The role of coal in India’s energy mix and power

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Plan

• India’s energy challenge

• Share of coal in India’s energy and power mix
  – Past trend and projections

• Some recent trends
  – Current overcapacity and limitations on generation
  – Increasing cost of generation
  – RE becoming more lucrative for paying consumers

• Implications and Challenges
Energy poverty

• Insufficient consumption of modern energy in homes and enterprises
  • ~50% households consume < 500 kWh / year
    – EU average: 3862 kWh / year
  • ~67% households depend on solid fuels for cooking / heating
  • ~75% of rural enterprises don’t use any modern energy
  • India’s per-capita energy consumption <= Africa’s!?
Energy and infrastructure deficit and inequity

- Half the households do not have pucca houses, toilets
- Half the villages do not have primary health care
- One-fourth villages have no proper road access, one-fifth no primary school

Source: Census, NSSO, PM Sadak Yojana, Prayas estimates
Limited natural resources => high import costs

India’s energy imports as % of GDP higher than many other countries

- India’s energy imports growing
- Many negative impacts (cost, trade deficit, geo-political risks)
Rising imports and viability

• Not well endowed with conventional energy
  – Domestic inefficiencies
  – Rapid rise of imports
• Land, water, location constraints
• Rising imports
  – Trade deficit, geo-political risks
  – Increased costs – harder to provide access
• Energy pricing
  – Viability
  – Subsidy targeting and subsidy delivery
  – Quality of supply
Social and Ecological impacts

- Displacement
- Air, water pollution
- Climate change

=> Economic impacts
Indian coal sector in numbers

• Historically the most important source of energy
Role of coal

- Largest share even including non-commercial sources
- Most studies predict major role for coal up to 2030
- Ambitious targets – 1.5 BT coal by 2019
Coal supply and consumption

- CIL is dominant supplier (~80% of domestic supply)
- Indonesia largest source of imports (~55% of imports)
- Power largest consumer (~67% of consumption)
Power Generation Capacity – Fuel wise

As on 29 Feb. 2016

- Coal, 1,75,858, 61%
- Hydro, 42,703, 15%
- Gas, 24,509, 9%
- Oil, 994, 0%
- Renewable, 38,822, 13%
- Nuclear, 5,780, 2%
Share of coal based generation
Coal Thermal Power Capacity - Projections

Coal based capacity - actual till 2015 and projections for 2030-32

- Actual coal based installed capacity (MW)
- Low carbon committee report - B1G
- Integrated Energy Policy - least coal scenario
- Low carbon committee report - LCG
- India Energy Security Scenarios (IESS) - scenario 2
Current overcapacity and limitations on generation

- FY 15-16: 18 States/UTs expected to have net surplus energy and 16 States/UTs to have peak surplus on annual basis (CEA – LGBR)

- ~ 10,000 – 15,000 MW capacity idle / low PLF

- Maharashtra – backing down of ~ 5000 MW capacity for next 3 years

- CIL – slowing down production due to lack of off-take

- Plants shutting down due to water shortage
  - Parali – 1130 MW – 2 years
  - Farakka – 2100 MW
Increasing cost of generation ...1

• > 15,000 MW coal capacity with variable / fuel cost ~ 3.75 Rs./ kWh
  - recent solar tariff @ 4.5 Rs./ kWh – fixed for 25 years

• Claimed increase in coal generation cost (0.25 to 0.75 Rs./ kWh)
  – New environmental norms
  – Clean Environment Cess
Increasing cost of generation ...2

Huge capacity under litigation, demanding tariff increase over and above agreed, competitively bid tariff (by 0.3 to 1.25 Rs./unit)*

<table>
<thead>
<tr>
<th>Project</th>
<th>Capacity in MW</th>
</tr>
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<tbody>
<tr>
<td>Adani Power Ltd Mundra TPS</td>
<td>2425</td>
</tr>
<tr>
<td>Coastal Gujarat Power Ltd, Mundra UMPP</td>
<td>4000</td>
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<tr>
<td>Adani Power Maharashtra Ltd, Tiroda TPS</td>
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<td>Rattan India Power Limited</td>
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<tr>
<td>Lanco Anpara Power Ltd</td>
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<td>Sasan Power Ltd, UMPPP</td>
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<tr>
<td>EMCO Energy Ltd</td>
<td>300</td>
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<tr>
<td>Adani Power Rajasthan Ltd.</td>
<td>1320</td>
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<tr>
<td>GMR Kamalanga Energy Ltd</td>
<td>1400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19,145</strong></td>
</tr>
</tbody>
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* excl. Recent increase in coal cess & costs due to new env. norms
RE becoming cheaper and more lucrative for paying consumers

• Last 3 months, > 1000 MW solar PV projects signed at tariff - 4.35 Rs./kWh to 4.86 Rs./kWh

• Legal, policy and regulatory push for retail competition and concessions for RE
  – Inter-state transmission charges waived off – NTP
  – Concessional CSS charges by various SERCs (100% to 25% concession)
  – Net-metering and banking
Attractiveness of non-utility RE generation for paying consumers

Solar Rooftop PV viability in comparison to cumulative projected MSEDCL sales (MUs) in 2015-16 and their respective effective energy charges (Rs/kWh)

- 48,345 MUs (~48% of sales) are priced (energy charges + 15% Electricity Duty) above indicative rooftop solar PV price (Rs 7/kWh)
- 26,722 MUs (~30% of sales) are priced (only energy charges) above indicative rooftop solar PV price (Rs 7/kWh)
Implications and Challenges

• Coal will remain king but with shrinking empire
• Much greater role for RE,
  – more lucrative and feasible for ‘paying consumers’ of utility
• Challenges
  – Equitable sharing of increasing cost of coal based generation and cost reduction
  – Preventing build up of stranded assets
  – Ensuring financial viability of DISCOMs (reducing cross subsidising consumers and increasing generation costs)
  – Preventing adverse impact of this transition on reducing energy poverty
THANK YOU

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