

Alternative industrial sector outcomes in India:

India's energy use could be much higher



For

IEO2019 Issue in Focus webinar

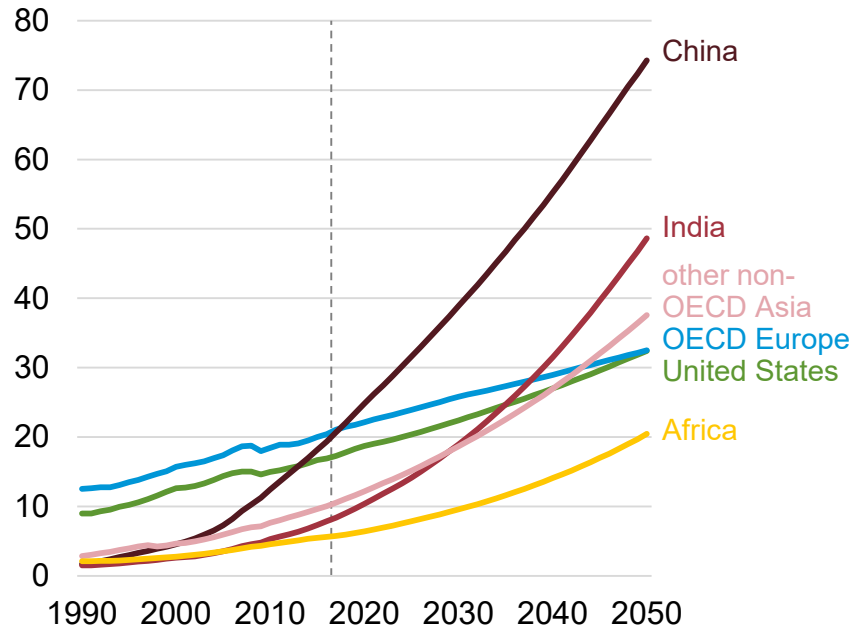
December 12, 2019 | Washington, DC

By

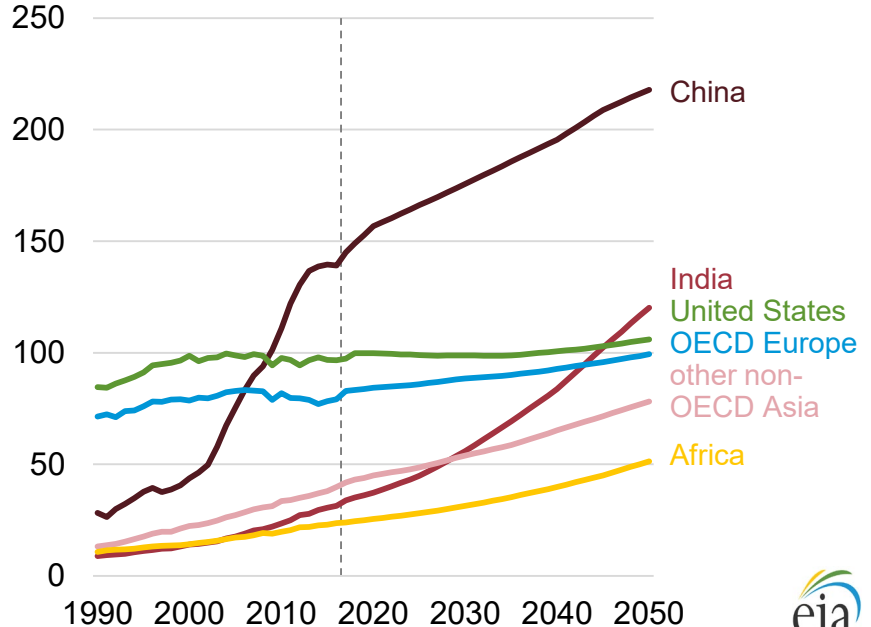
Elizabeth Sendich, Lead Industrial Economist

