



The IISS Greening of Asia Project

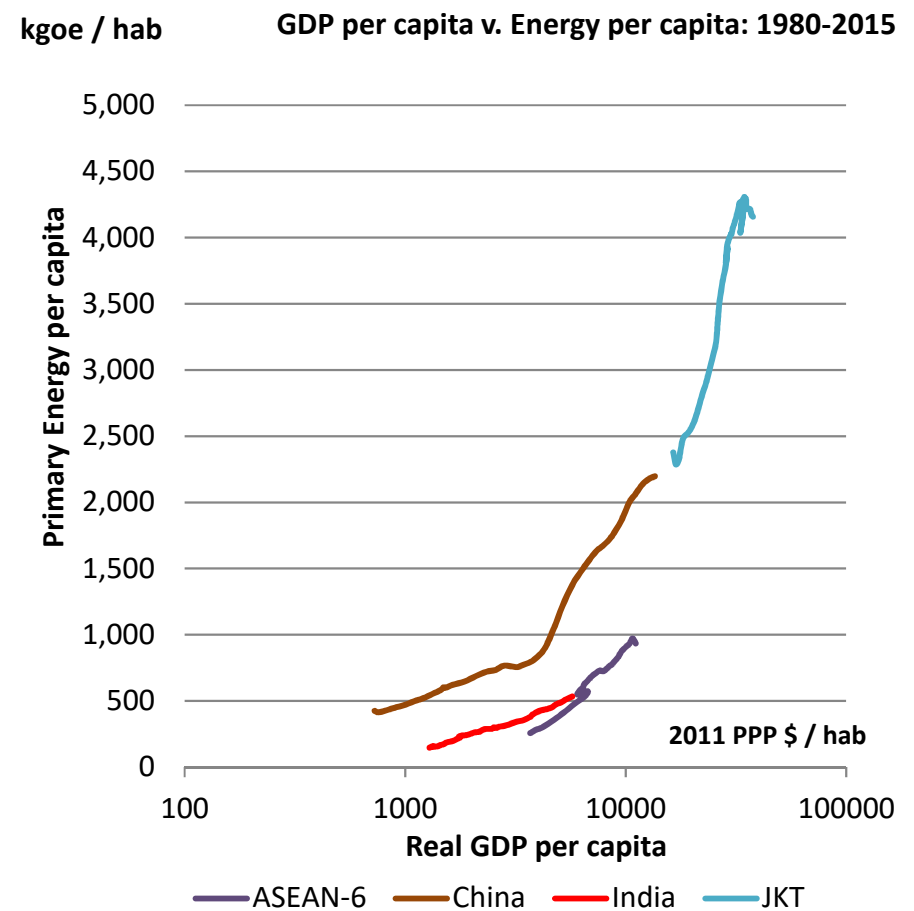
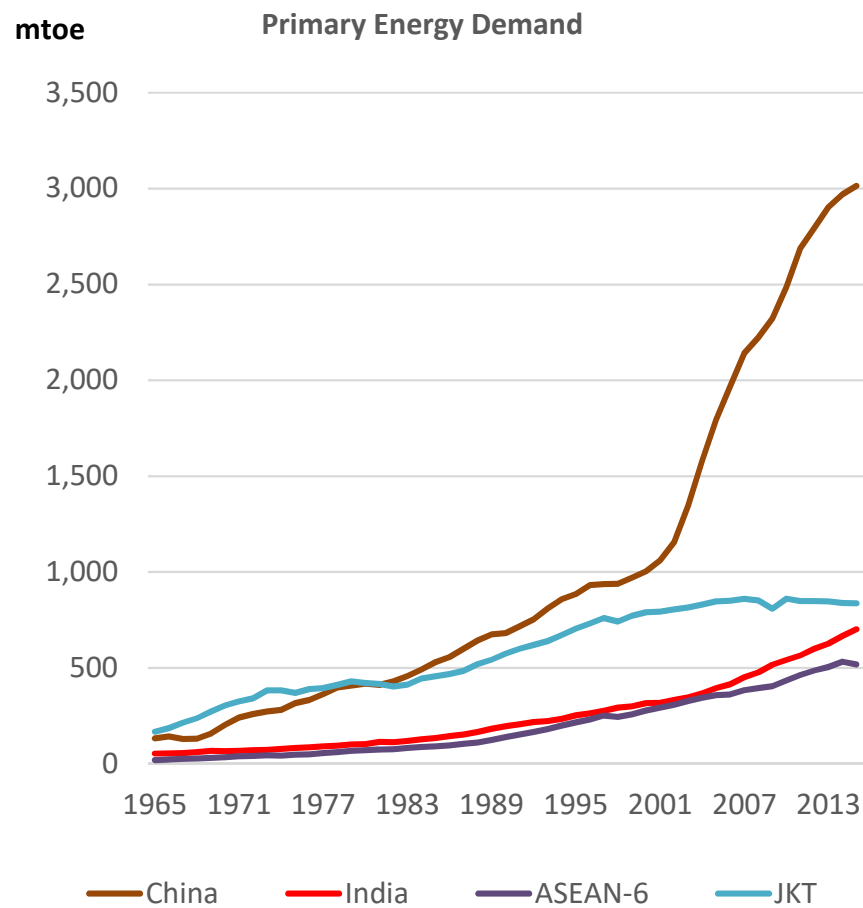
India

