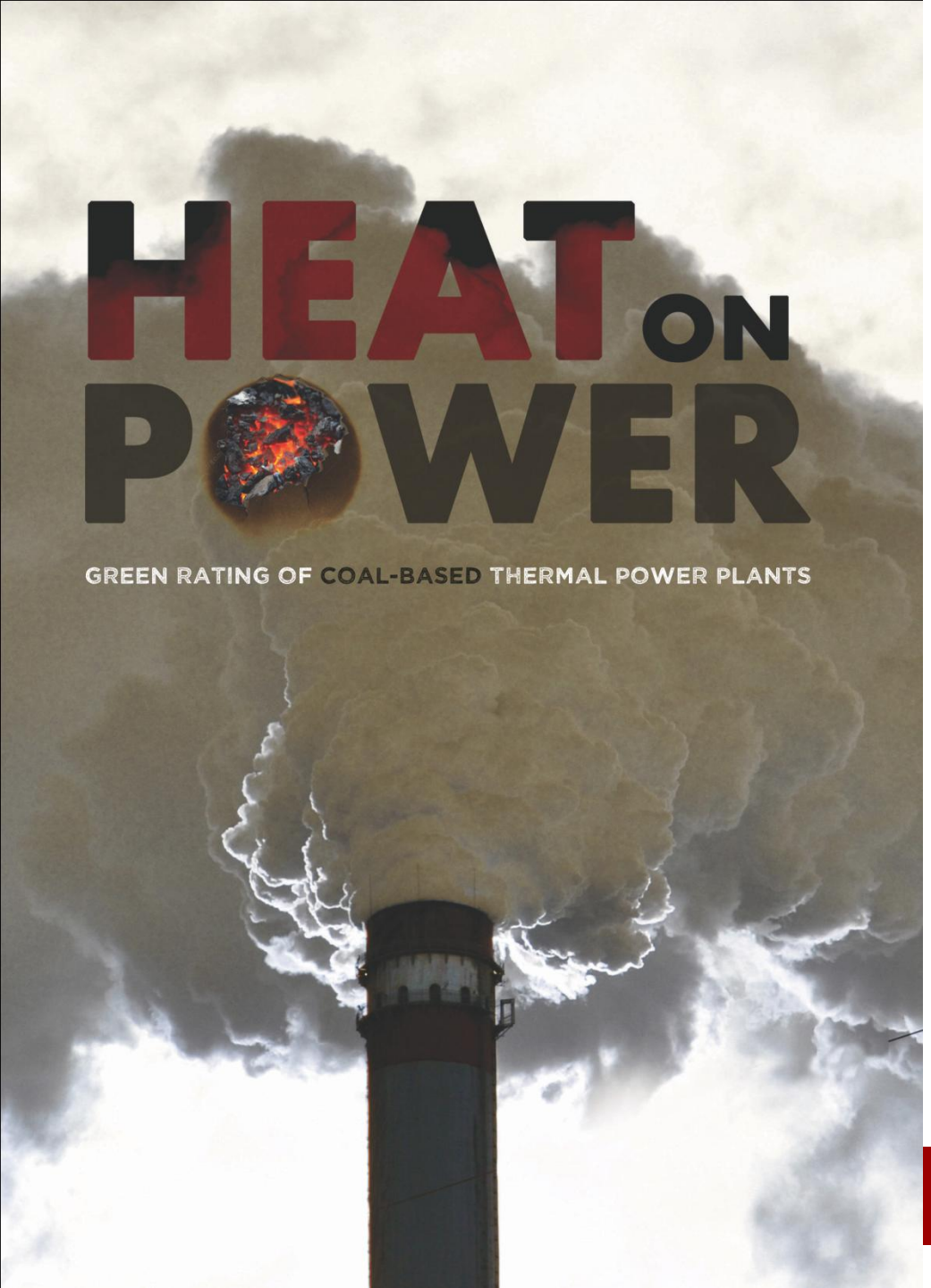


CSE THE FIVE LEAVES AWARD

WAY AHEAD

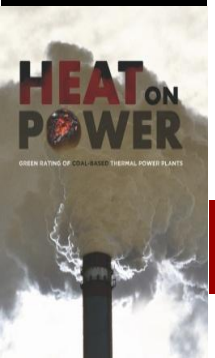
Environmental footprint

Water: 70 per cent of the total freshwater withdrawal by industrial sector

Coal: Over 70 per cent of the total coal consumed

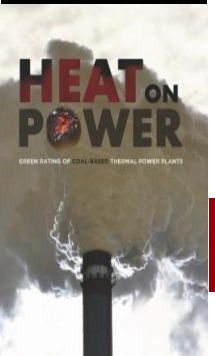
Pollution: Of the total industrial sector:

