

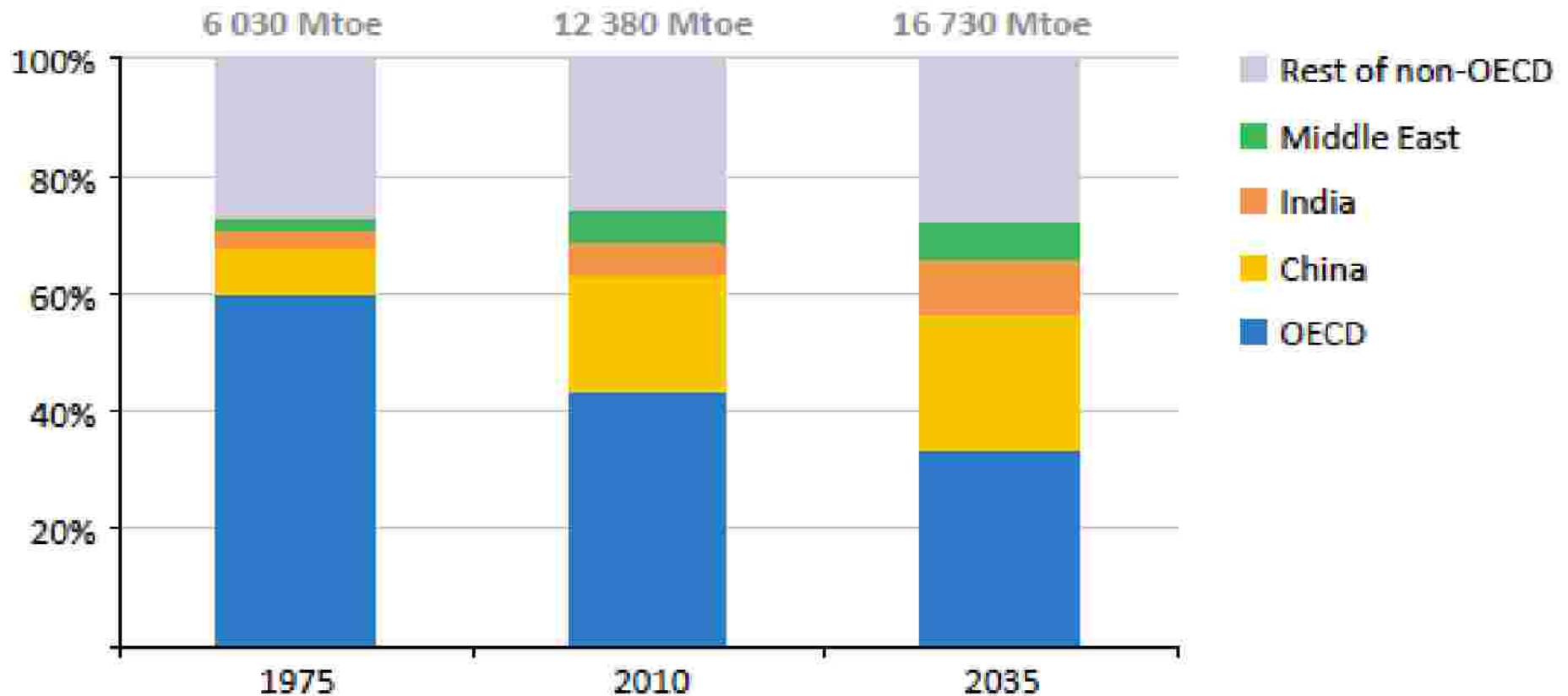
Overview

Chandra Bhushan

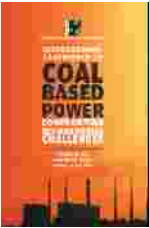
Centre for Science and Environment, New Delhi