India is large and growing fast in the IEO2019 Reference case, but much uncertainty can affect energy use

gross domestic product (GDP)
trillion 2010 dollars**



primary energy consumption
quadrillion British thermal units



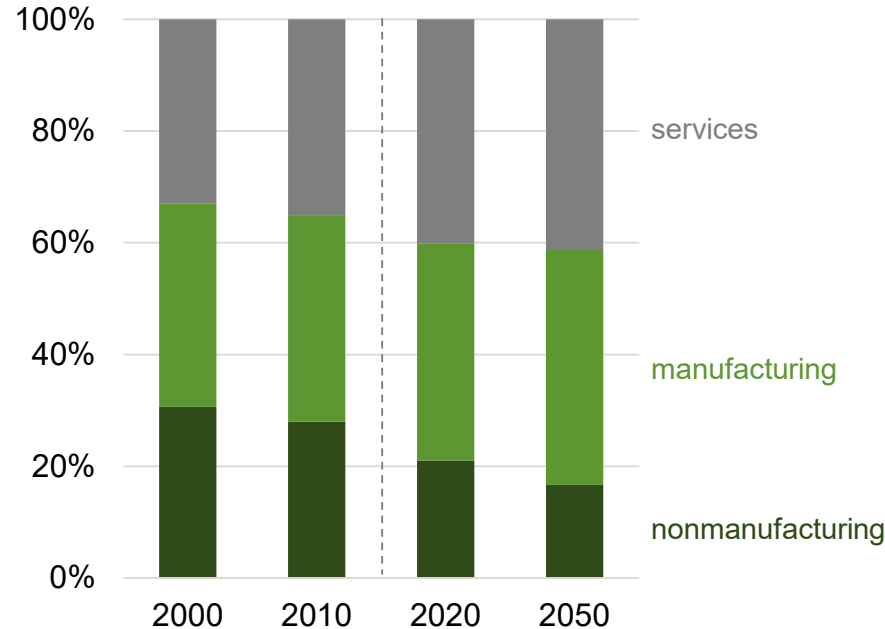
**all dollars reported use purchasing power parity exchange rates



Two key uncertainties are industrial sector energy intensity and economic composition, which determine industrial sector growth

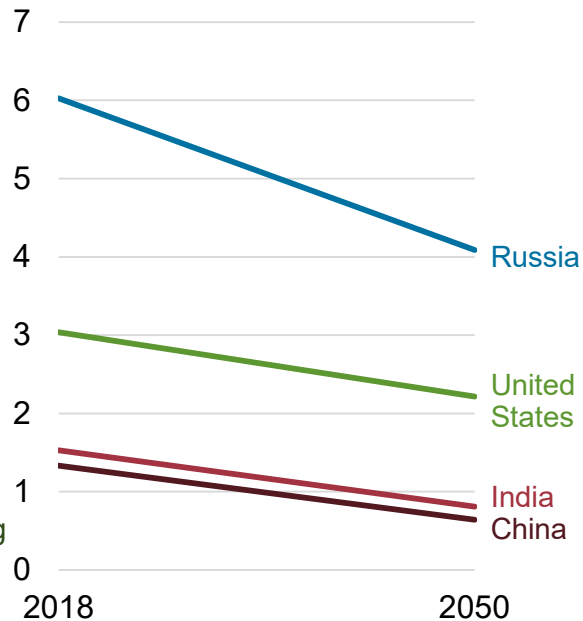
Reference case Indian gross output shares

share of trillion 2010 dollars**



Reference case regional industrial energy intensity

British thermal units per 2010 dollars** gross output



**all dollars reported use purchasing power parity exchange rates

We developed some tests to address uncertainties that could raise energy use to assess the potential outcome

		economic composition assumptions	
		standard	alternative
energy intensity assumptions	standard	Reference case	Composition case
	alternative	Technology case	Combination case

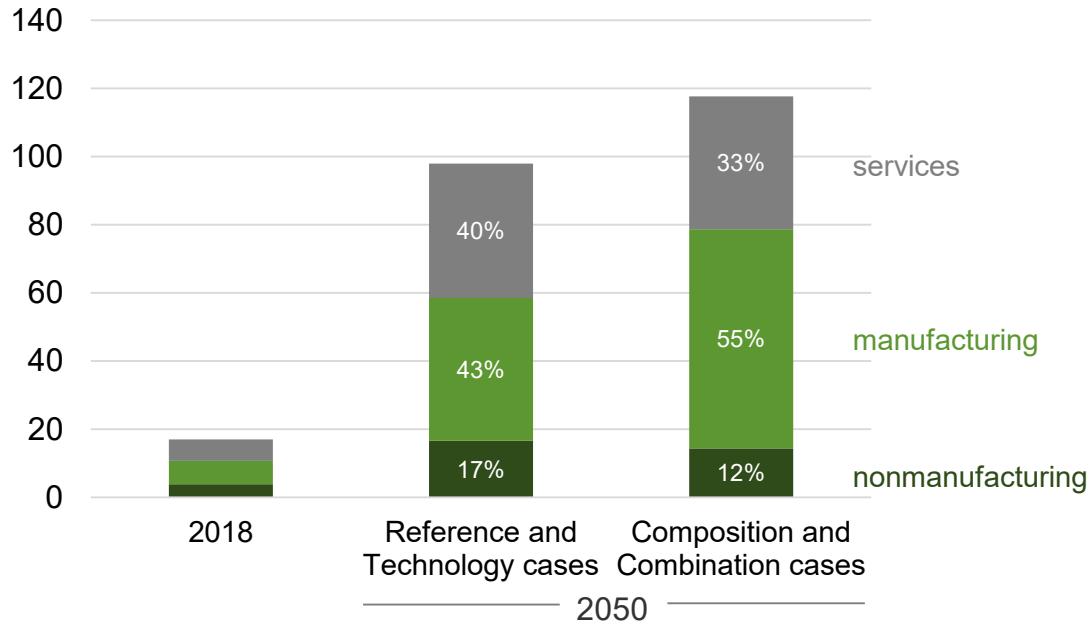
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We tested an alternative economic composition that focused the Indian economy on manufacturing rather than construction and services