- 60 per cent of PM emissions
- 45-50 per cent of SO_2 emissions
- 30 per cent of NOx emissions
- More than 80 per cent of mercury emissions



Mismatch between regulation and environmental footprint

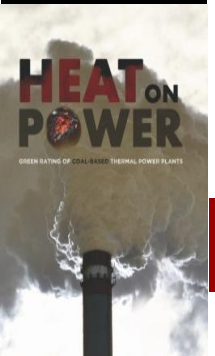
	China	China *(polluted regions)*	India
PM (mg/Nm^3)	30	20	150-350 (50 for some)
SO_2 (mg/Nm^3)	100	50	None
NO_x (mg/Nm^3)	100	100	None
Hg (mg/m^3)	0.03	0.03	None



Most efficient stock least efficiently utilized

Rank (score)	Plant	Gross Efficiency (%)	PLF (%)
10 (36%)	Tata - Mundra	38.1	74
12 (28%)	NTPC - Sipat	36.5	68.3
15 (26%)	Adani - Mundra	31.5	52.4

Should we be building more power plants or incentivizing existing to produce more and efficiently?

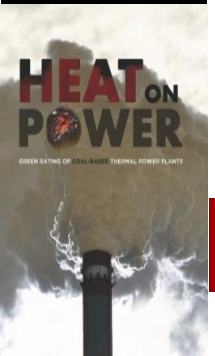


Costs and regulation

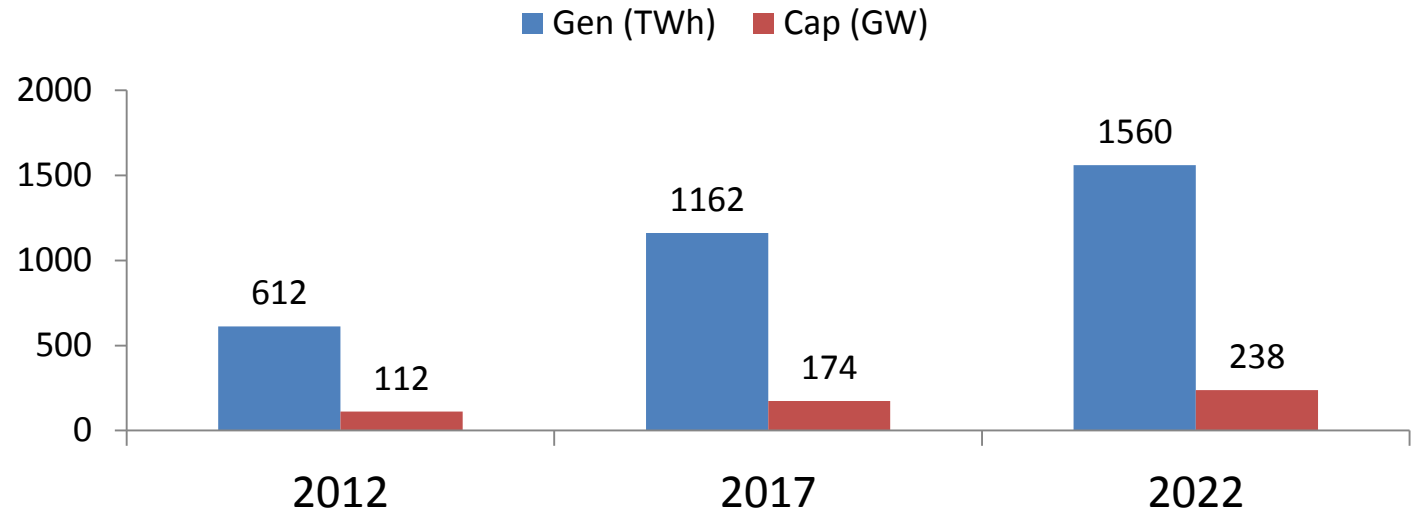
✓Higher pollution standards will increase power tariff is not a tenable argument. Cost of pollution control is only about 10% of the operating and capital costs

✓Our present regulatory institutions don't have the ability or the tools to enforce standards.