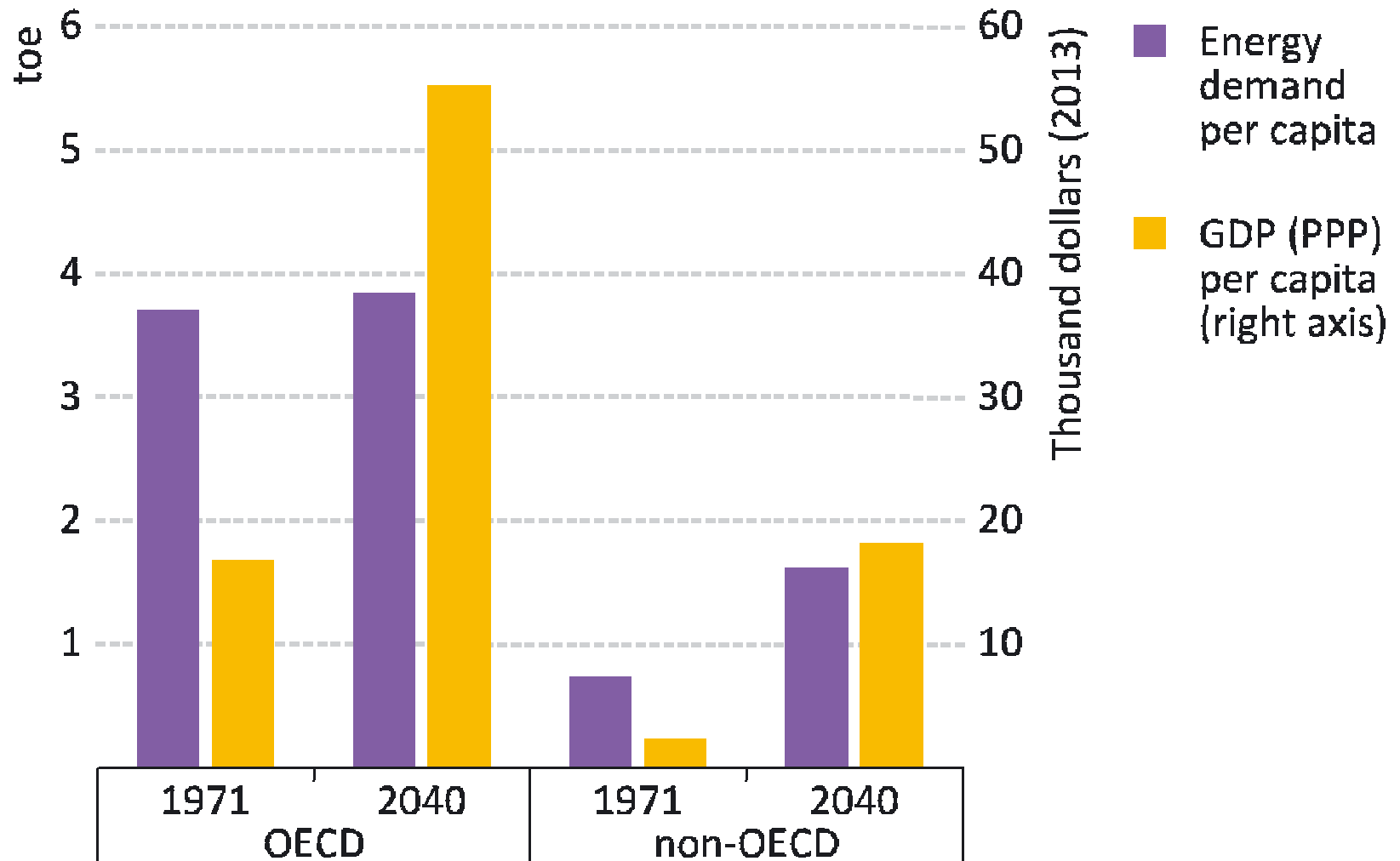
World Energy Demand



- One-third increase in global energy demand during 2011-2035
- World @ 1% pa, China @ 2% pa, India @ 3% pa, OECD @0.2% pa



