Green Rating Project
What, why, How?

CSE's Green Rating Project - what and why?

✓ Started in 1997; Rated 6 sectors:

1. Pulp and Paper 1999, revisited 2004, 2013
2. Automobile, 2001
3. Chlor-alkali, 2002
4. Cement, 2005
5. Iron and steel, 2012
6. Thermal power, 2014

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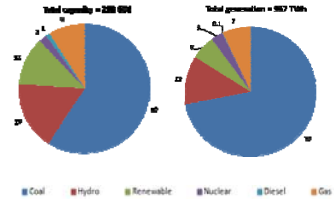
Coal : central to energy mix



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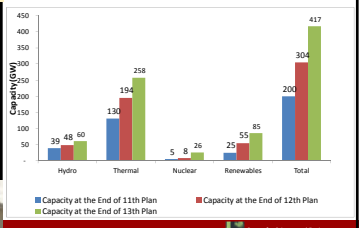
Expected to remain mainstay



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The dilemma : coal's env. costs

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

Coal: Over 70 per cent of the total coal consumed in India

GHG Emission: over 50 per cent of India's total CO_2 from fuel combustion is by coal-based power plants

Pollution: Of the total industrial sector

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

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Coal thermal power

✓ Core industrial sector; set to expand
- Resource intensive – water, coal and land
- High pollution potential
- half the country's GHG emissions

✓ Difficult issue; would like it to go but recognize that it will stay for countries like India.

✓ So even as we push for renewables the question is how to clean coal thermal power- How?

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Research: Design & Coverage

✓ Sample: geographically diversified; state, centre and private
- ✓ Sample size: 47 plants, 54 GW; Over half the sector's capacity; Just under half participated; non-participating was also rated
- ✓ Varying unit sizes – 30% were 210 MW units; 25% were 500 MW units
- ✓ Varying age – 25% each exceeded mid-life and full-life

✓ Extensive questionnaire

✓ Site surveys- plant, community, NGOs, media, PCBs,

✓ Photographs, Sample tests

✓ 2 years of rigorous assessment

✓ Several hundred data for each plant

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Parameters studied and weights

✓ Over 60 parameters analysed

✓ Weights: pollution – 42%; energy – 29% resource use – 19%; others – 10%

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What we found ?

- Top performers- scored 45-50%
  1. CESC-Budge Budge (West Bengal)
  2. JSEWL-Toranagallu (Karnataka),
  3. Tata-Trombay (Maharashtra) JSW-Ratnagiri (Maharashtra).
     * Tata-Mundra (Gujarat)- highest energy efficiency
     * GIPCL- Surat- lowest water use
- Average score- 23%
- 40% plants- <20% score (no award)
- Inefficient resources use and technological backwardness leading to high levels of pollution

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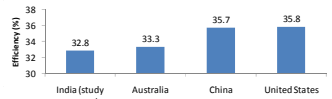
Poor energy efficiency



- ✓ Indian fleet one of the most inefficient – 3 percentage points below China's
- ✓ Indian plants emit 15% more CO_2 than Chinese plants
- ✓ 14 plants < 32% EE, almost all state-owned; JSEB-Patratu 21%
- ✓ Only 12 plants' efficiency in excess of 36%, around Chinese avg.

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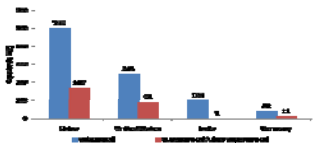
Dated technology



No sustained policy push to close inefficient plants, to allow new only SC

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What we found ?

- ✓ Needs 22 BCM water; >50% India's domestic need
  - OTC plants: <20% electricity draw 90% water - almost all state owned
  - CT plants draw 4 m^3/MWh; China average 2.5 m^3/MWh.
- ✓ 55% units exceed air pollution norms; another 10% likely violators
  - despite lax PM norm - 50-350 mg/Nm^3; Chinese norm - 30mg/Nm^3
- ✓ >75% plants failed to meet the MoEF's ash utilisation target
  - Only 50-60% of the 170 MTPA used
  - About a billion tonne dumped in ash ponds, pollute land, air and water; 300 MTPA will be produced by 2021-22

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What we found ?

- ✓ 20 plants were discharging ash slurry into water bodies, a serious violation
- ✓ Effluent samples taken by CSE show 40% violated TSS norm
- ✓ 60% plants do not have ETP and STP
- ✓ NTPC Ltd.- Non-participating
  - The largest coal-power producing company in India was found below par
  - It's six plants received scores between 16% and 28%
  - It's worst was Delhi-Badarpur plant

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How does your state perform?