Strategic Energy Policy Assessment

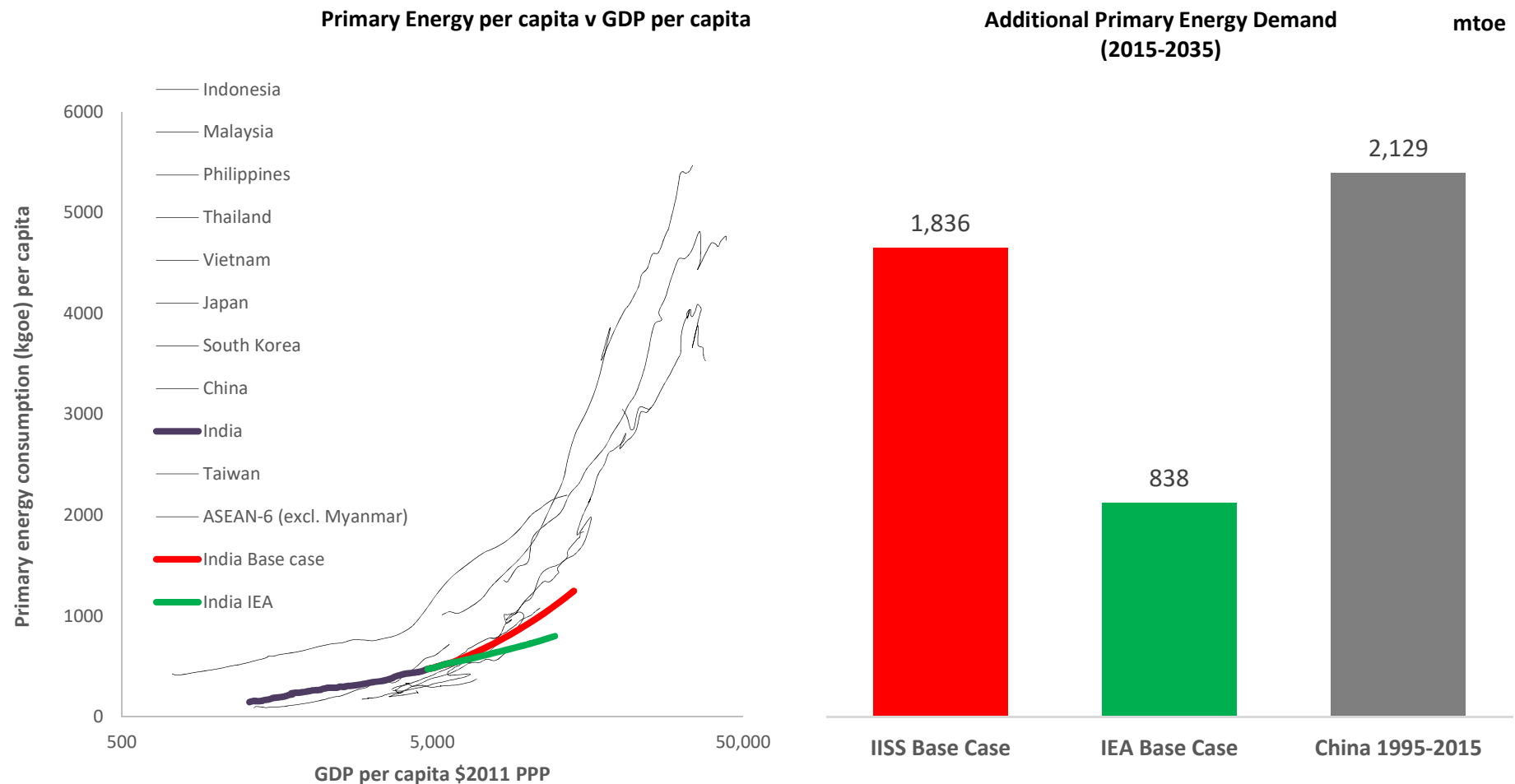
IISS Roundtable on India's Energy Strategy