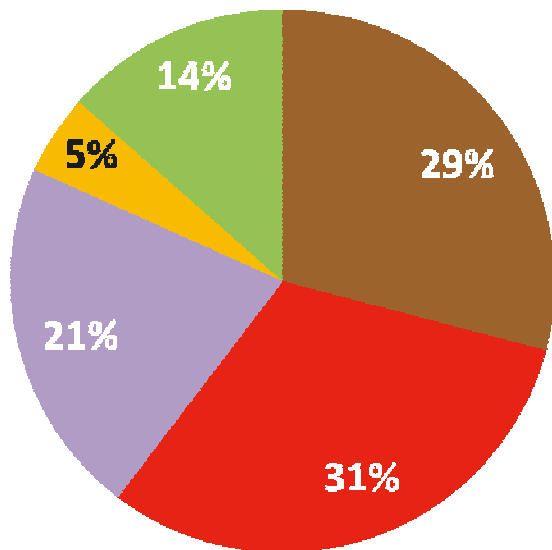
Energy inequality





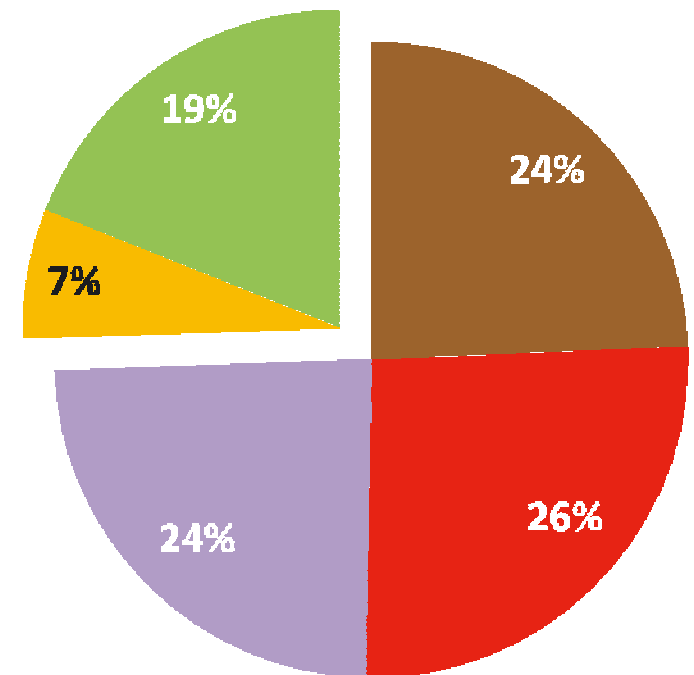
World Energy Mix

2012
13 361 Mtoe



- Coal
- Oil
- Gas
- Nuclear
- Renewables

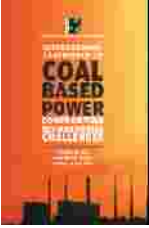
2040
18 290 Mtoe



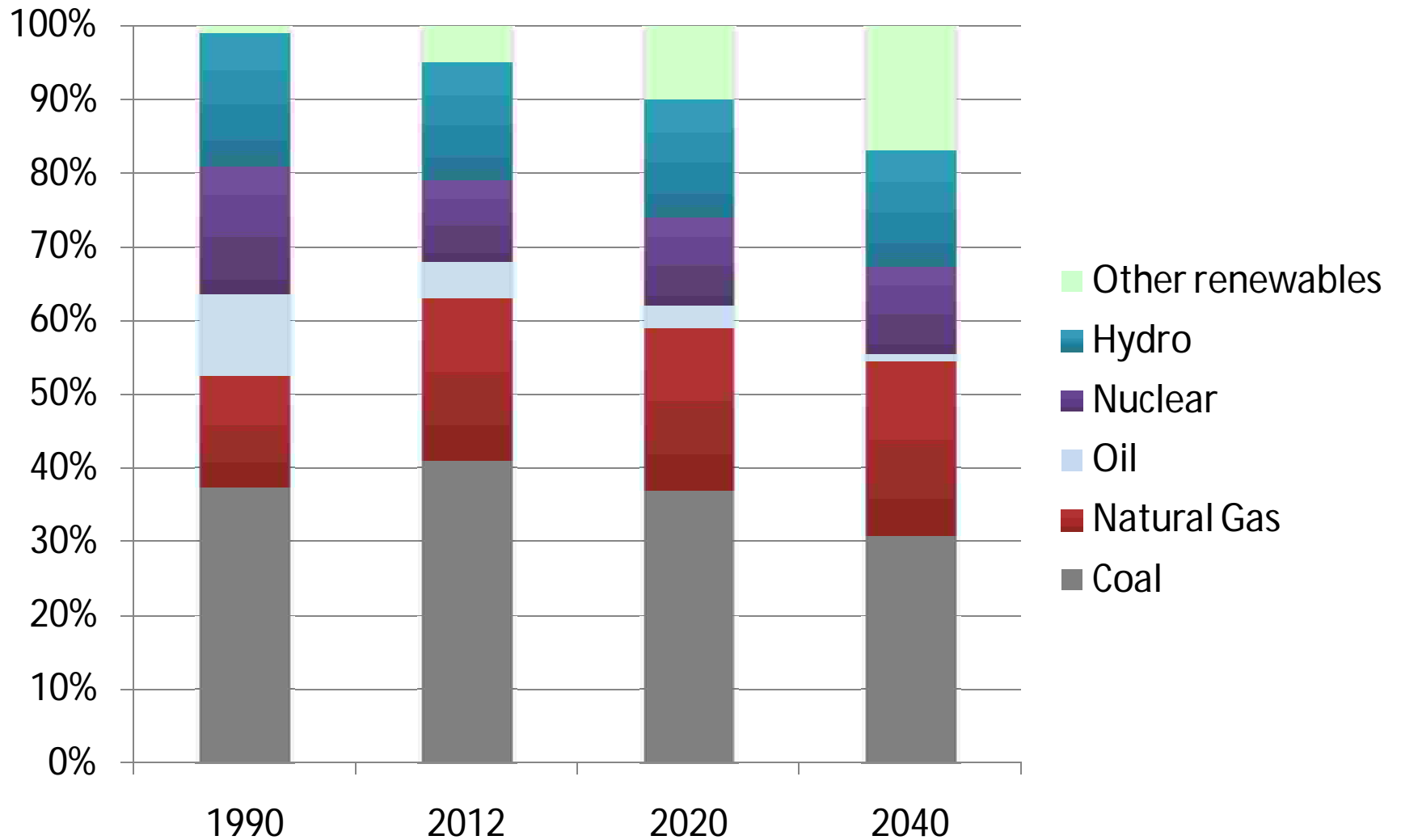


Electricity from Coal: 2014

	Percentage of coal in electricity mix (%)	Percentage of gas in electricity mix (%)	Percentage of fossils in electricity mix (%)
US	38%	30%	68%
Japan	30%	43%	73%
EU	26%	15%	41%
Germany	45%	10%	55%
Australia	67%	20%	87%
China	72%	2%	74%
India	70%	6%	76%