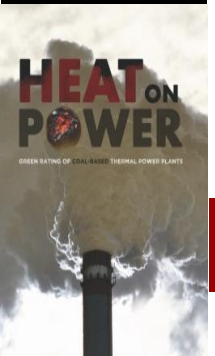
✓Regulation is not sufficient; incentives and promotions are also required.



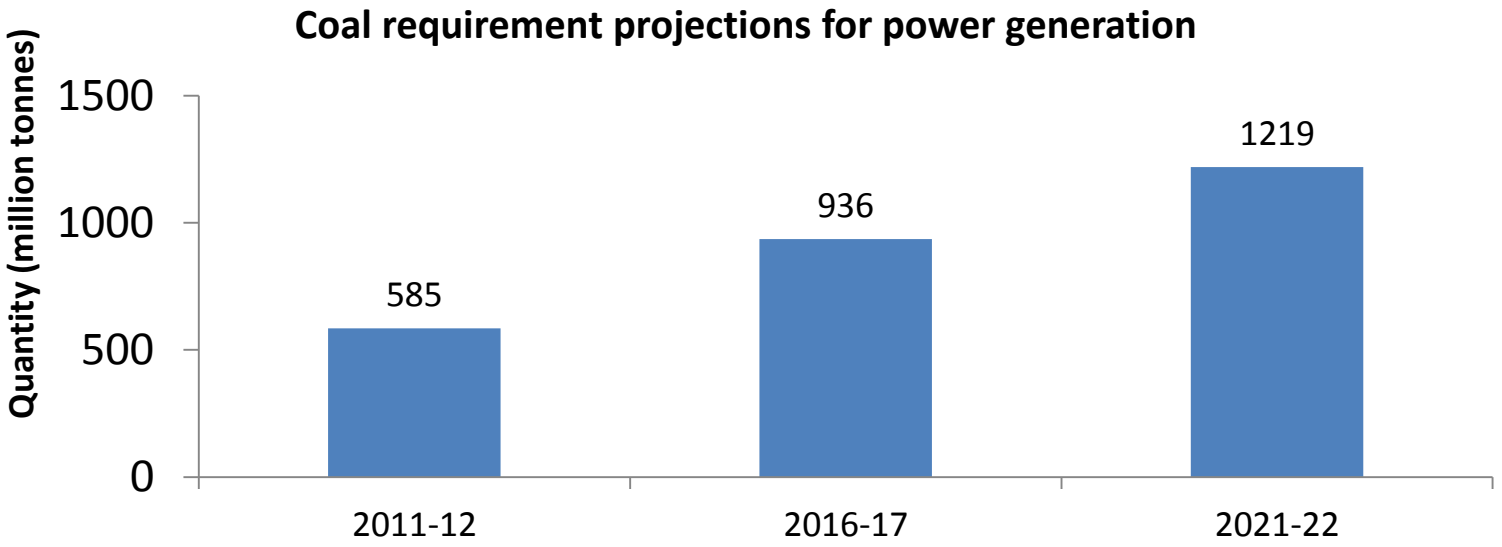
Coal power will increase



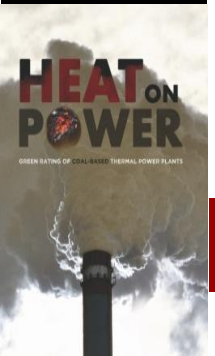
- Electricity demand to double by 2022.
- Even in 2022 per capita consumption in India to remain less than half of the global average
- Coal projected to meet most of demand increase