Singapore International Energy Week, 26 October 2017

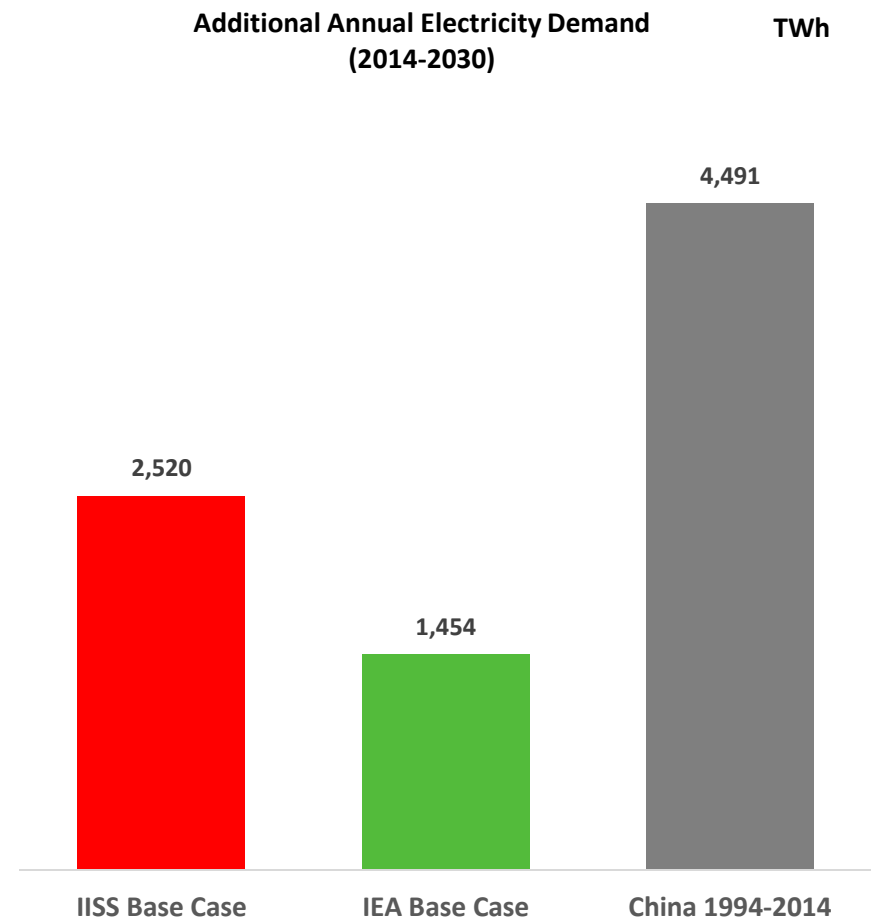
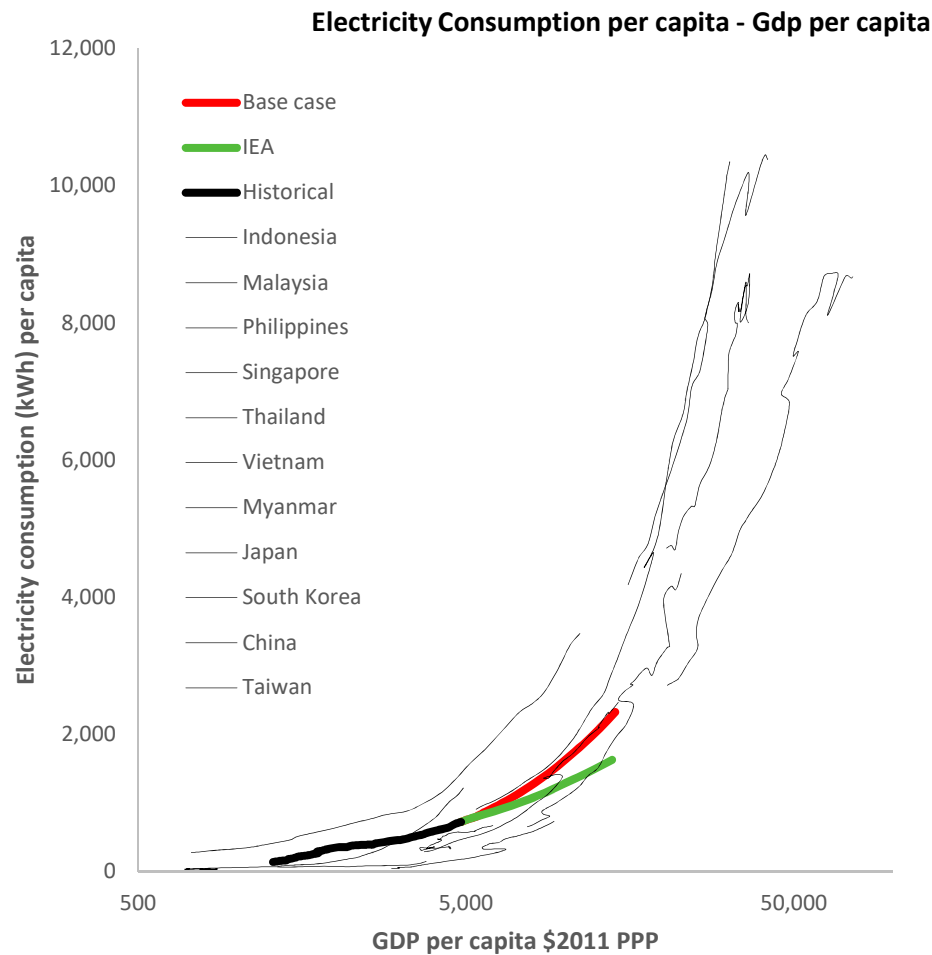
India is a future energy giant



The IEA may underestimate India's future demand for primary energy...



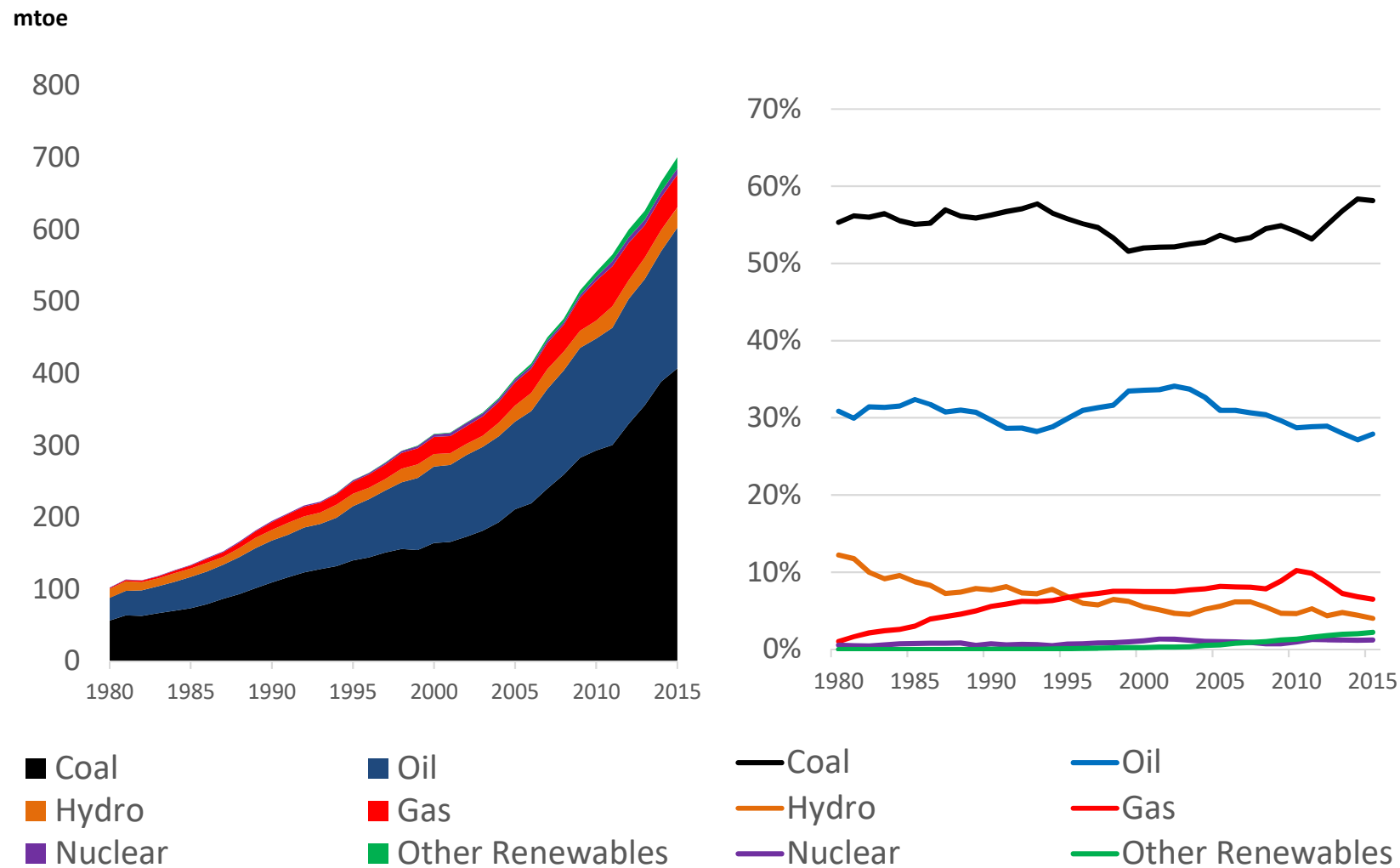
...and electricity as well.



