

“India’s Opportunities for addressing carbon lock-ins: Spotlight on coal”

PEP 1.5 Symposium, Berlin

Archetypes of Decarbonisation Pathways and Climate Policy entry points to raise ambition

September 2019

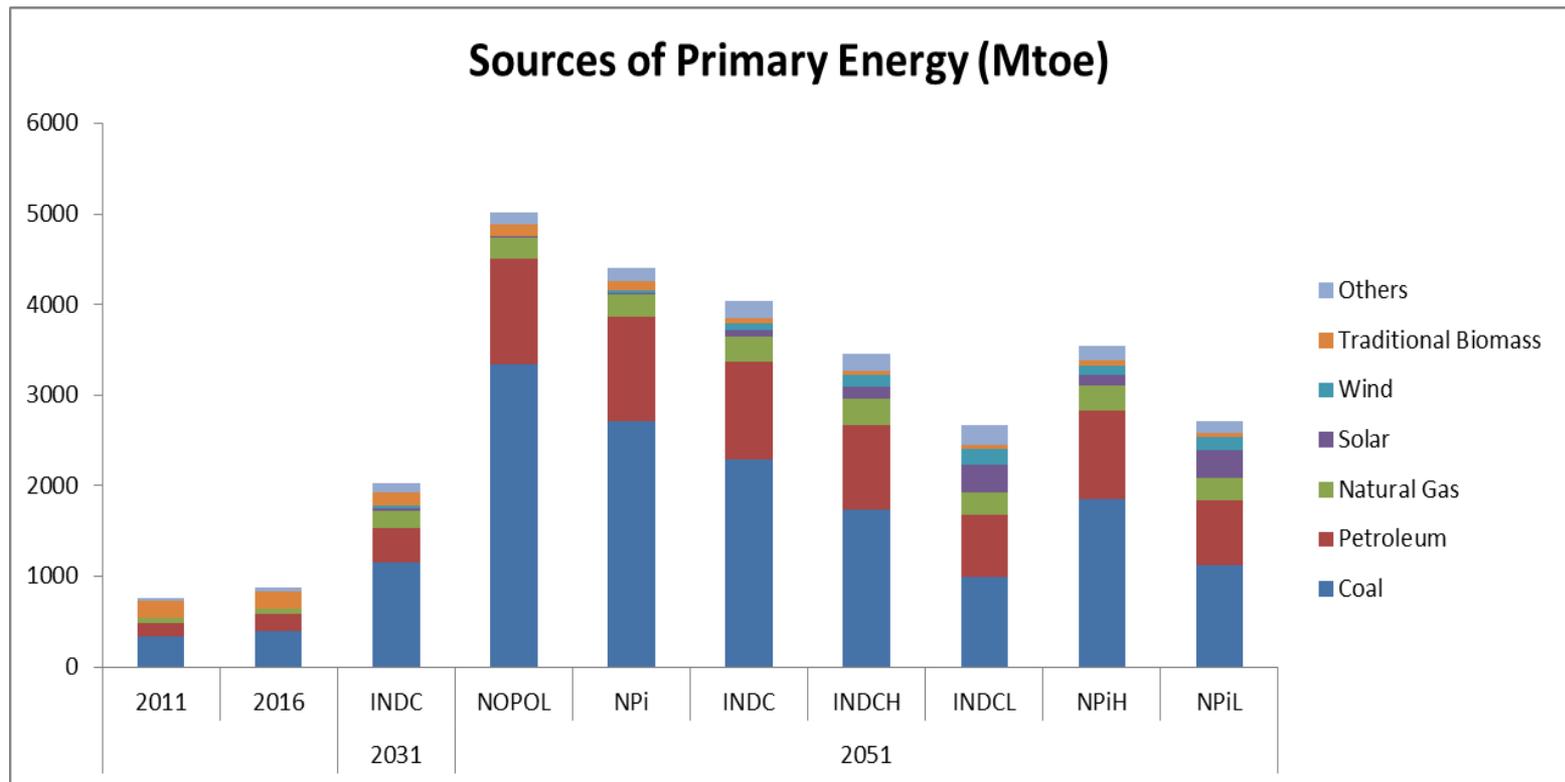
Ritu Mathur, TERI



Scenarios Description

- No Policy Scenario: Counterfactual scenario to chart the development path in the absence of climate policies
- National Policies Implemented (NPI): Scenario representing climate policies rolled out till 2016
- INDC: Scenario representing all climate policies and targets formulated in India's INDC submission
- INDC-high: Scenario incorporating additional climate and development strategies beyond NDCs
- INDC-low: Scenario depicting deep decarbonization development pathway towards a WB2DC world
- NPI-high: Early action scenario pertaining to mid century strategies beyond NDCs
- NPI-low: Early action scenario for deep decarbonization development pathway towards a WB2DC world

Energy Mix across Scenarios