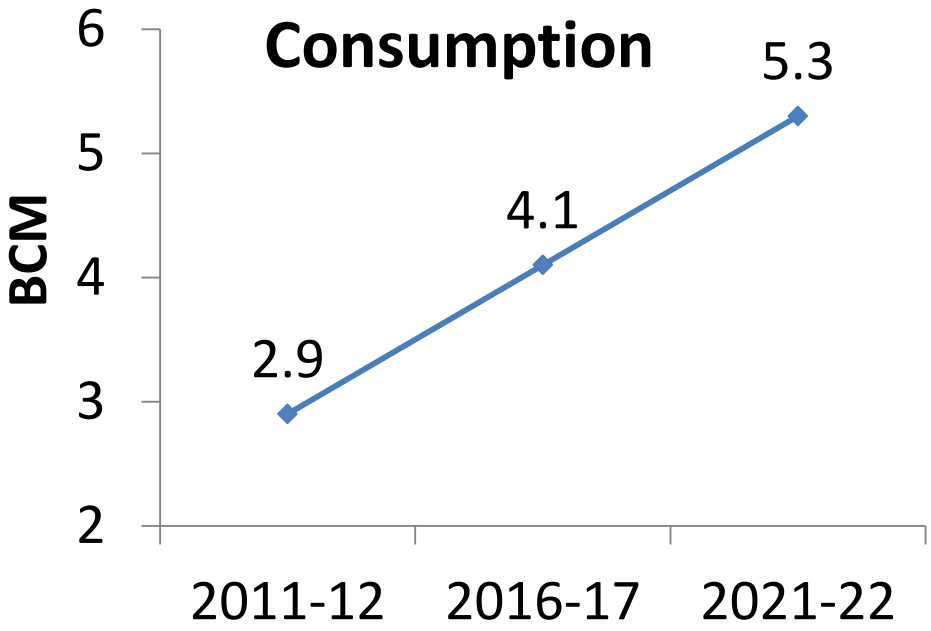
Resource needs - coal



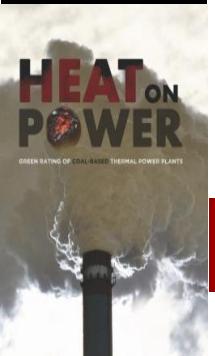
- Increase in transportation infrastructure
- 2-3 times increase in coal beneficiation capacity to use very poor quality coal