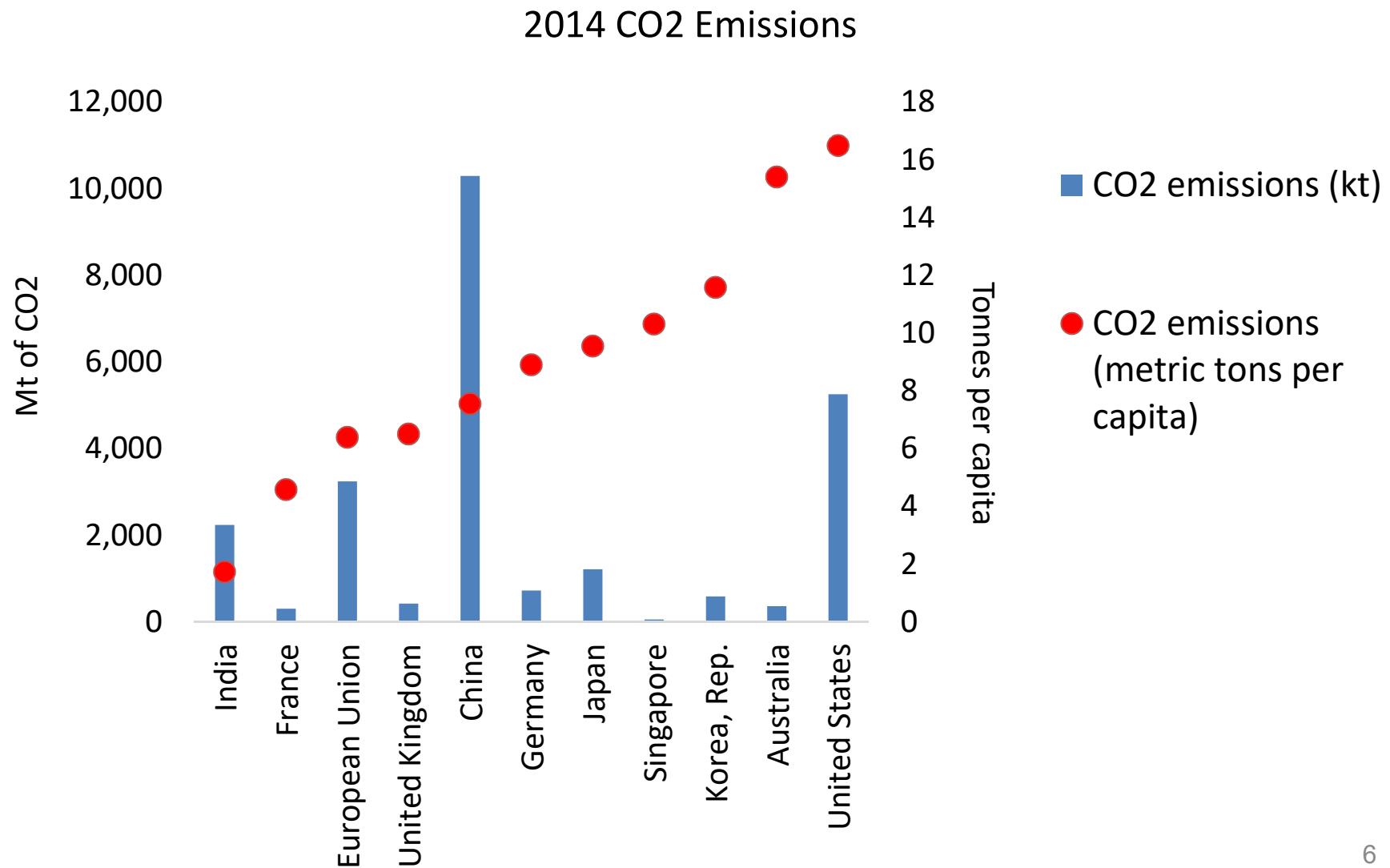
Sources: IISS, based on data from IEA

India is a very coal-intensive country...

Primary Energy Consumption by Fuel (1980-2015)



...and therefore a future CO₂ giant.



India's energy strategy: *development first*

- Economic and social progress; Industrialisation
- Electrification: '24/7 power for all'
- Coal India target: 1 bn tonne per year (<550Mt today)
- When 'green' clashes with 'cheap', India goes for 'cheap'

COP-15 to COP-21: from villain to hero...



Copenhagen, Dec 2009

COP15: Climate-Change Conference

TIME looks at the agenda for the talks in Copenhagen that began on Dec. 7, 2009

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CAPPING CARBON

Why India Is Playing Hard to Get on Climate Change

By Bryan Walsh | Friday, Nov. 06, 2009

If U.S. diplomats consider India to be a major obstacle to global climate-change negotiations — and they do — it might be because of Sunita Narain. The director of the influential Centre for Science and Environment, Narain can be as caustic as she is intelligent, and never more so than when she is taking rich nations to task for what she sees as their hypocrisy on global warming. They pressure the developing world to control carbon emissions even as they refuse to move themselves, she says. "The rich have to reduce their emissions to the point of being small," she says. "We need to be able to do that."



The Copenhagen Protocol

How China and India Sabotaged the UN Climate Summit

What really went on at the UN climate conference in Copenhagen? Secret recordings obtained by SPIEGEL reveal how China and India prevented an agreement on tackling climate change at the crucial meeting. The powerless Europeans were forced to look on as the agreement failed.

