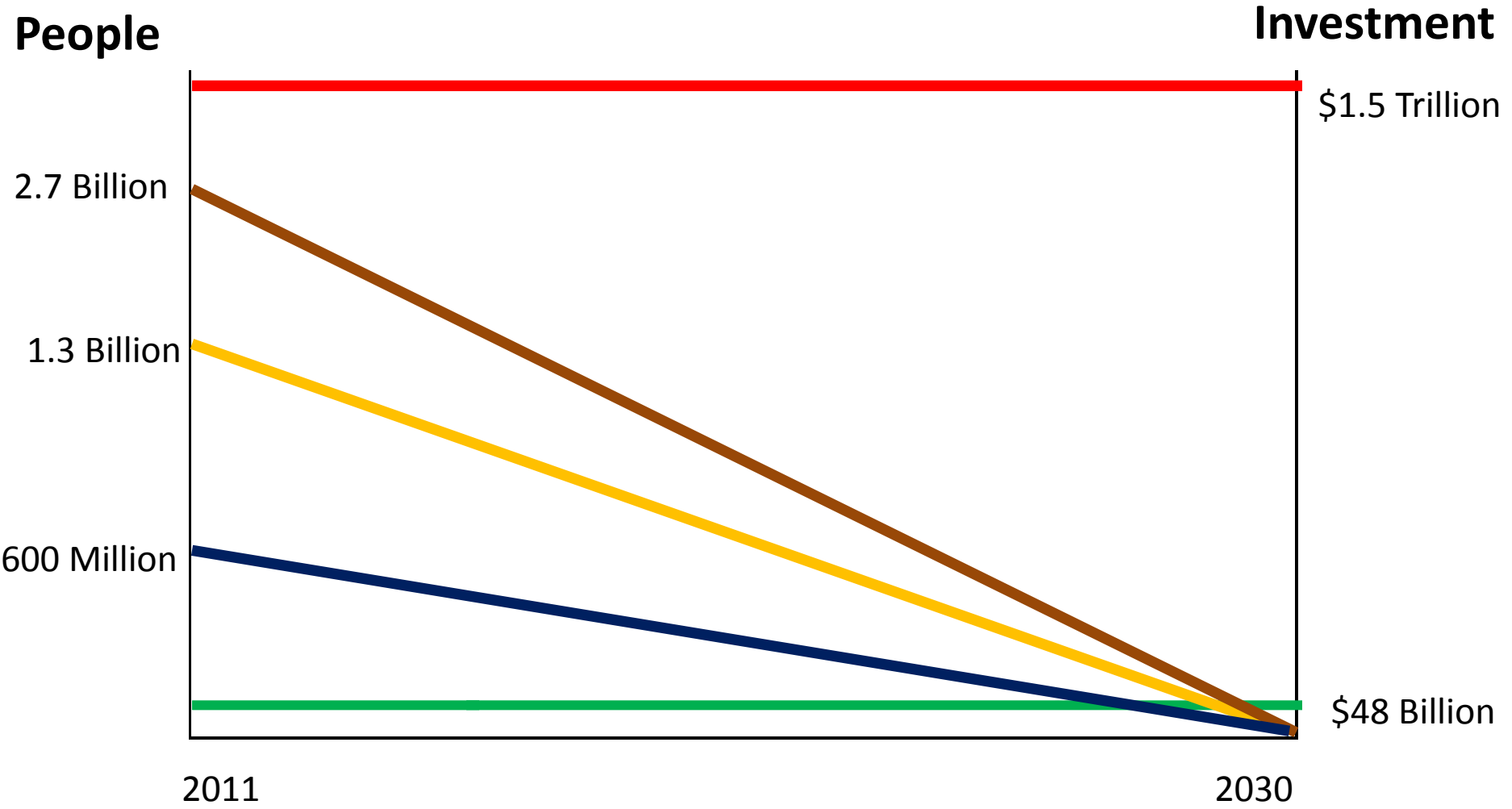


Wind- Onshore

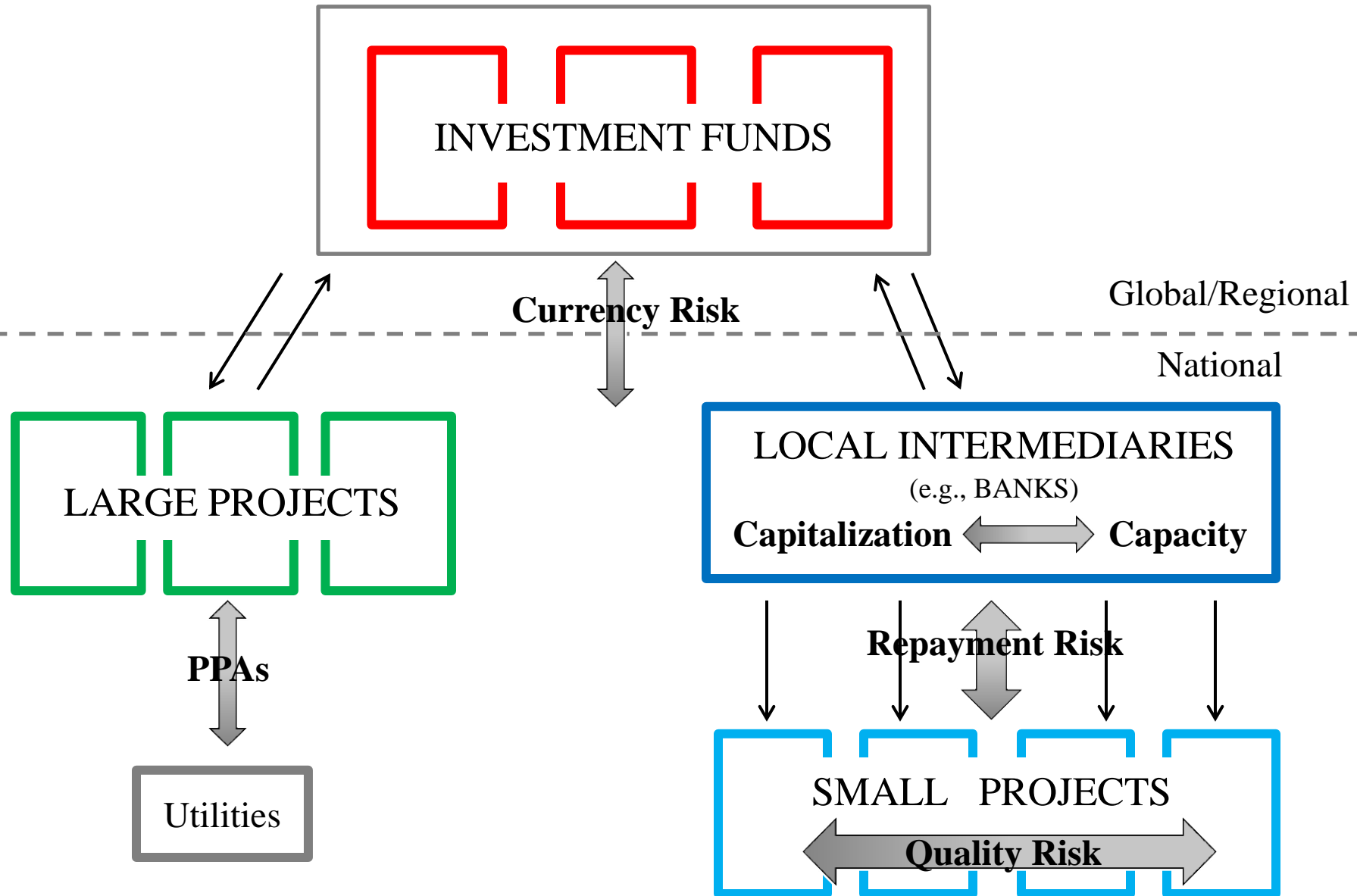


Investment for Access

(3% of total investment needed by 2030)



De-risking Energy Access



Dynamic Global Energy Landscape