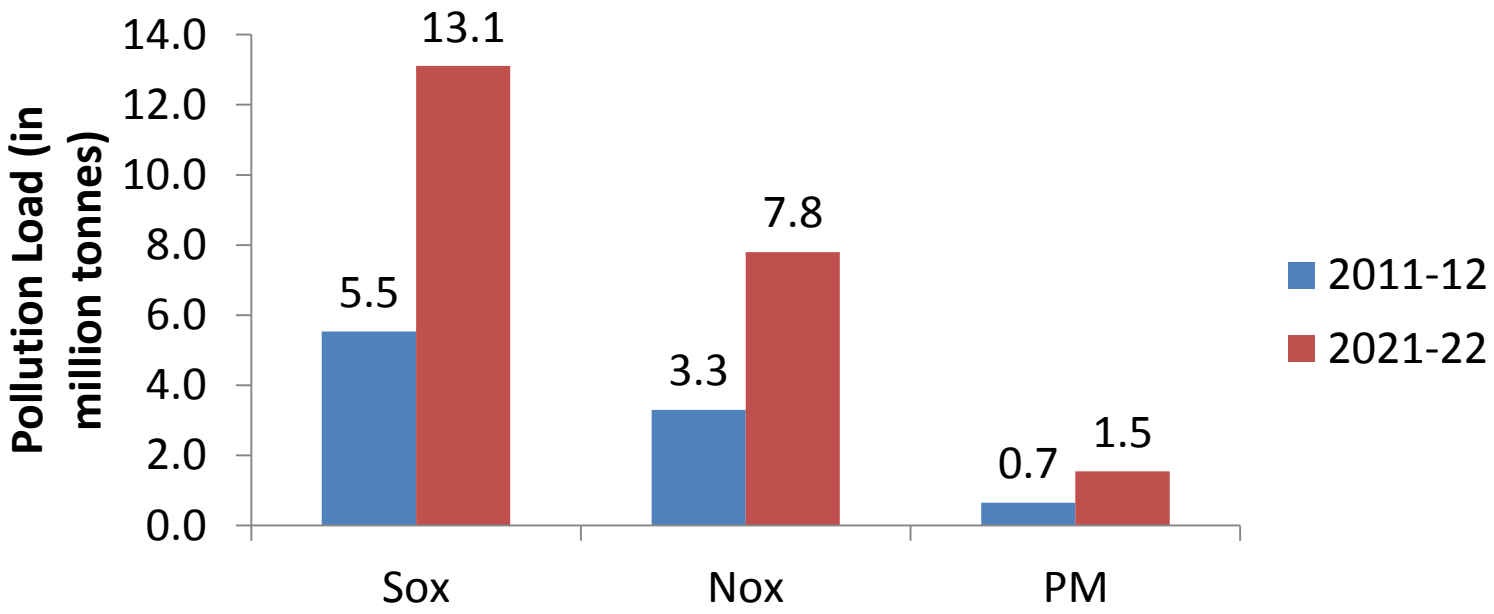
Resource needs – water & land



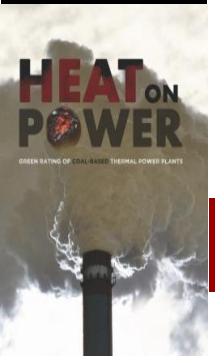
Land requirement (based on EC granted till Feb, 2015): 2.85 lakh ha (0.75 lakh ha for plants + 2.1 lakh ha for coal mines, including 46,719 ha forest land)