By Tobias Rapp, Christian Schwägerl and Gerald Trautetter

Paris, Dec 2015

India's climate leadership at Paris

India has done well to defend its development priorities, while detailing its ambitious renewable energy targets

Vaibhav Chaturvedi | Kanika Chawla



Prime Minister Narendra Modi (centre), environment minister Prakash Javadekar (left) and power minister Piyush Goyal releasing a book at the inauguration of the India Pavilion at COP21 Summit, in Paris, France on 30 November. Photo: PIB

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Not much impact of malware attack on India yet, says Ravi Shankar Prasad

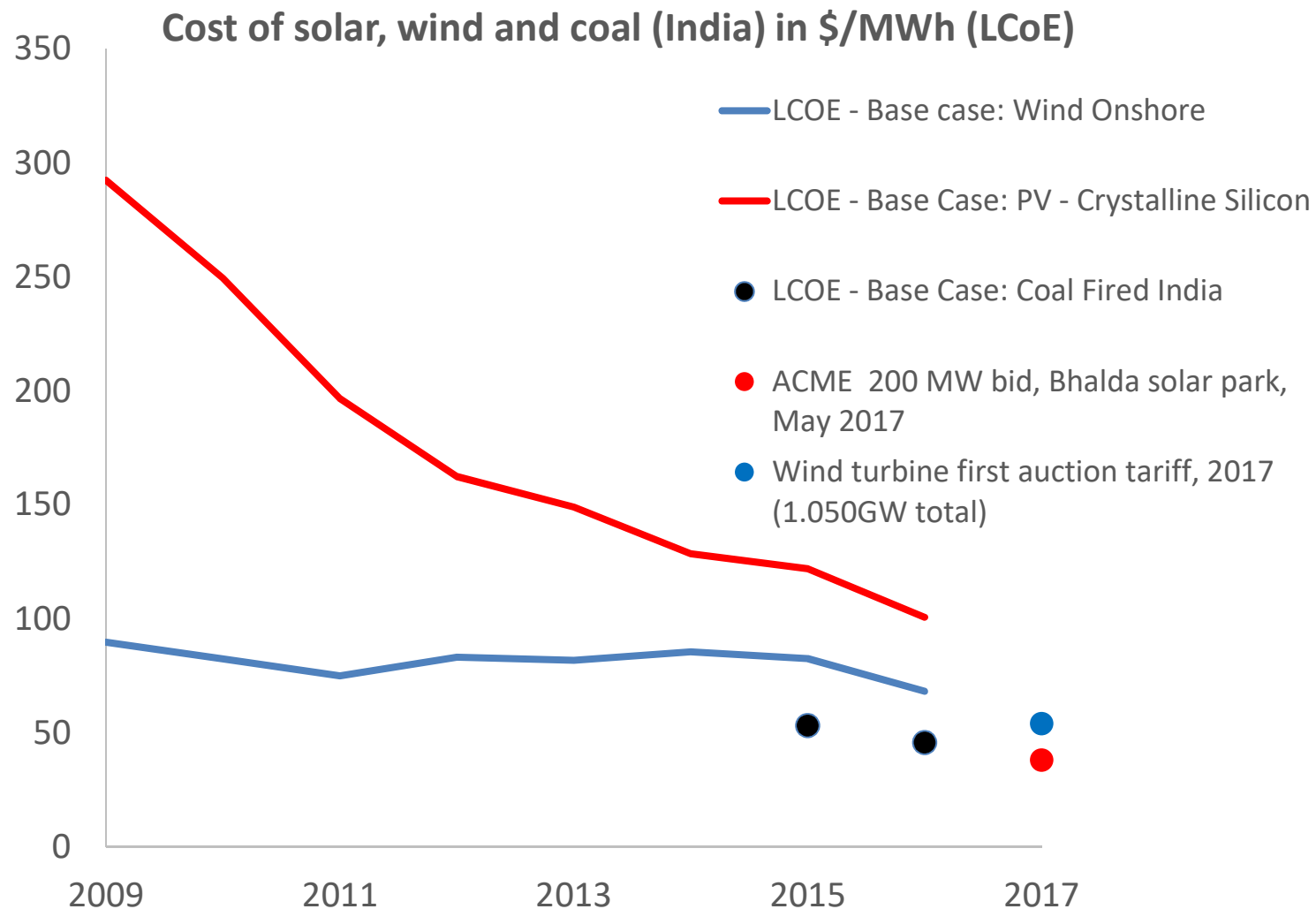


The agreement on climate change, reached in Paris on 12 December, was momentous for reasons beyond the obvious. The world watched the two weeks of negotiations at COP21 (Conference of Parties) eagerly, hoping for a strong and definitive agreement to mitigate and

...as uncertainty is shifted away from cost...

- Kyoto: translate future global 'stock' of emissions into binding targets
 - Intractable 'fairness' problem
 - Cost of compliance is unknown
 - Fierce resistance from large developing countries
-
- Post-Copenhagen (Paris): strictly voluntary commitments
 - No threat to emerging countries' 'right to grow'
 - Resistance disappears
 - Uncertainty moves onto what will be achieved globally