Indian gross output by sector

trillion 2010 dollars**



- Indian manufacturing has growth potential greater than in the Reference case based on past policy emphasis of the Indian government
- Alternative maintains a GDP-neutral growth by reducing construction industry and services sector output

**all dollars reported use purchasing power parity exchange rates

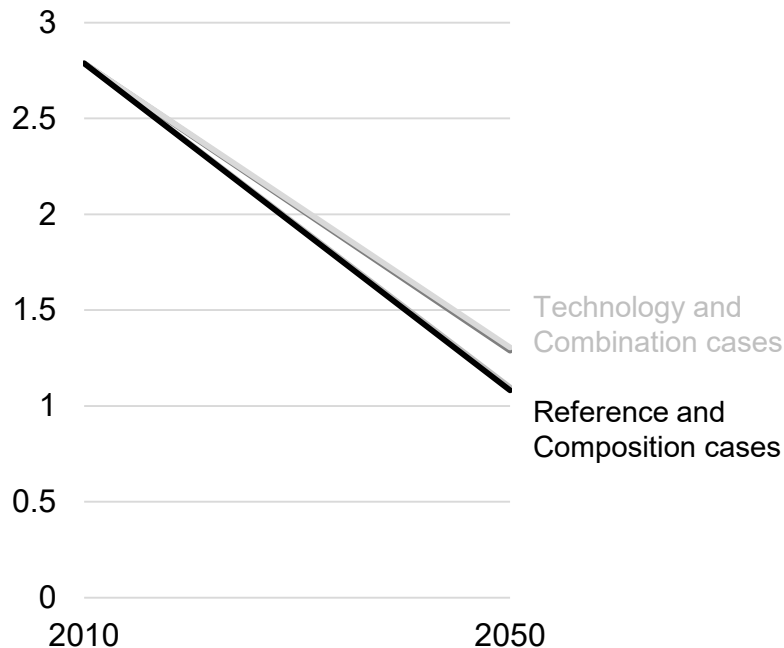
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We tested an alternative technology path that increases energy intensity, implicitly covering changes in technology and technique