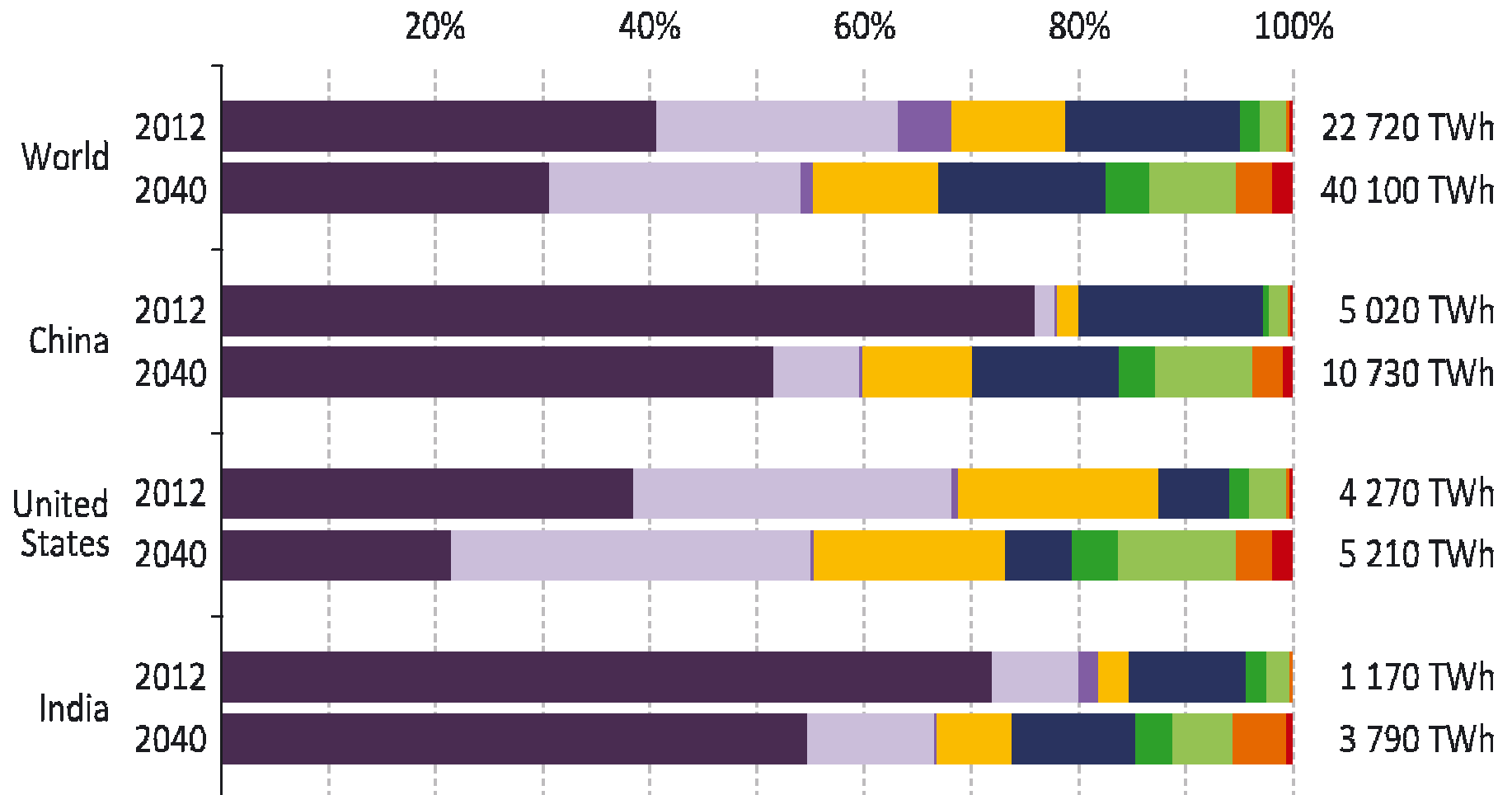


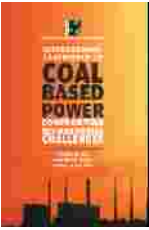
Electricity from Coal: 2040



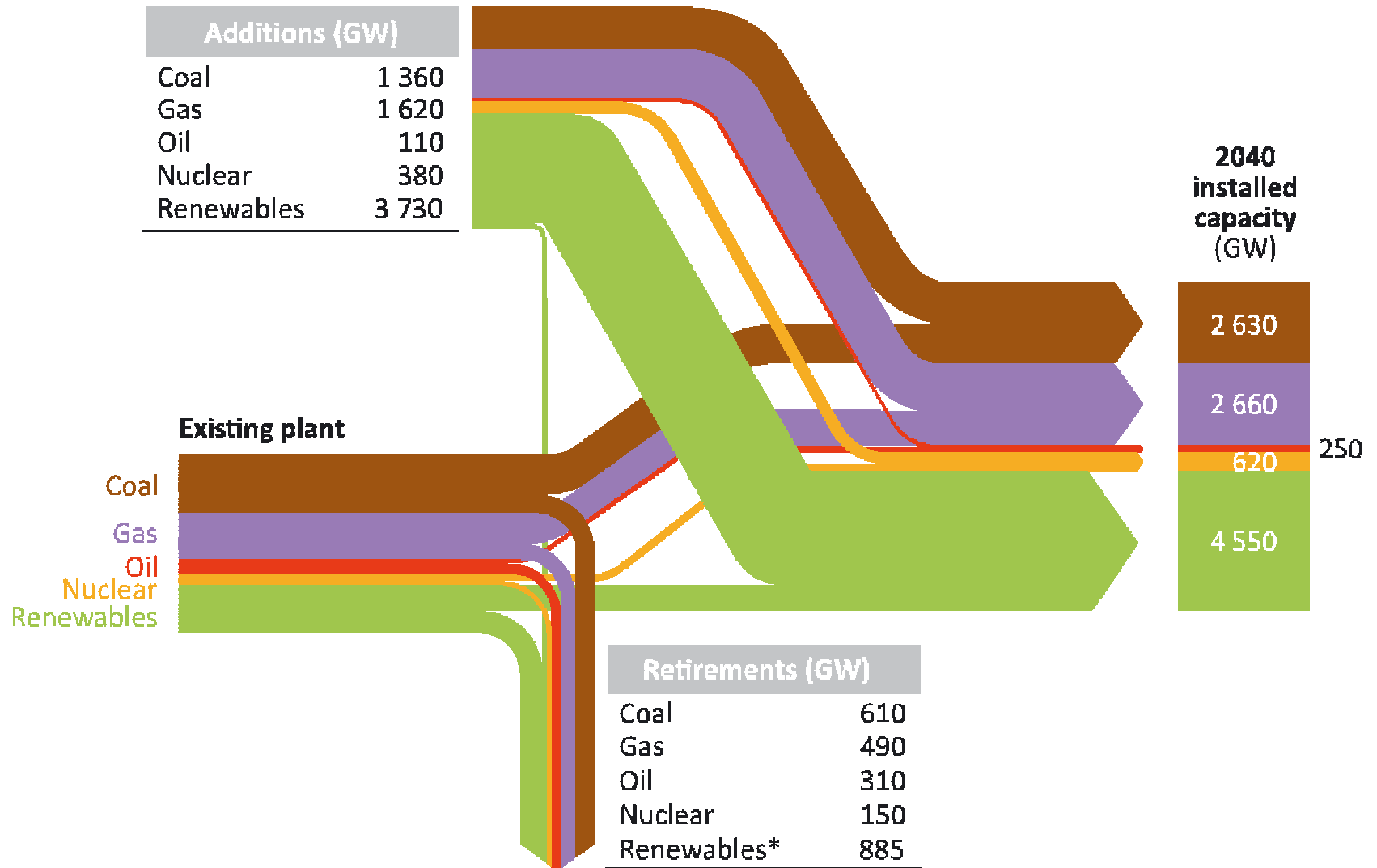


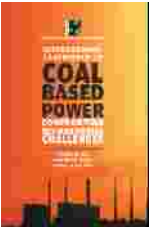
Electricity from Coal: 2040





Coal power installed capacity: 2040





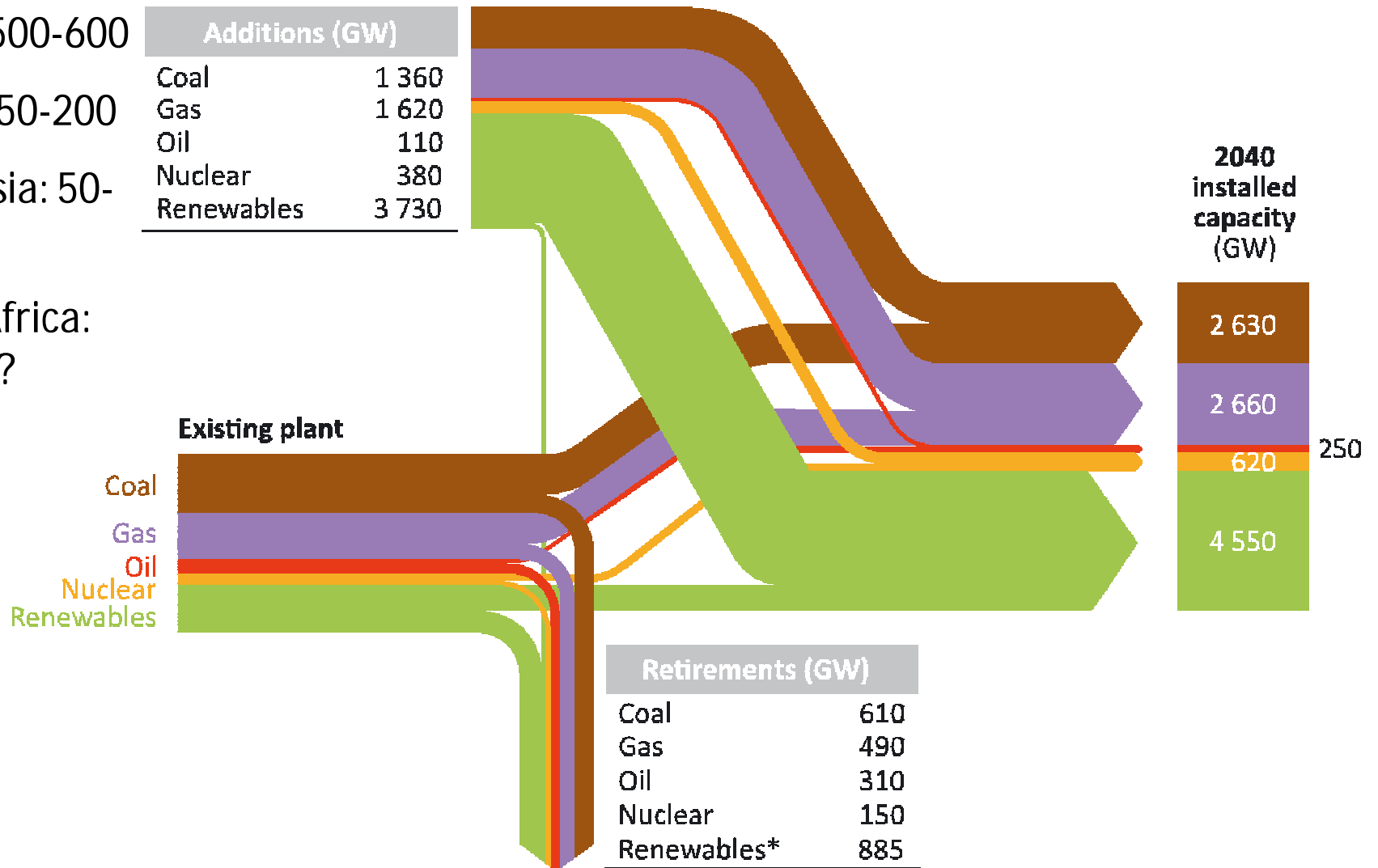
Coal power installed capacity: 2040

China: 500-600

India: 150-200