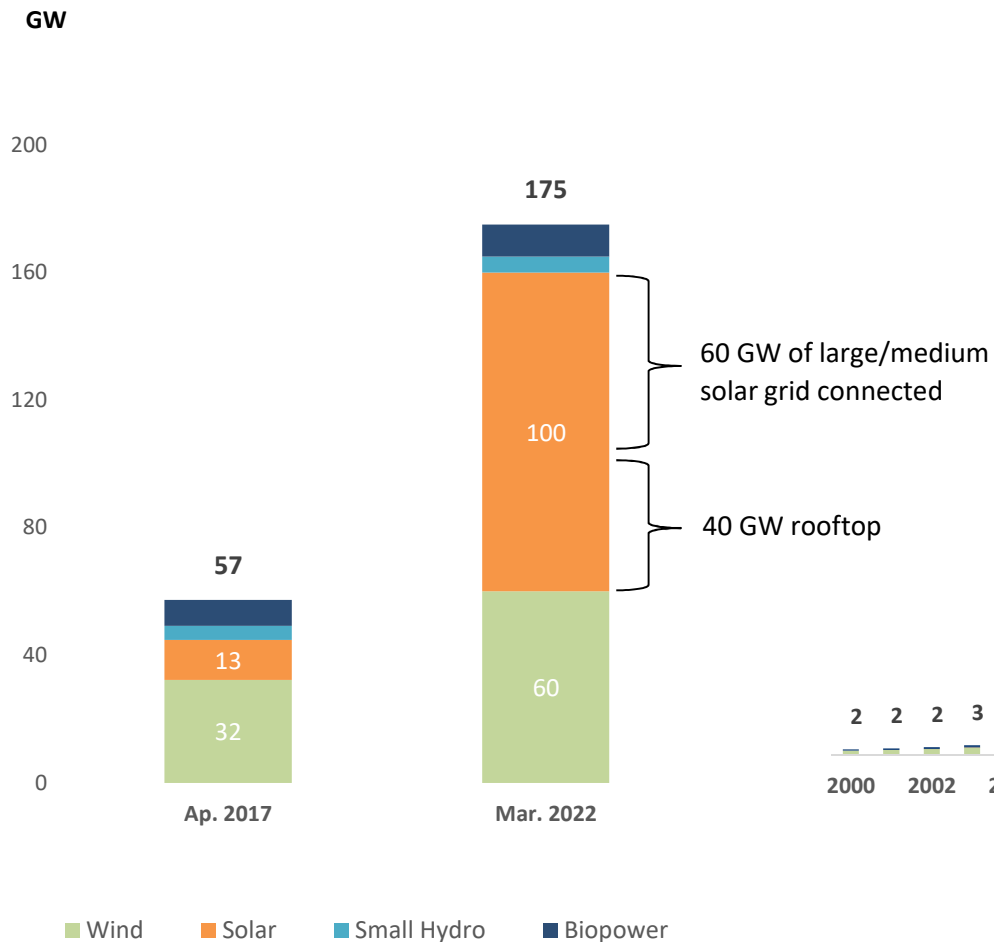
...and 'green' becomes much cheaper.



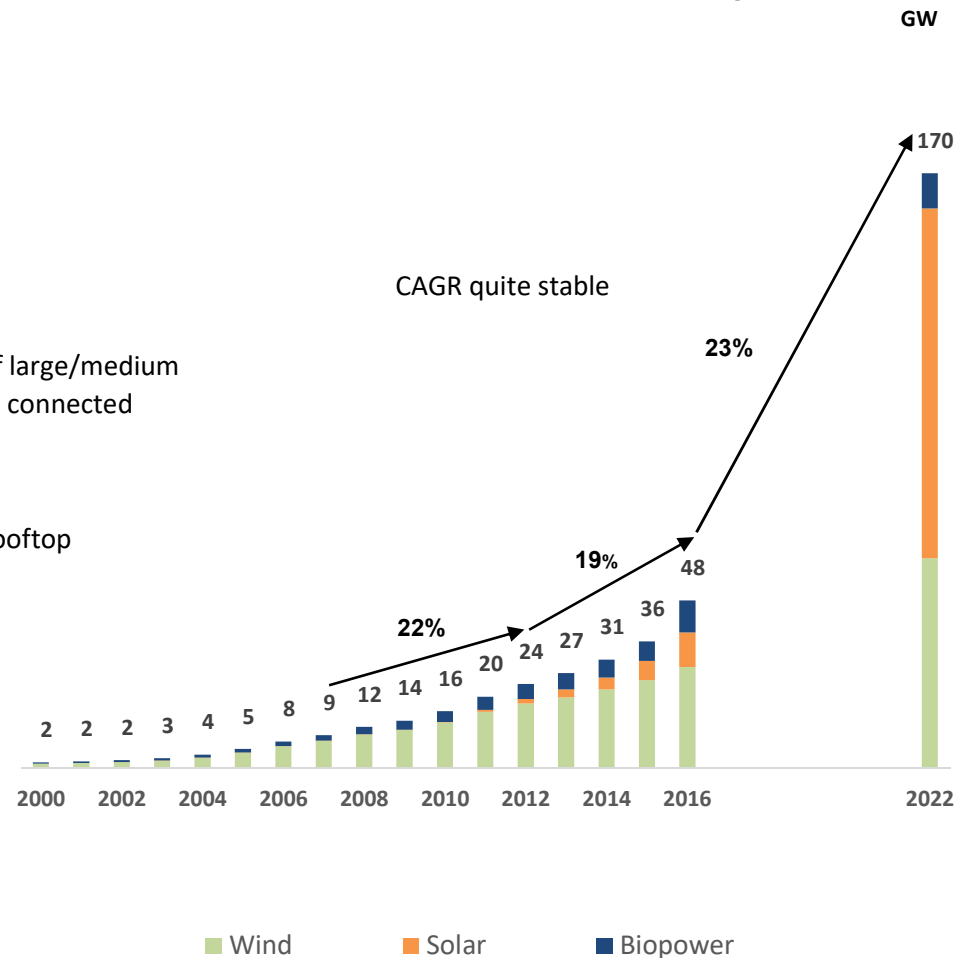
Renewables: centrepiece of India's energy strategy