Indian manufacturing energy intensity

British thermal units per 2010 dollars**

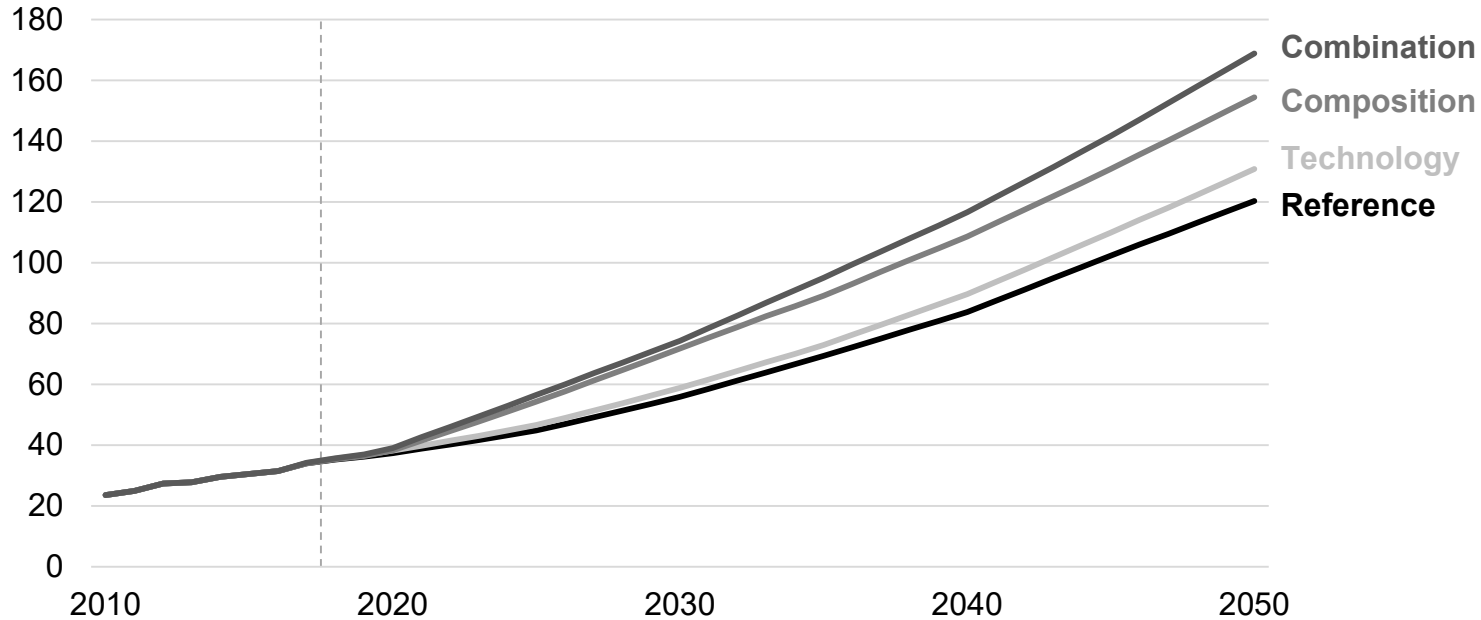


- India's industrial technology does not advance as quickly as in the IEO2019 Reference case—eliminating so-called technology leap-frogging
- This assumption *indirectly* tests different paths of technology adoption, capital substitution for labor, and the addition of recorded energy use that was previously not explicit in national accounting

**all dollars reported use purchasing power parity exchange rates

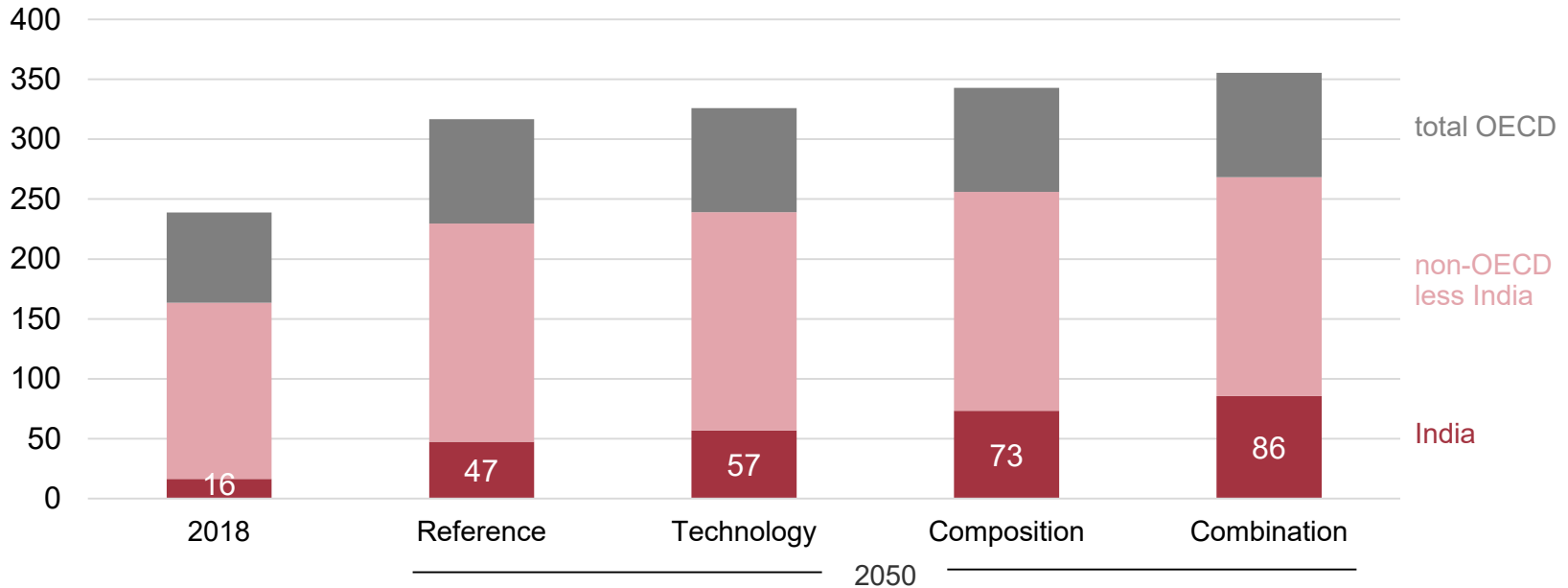
For total Indian energy, the Combination case is more than the sum of its parts—the other tests