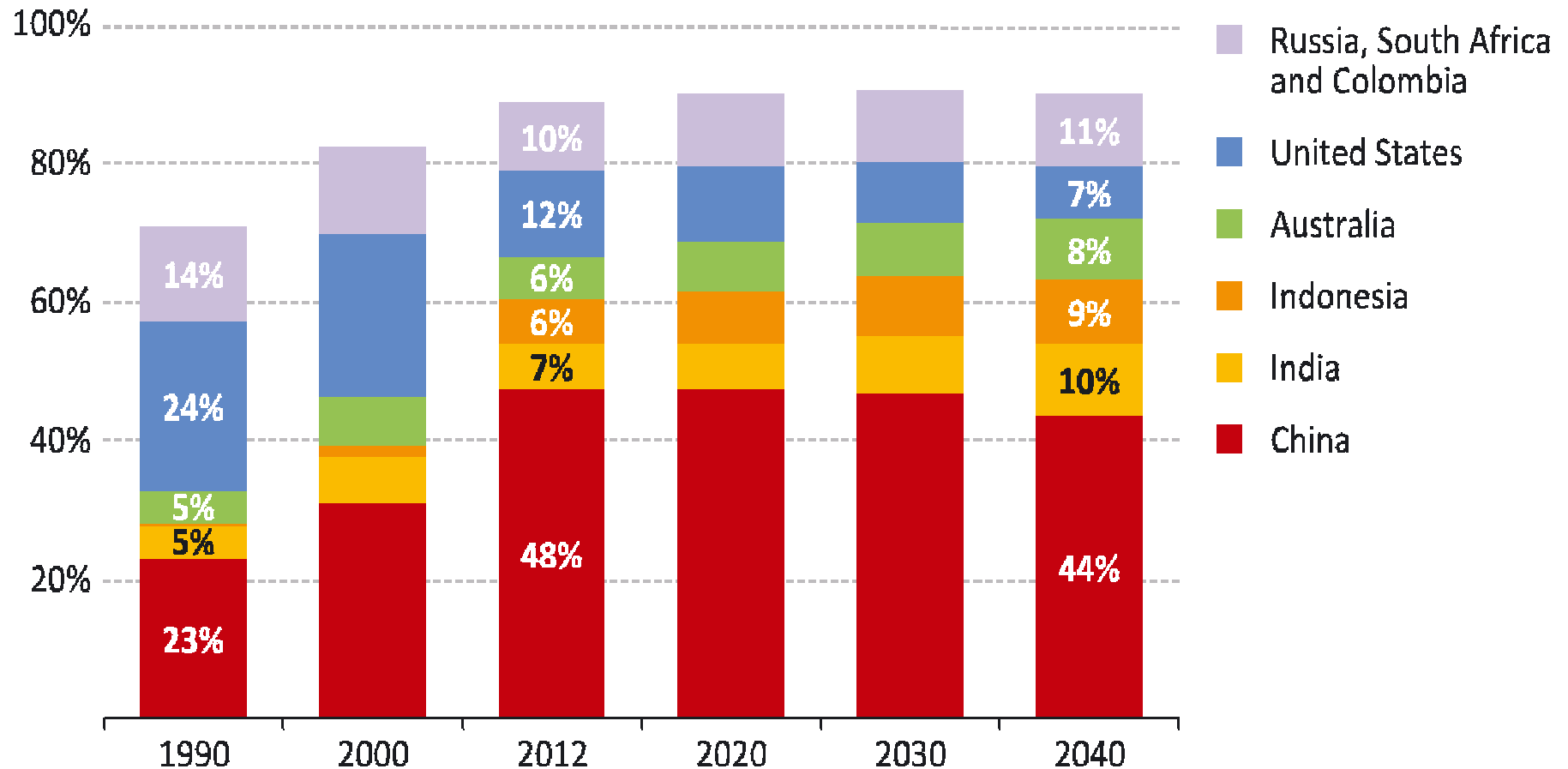
Indonesia: 50-60

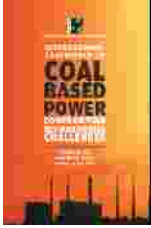
South Africa: 10-20 ??





Share of world coal production





Coal power environmental footprint in India: 2012

Capacity: ~115 GW

Generation: ~620 TWh

Water: 65% of the total freshwater withdrawal by industries

Land (plant & mining): 250,000 ha

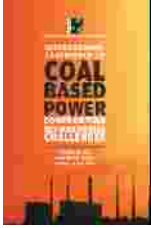