Gol's Targets for Installed Capacities

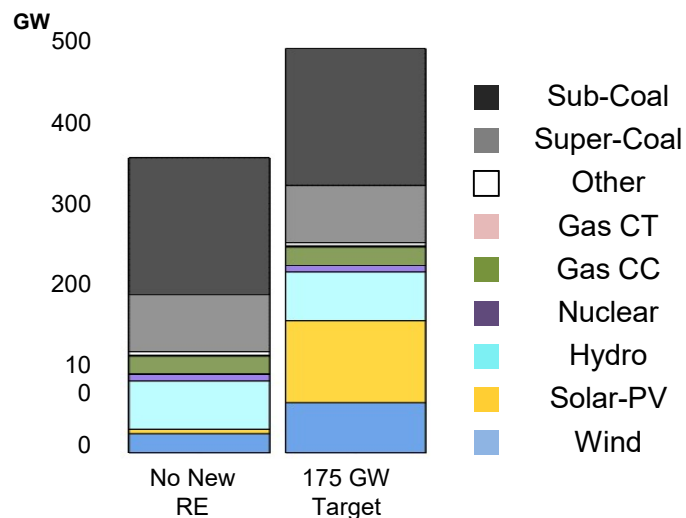


2022 Targets in Historical Perspective (excl. small hydro)

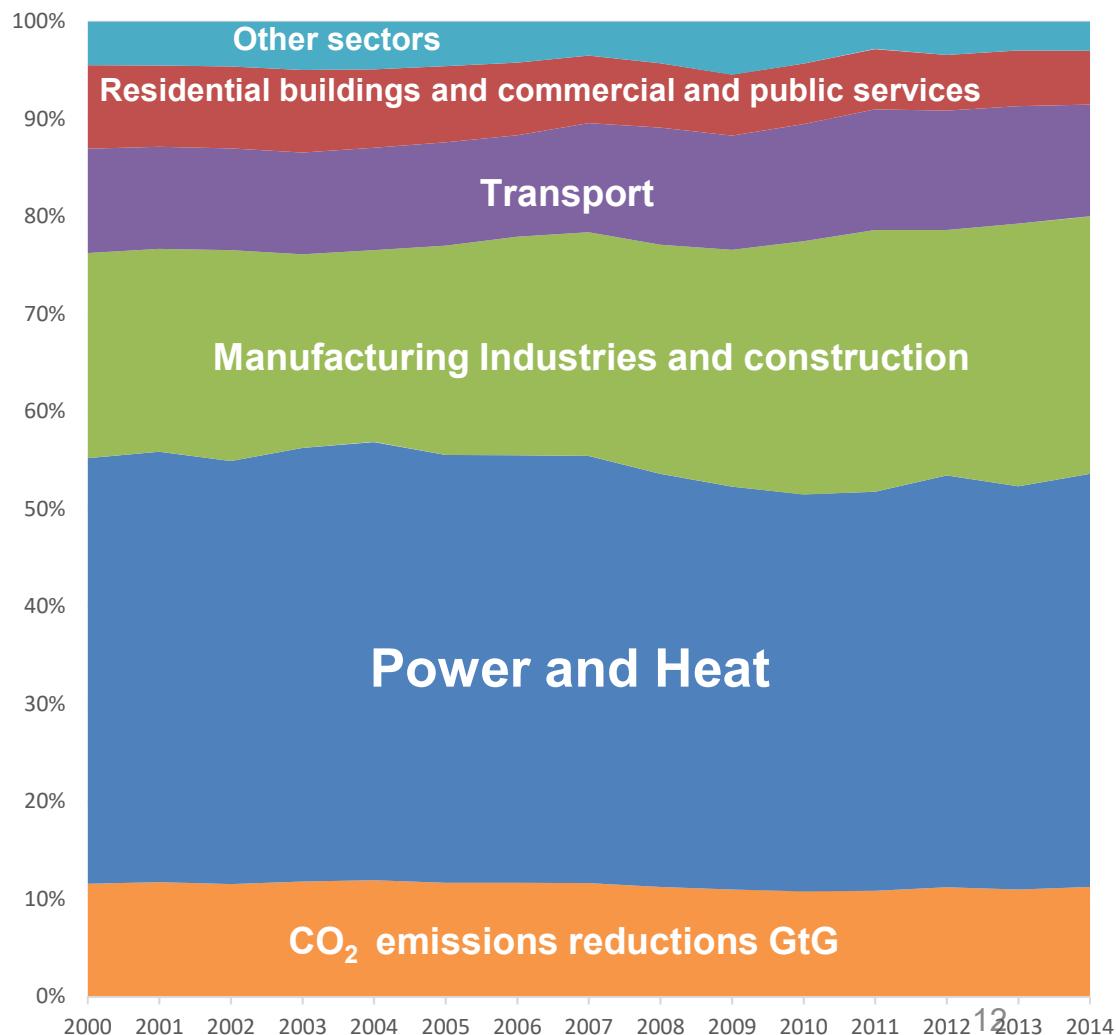


A limited impact on power sector's emissions

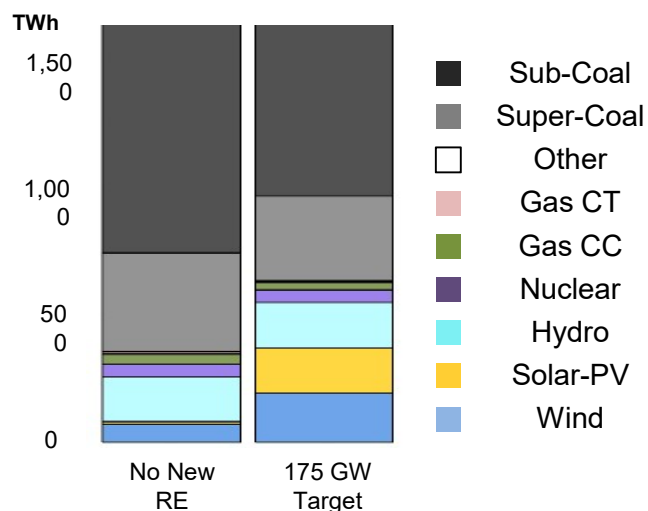
Installed capacity by fuel type in 2022



CO₂ emissions from fuel consumption by sector

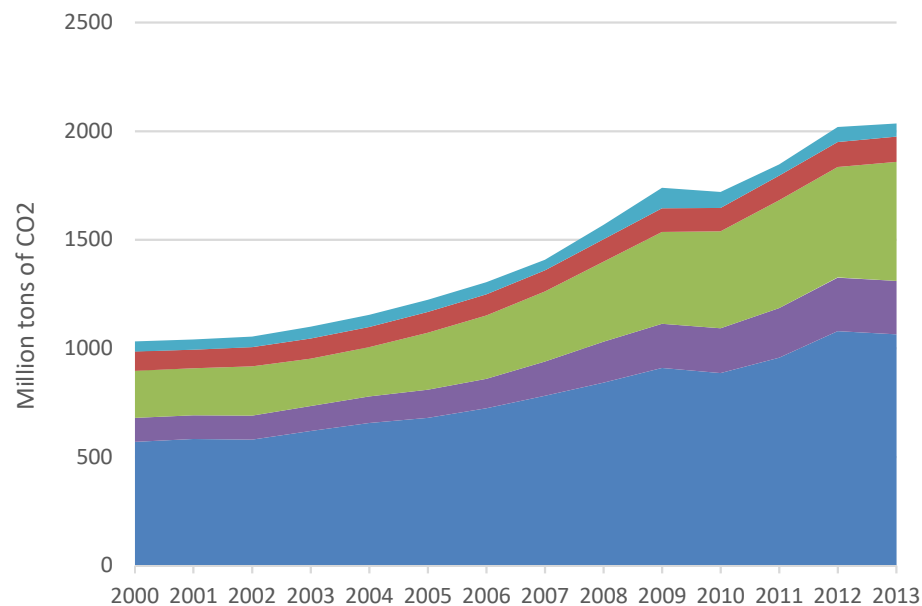


Electricity Generation by fuel type in 2022



...and big problems left unaddressed

Power: 50% of emissions



- CO₂ emissions from other sectors, excluding residential buildings and commercial and public services
- CO₂ emissions from residential buildings and commercial and public services
- CO₂ emissions from manufacturing industries and construction
- CO₂ emissions from transport
- CO₂ emissions from electricity and heat production, total

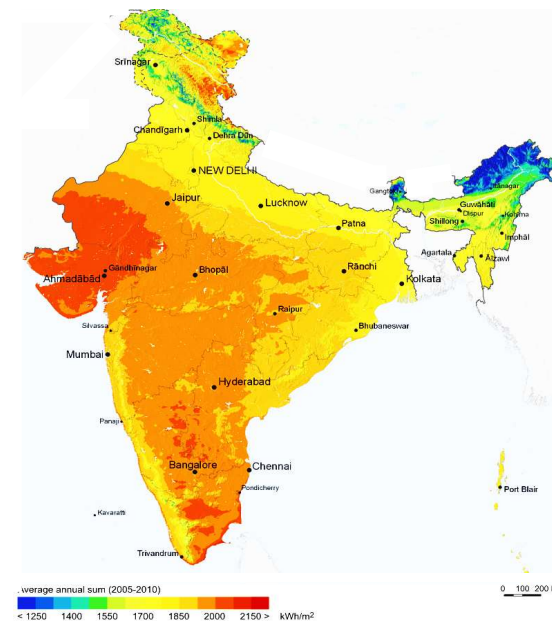
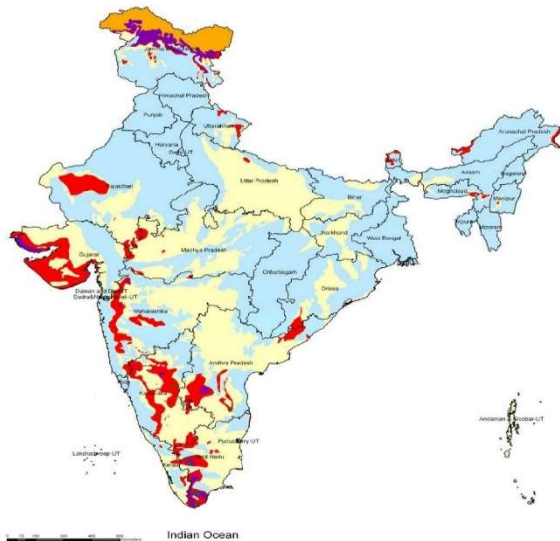
Sources: World Bank; WHO

10 Indian cities among 20 most polluted

Rank	Country	City	PPM 2.5	Rank	Country	City	PPM 2.5
1	Iran	Zabol	217	20	India	Amritsar	108
2	India	Gwalior	176	21	India	Gobindgarh	108
3	India	Allahabad	170	22	Pakistan	Rawalpindi	107
4	Saudi Arabia	Riyadh	156	23	China	Hengshui	107
5	Saudi Arabia	Al Jubail	152	24	Bangladesh	Narayanganj	106
6	India	Patna	149	25	Iran	Boshehr	105