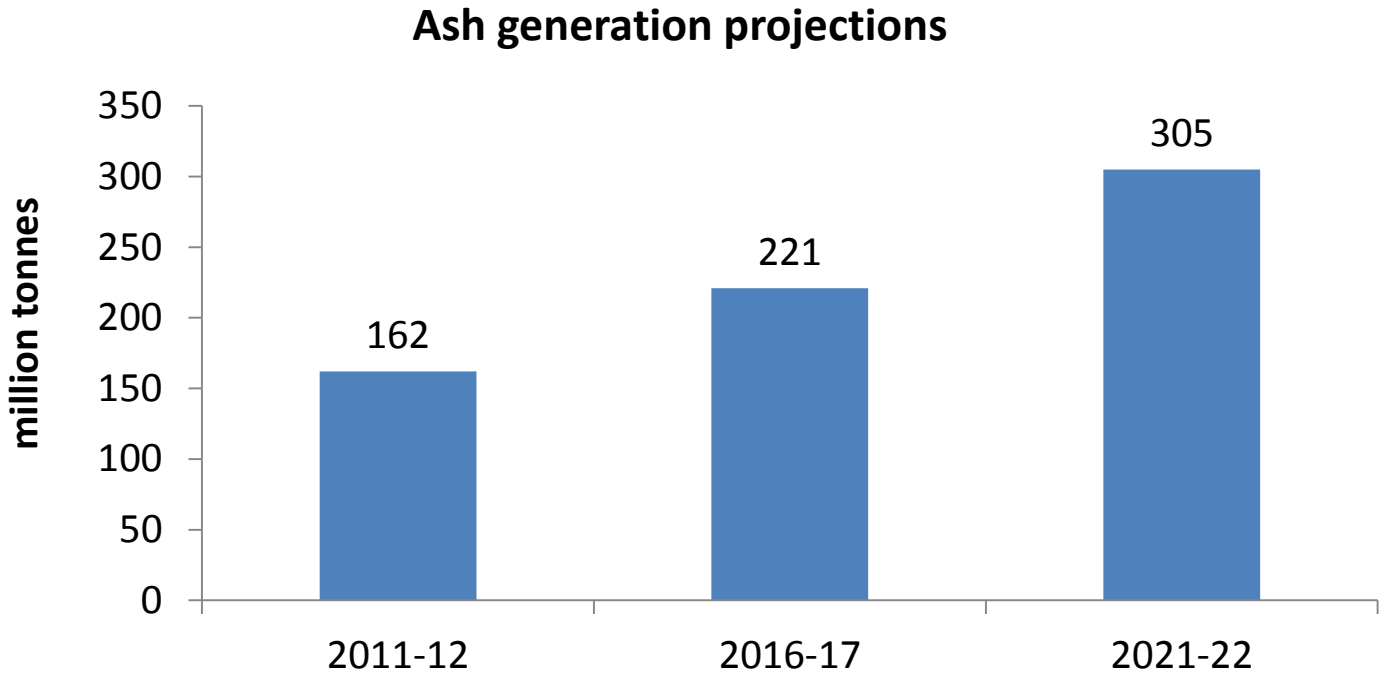
Pollution load, if unchecked



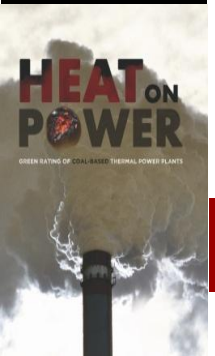
Massive increase in clusters



Fly ash

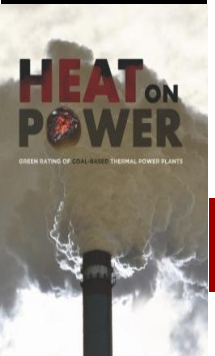


- **Presently, more than a billion tonne of ash lying unused in ash ponds across the country.**
- **Ash generation to double by 2022**



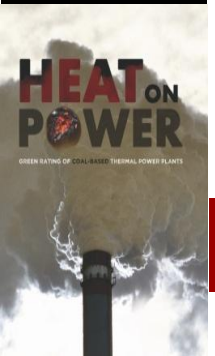
Way forward: set norms

- Set strict standards for PM, SOx, NOx and Hg
- Norms for water use should be incorporated in clearances. Air cooling technology in water scarce regions
- Increase water tariff to promote recycling and reuse
- Massive amount of surplus land with government companies; policy to utilize surplus land