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Tamil Nadu

- ✓ Capacity- 9.5GW, of which 3 plants (40% capacity) assessed; additional 43 GW in pipeline.
  - Neyveli thermal power station (NTPS), NLC, Neyveli (participated); score 22%
  - Mettur thermal power station (MTPS),TNEB, Salem; score 18%
  - Tuticorin thermal power station (TTPS), TNEB, Tuticorin; score 19%
- ✓ None of the plants in state -
  - met ash utilisation norms of MoEF&CC except MTPS which had exceptional utilisation of ash (over 100 per cent)
  - Both the state government plant – MTPS and TTPS were heavily air polluting
  - Huge water guzzlers [MTPS – 6.4 cub.m/MWh; NTPS – 5.23 cub.m/MWh (groundwater)]
- ✓ Social issues: rehabilitation, compensation for NTPS

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Mettur thermal power station- Air pollution

Tuticorin thermal power station- Air pollution

Andhra Pradesh

- ✓ Around 10.49 GW capacity. Pipeline 25.2 GW
- ✓ GRP assessed 3 plants (75% of capacity), none participated:
  1. APGENCO Kothagudem (KTPS -ABC); score 18%
  2. APGENCO Kothagudem - V & VI (KTPS –V & VI); score 11%
  3. Dr. Narala Tata, Vijayawada (VTPS); score 21%
  4. NTPC Ltd., Ramagundam; score 25%
- ✓ APGENCO KTPS-ABC runs without valid consent to operate
- ✓ APGENCO Kothagudem - V & VI (KTPS –V & VI) huge water guzzler [4.7 m^3/MWh]; Air pollution major issue (PCB inspection reports & high stack emissions visible during GRP survey)
- ✓ KTPS had less than 20 percent ash utilisation rate; also, ash slurry directly discharged into river;
- ✓ NTPC Ramanagundam – fugitive ash emission from ash pond major issue
- ✓ Dr. Narala Tata, Vijayawada – uses ground water (GRP community survey); air pollution major issue (CEA reports stack emissions non complying with standards); social issues:18 villages surrounding the plant have passed resolution against the plant's expansion proposal

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Ash slurry discharge into the Bhoodidavagu stream by Kothagudem, APGENCO. People allege cattle have died after drinking water from the stream

NTPC Ramanagundam ash pond fugitive dust emission from ash pond is a major issue

Karnataka

- ✓ Around 6.3 GW. GRP assessed 3 plants, capturing around 60% of the state capacity.
  1. Karnataka Power Corporation Ltd. (K.P.C.L), Raichur; score 11.8%
  2. Udupi Power Corporation Ltd. (UPCL); score 25%
  3. JSW Energy Ltd. (JSWEL) , Toranagallu; score 49.8% (participated)
- ✓ Poor environment performance – water pollution in KPCL (ash slurry discharge) & UPCL (water contamination issues reported by community); high air (stack emissions visible) in both
- ✓ UPCL – huge social and pollution issues (committee formed to investigate pollution issues); salt mist spray community complaints
- ✓ KPCL – extremely non co-operative mgmt. (CAG & PCB have reported problems in inspection)

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What is the way ahead?

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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

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CSE Recommendations : Technology

- ✓ Old inefficient , polluting plants should be retired or modernized at an accelerated pace; Environmental clearance process should incentivize this
  - Estimated 12,000 MW capacity below 30% efficiency
  - Around 20,000 MW is older than 30 years
- ✓ New capacities should be only SC/USC
- ✓ Regulations/incentives to improve capacity utilisation
  - Most efficient stocks are less efficiently utilised- Tata Mundra, Adani Mundra, NTPC-Sipat ; 52-75% PLF
- ✓ Coal washing capacity- to be increased 2-3 times
- ✓ Inclusion of environmental costs/ compliance in Merit Order Dispatch – cheaper but polluting plants shouldn't be called first

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CSE Recommendations : pollution & resource efficiency

- ✓ Set strict standards for PM, SOx, NOx and Hg
- ✓ Water use should be cut - increase water tariff ; incorporate norms for water use in clearances.
- ✓ Promote ash use – supporting policies for use in infrastructure, bricks, cement.
- ✓ Loopholes that allow ash dumping, yet consider it utilization (for eg. in low lying areas) need to be closed;

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CSE Recommendations : Improved assessment and regulatory tool

- ✓ Capacity concentration in 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
  - Economic tools (incentives)

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MoEF/CPCB - Steps announced

- ✓ Power Plants using fresh water have to install cooling towers in place of once through cooling system.
- ✓ New power plants have been asked to maintain COC of 8 instead of 2-3; Existing plants have been asked to recycle ash pond effluents
- ✓ In May, Central Pollution Control Board announced draft regulations tightening air pollution standards.
- ✓ Ash use: draft norms that will expand ash utilisation in roads and construction from 100 km radius to 500km;

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Power ministry - stated plan

- ✓ Only supercritical technology projects will be approved after 2017; but, no clarity on approx. 150,000 MW already approved
  - 40,000 MW, 45% of total, under construction is sub-critical,
- ✓ Old plants to be shut but, no accelerated targets yet - less than 3 GW to be retired by end of the 12th Plan
- ✓ Doubling coal cess from Rs.100 per tonne to Rs.200 per tonne – end use not laid out.

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Conclusion

- ✓ International pressure on coal: GHG/climate focused
- ✓ Domestic issues: energy access is vital but pollution and health are a rising concern
  - Expect tightening environmental norms/policies
- ✓ Huge water needs potential source of conflict
- ✓ Challenges for sector given poor env. performance
  - But, opportunities for efficient/clean generating Cos.
- ✓ Need to make regulations effective *and* pragmatic: market instruments/ tariff incentives

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