Pollution: Of the total industrial sector:

- q 60% PM emissions

- q 45-50% SO₂ emissions

- q 30% NO_x emissions

- q ~ 80% mercury emissions



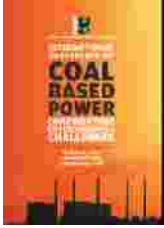
Coal Policies

China: Announced a cap on annual coal consumption at 4.2 billion tonnes by 2020. Also, no new coal power plant after 2030. Strict standards, shuttered old & small plants etc.

India: Enacted strict pollution norms, ambitious non-fossil target for power sector (40% by 2030), Clean energy cess @ \$6.5/tonne of coal.

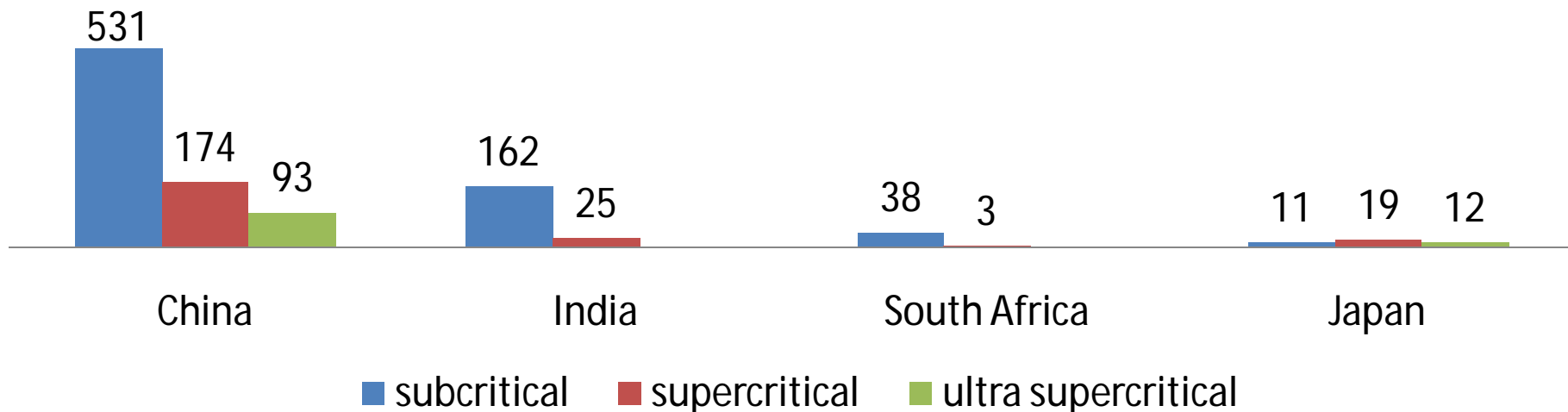
South Africa: Carbon tax starting from 2017, equivalent to \$8.0/ tonne of CO₂e

Indonesia: Planning to enact stricter pollution norms



Future Coal power?

1. Policy roadmap
2. Environmental regulation roadmap
3. Technology roadmap



IEA, 2014