Indian primary energy consumption
quadrillion British thermal units



With analytic inputs to other regions held constant, India's share of global industrial output increases, and composition has the larger effect

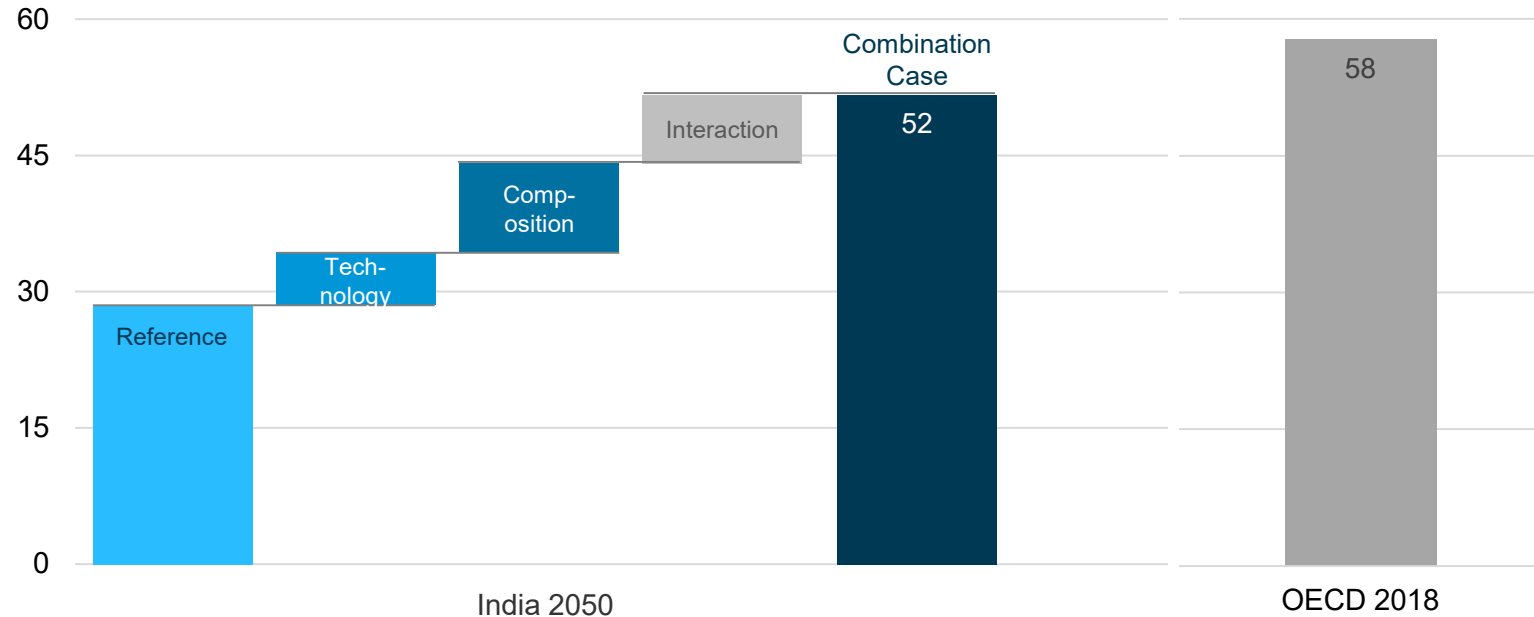
industrial sector energy consumption quadrillion British thermal units



Per capita energy is helpful for comparing across regions, showing the Combination case brings India close to the current OECD average

Industrial sector per capita energy consumption

British thermal units per person



Thank you for your attention, further details are available in the full report

- Additional detailed results include:
 - Assumptions, including what was *not* changed
 - Gross output breakdown by industry
 - Industrial energy use breakdown by fuel

https://www.eia.gov/outlooks/ieo/section_issue_aiso.php

- Discussant: Jitendra Roychoudhury, Research Fellow at King Abdullah Petroleum Studies and Research Center
- Q&A to follow