India will continue to see a lock-in to fossil fuels (especially coal), unless concerted efforts are made to revisit our development strategy

Where does coal stand in India today?

- Around half the country's primary energy mix
- Will continue to dominate energy mix in a current policy / NDC scenario
- Still significant in a do-more scenario
- Retired and unutilized capacities in deep decarbonization scenarios with current and planned capacity additions in power

IPCC 1.5 Degree report makes clear the urgency to act together and early on!

Does a major shift to renewables make sense for India?

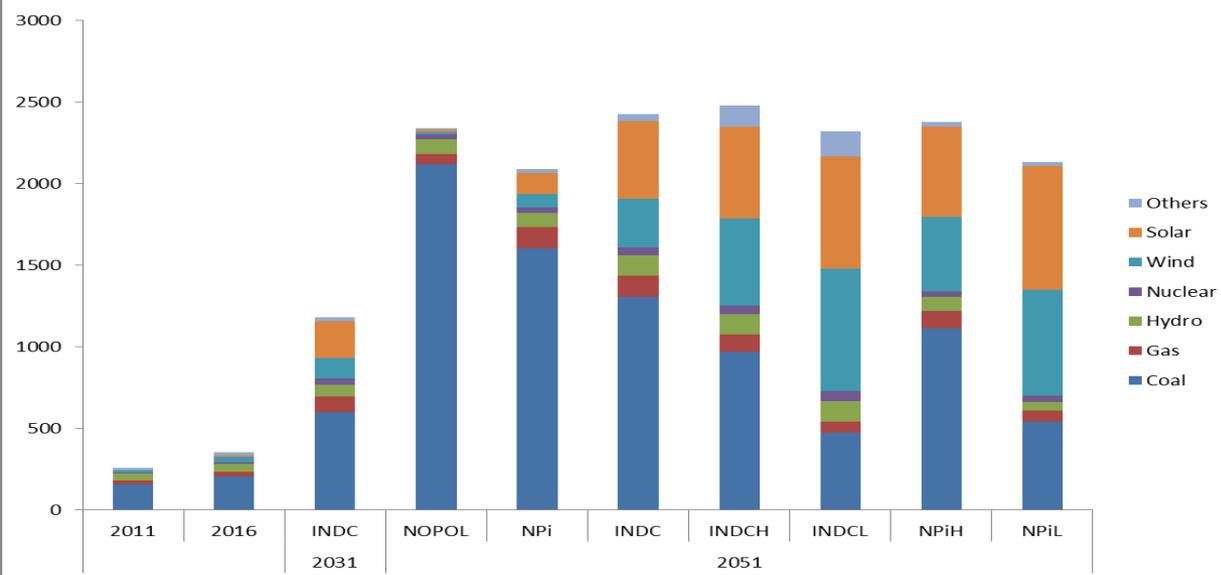
- Country blessed with renewable resources
- Costs of PV generation already at par with coal based thermal power
- National policy recognizes renewables (in particular solar) as a major thrust area
- Most cities face unacceptable air quality – growing respiratory issues

Improved quality of life, low carbon long term sustainable development a possibility