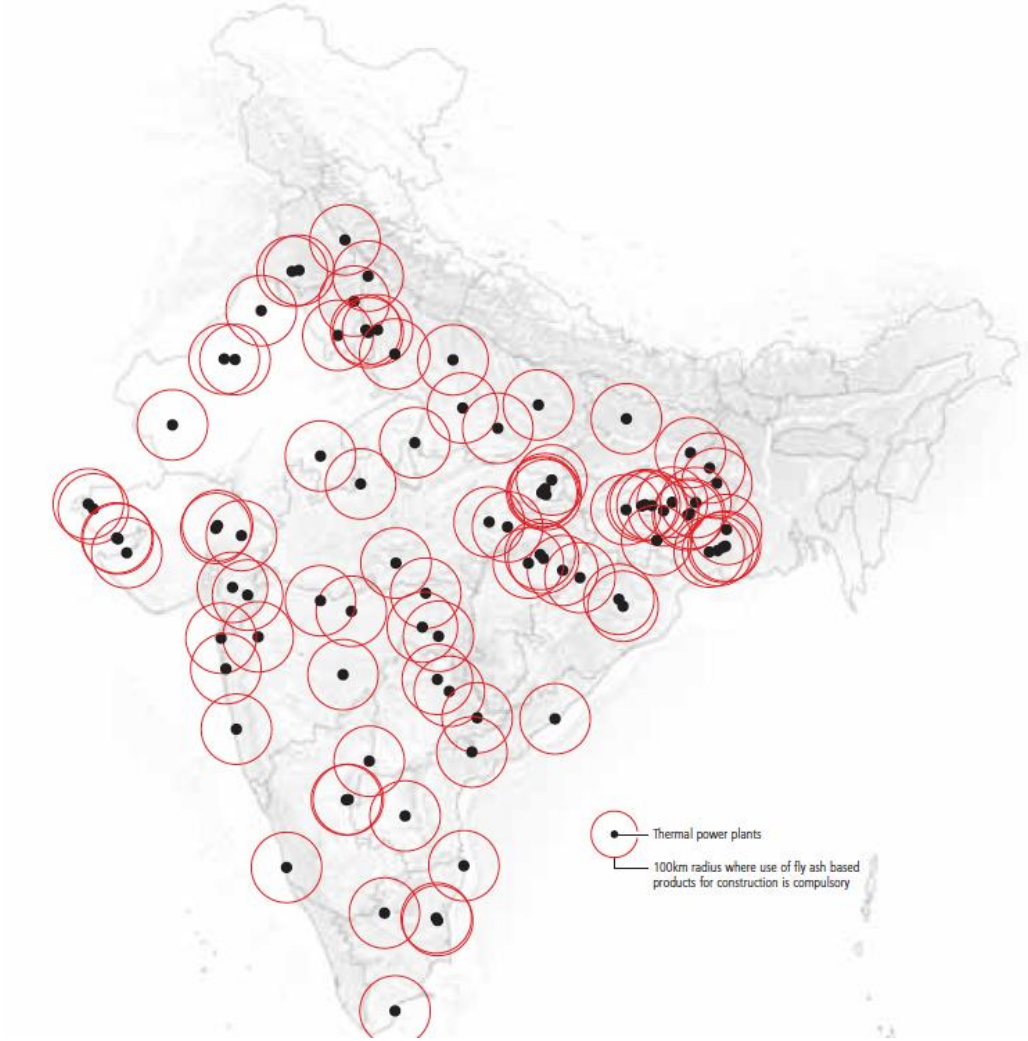


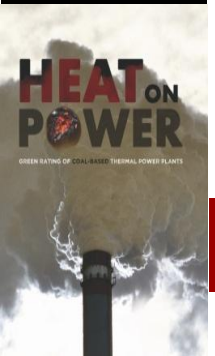
Way forward: Ash Handling

- Most plants will not meet Ash use targets due to inadequate supporting policies to increase use;
- Policies and regulations to change
  - Promotion, standards for utilisation and then strict implementation of policies on ash use in infrastructure, bricks, cement industry etc.
  - Loopholes that allow dumping, yet consider it utilization (for eg. in low lying areas) need to be addressed;
  - Standards and guidelines for use of ash for mine filling
  - Flexible regulation to take into consideration plant location