7	India	Raipur	144	26	India	Agra	105
8	Cameroon	Bamenda	132	27	Uganda	Kampala	104
9	China	Xingtai	128	28	China	Tangshan	102
10	China	Baoding	126	29	India	Jodhpur	101
11	India	Delhi	122	30	India	Dehradun	100
12	India	Ludhiana	122	31	India	Ahmedabad	100
13	Saudi Arabia	Dammam	121	32	India	Jaipur	100
14	China	Shijiazhuang	121	33	India	Howrah	100
15	India	Kanpur	115	34	India	Faridabad	98
16	India	Khanna	114	35	Saudi Arabia	Yenbu	97
17	India	Firozabad	113	36	China	Langfang	96
18	India	Lucknow	113	37	India	Dhanbad	95
19	China	Handan	112	38	Bangladesh	Chittagong	95
20	Pakistan	Peshawar	111	39	Iran	Ahvaz	95

However, significant implementation challenges

- Contractual structure
- Integration of intermittent / unreliable generation



- Addressed in Ashwin's presentation

Broadening and hedging the strategy

- Implicit bet on cheap electricity storage
- Electric vehicles: good complement to the RE strategy
 - Storage
 - Urban air quality
- India needs a gas strategy
 - Reduces RE integration problems
 - Precondition for industrial emissions regulations
 - Good hedge of the bet on cheap storage
- Cheap v green is less severe. Seizing RE opportunity is smart.
- RE-based energy strategy is incomplete. It needs broadening and hedging to avoid political legitimacy crisis when problems arise.