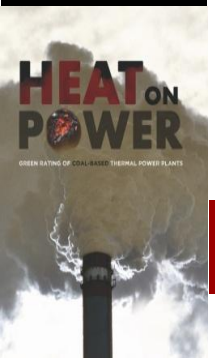
Ash Handling: promote and enforce

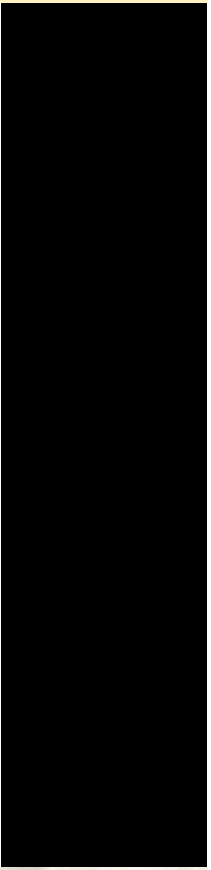


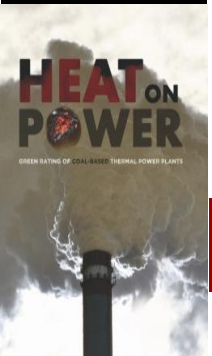


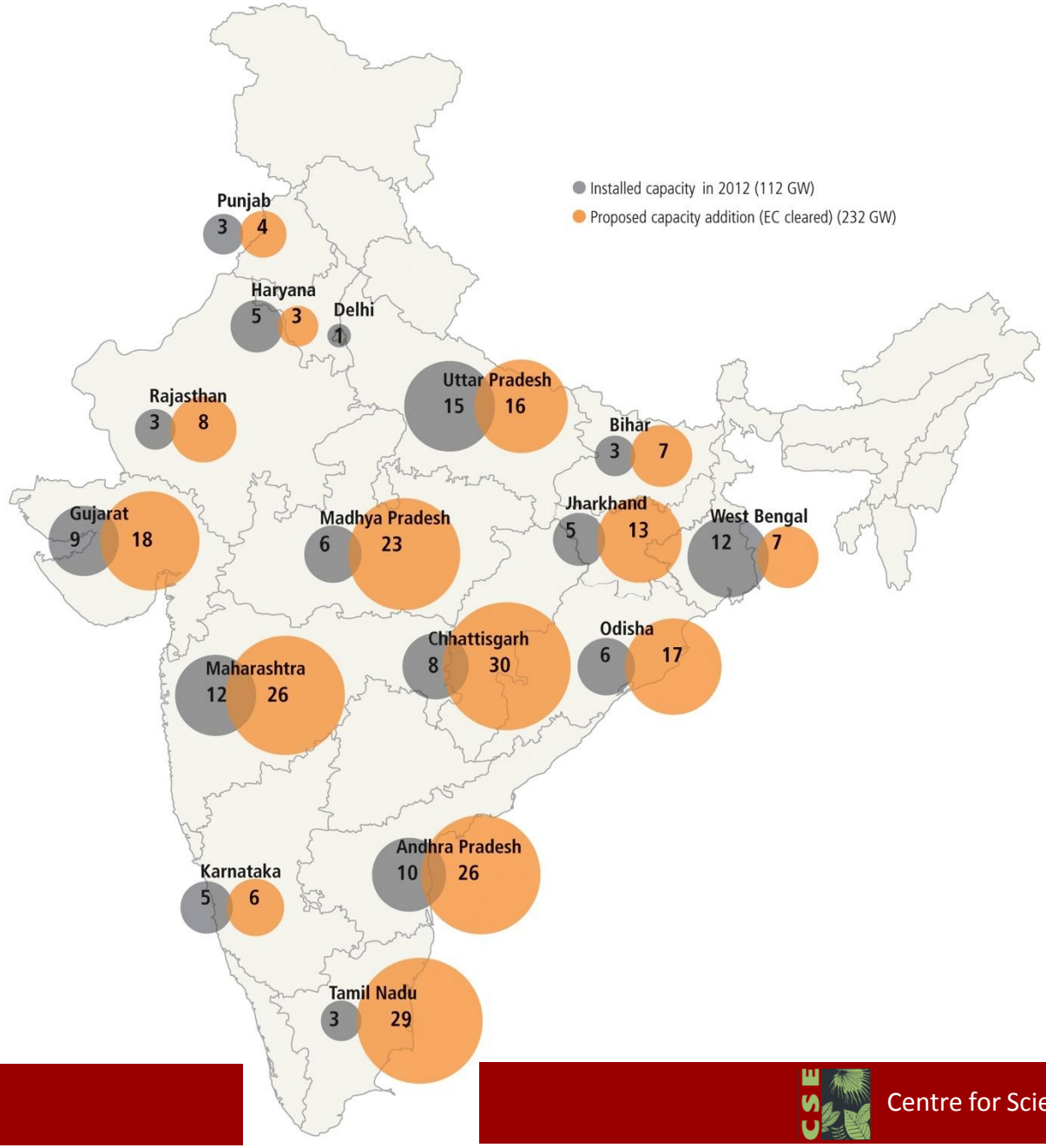
Way forward: Technology and efficiency

- Old inefficient plants that are heavily polluting should be retired or modernized at an accelerated pace; Environmental clearance process should incentivize this
- New capacities should be only supercritical/ultra super critical
- Inclusion of environmental costs/ compliance in Merit Order Dispatch; we should ensure that most efficient stock is utilised the most and polluting plants are not called first because they are cheaper.



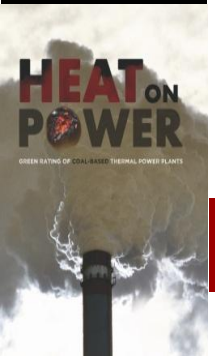



HEAT ON POWER
GREEN RATING OF COAL-BASED THERMAL POWER PLANTS


Installed capacity in 2012 (112 GW)
Proposed capacity addition (EC cleared) (232 GW)
Punjab 3 4
Haryana 5 3
Delhi 1
Rajasthan 3 8
Uttar Pradesh 15 16
Bihar 3 7
Gujarat 9 18
Madhya Pradesh 6 23
Jharkhand 5 13
West Bengal 12 7
Chhattisgarh 8 30
Odisha 6 17
Maharashtra 12 26
Andhra Pradesh 10 26
Karnataka 5 6
Tamil Nadu 3 29

Way forward: Improved assessment and regulatory tool

- Capacity concentration is few areas
  - Regional carrying capacity assessment and tighter norms for critically polluted areas
- 55 GW of coastal capacity expected to come up
  - Potential impacts on marine biodiversity need to be investigated
- Pollution monitoring and control by regulators are weak; need capacity and tools
  - Protocol and infrastructure for online monitoring
  - Institutional strengthening and use of multiple tool to enforce norms



Way forward

- We need to do all the above and more
- Most importantly, we need to discuss the role of coal in our future energy plans.