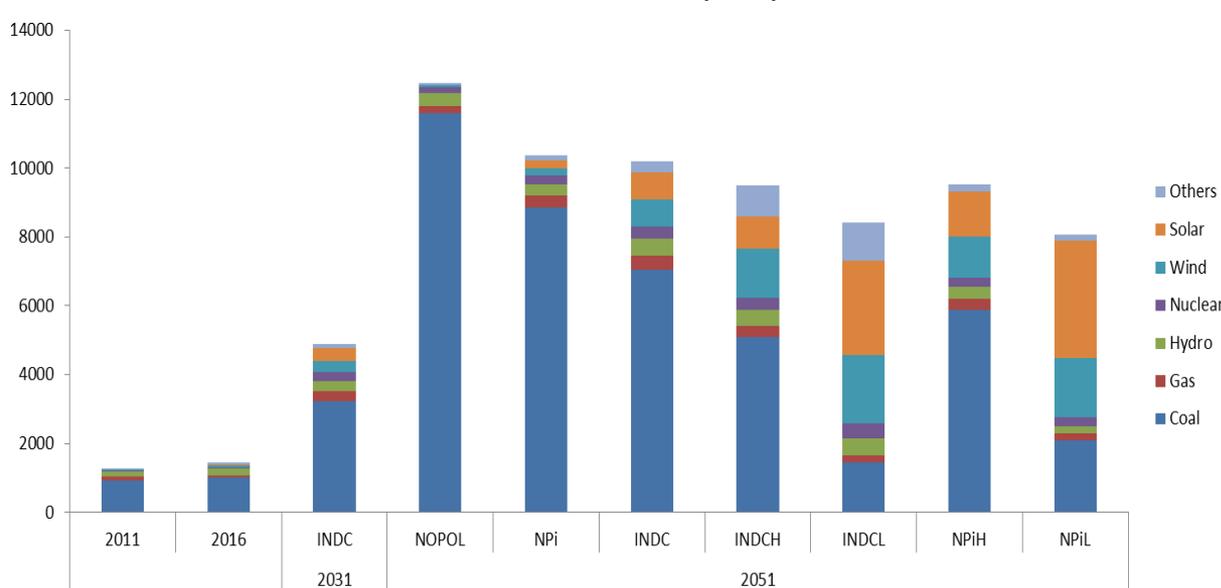
Power Sector

Installed Capacity of Power (GW)



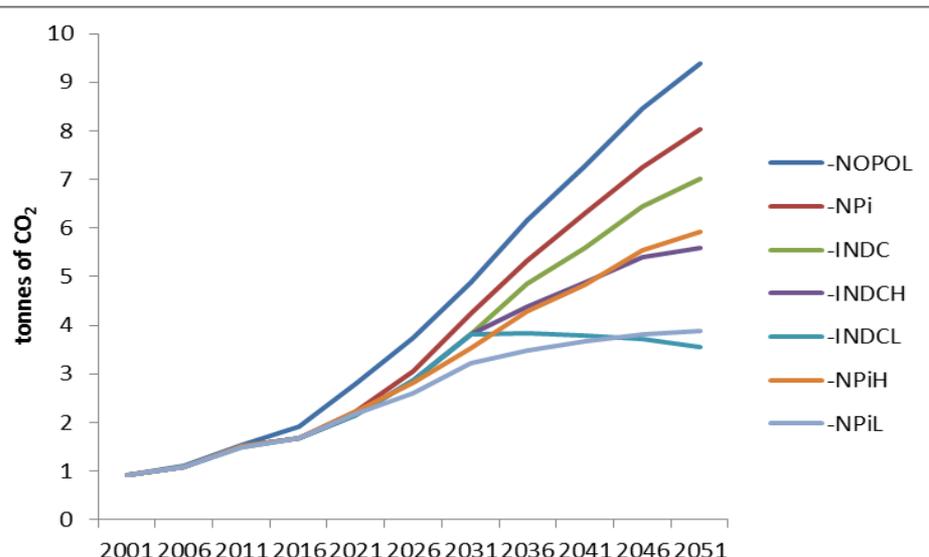
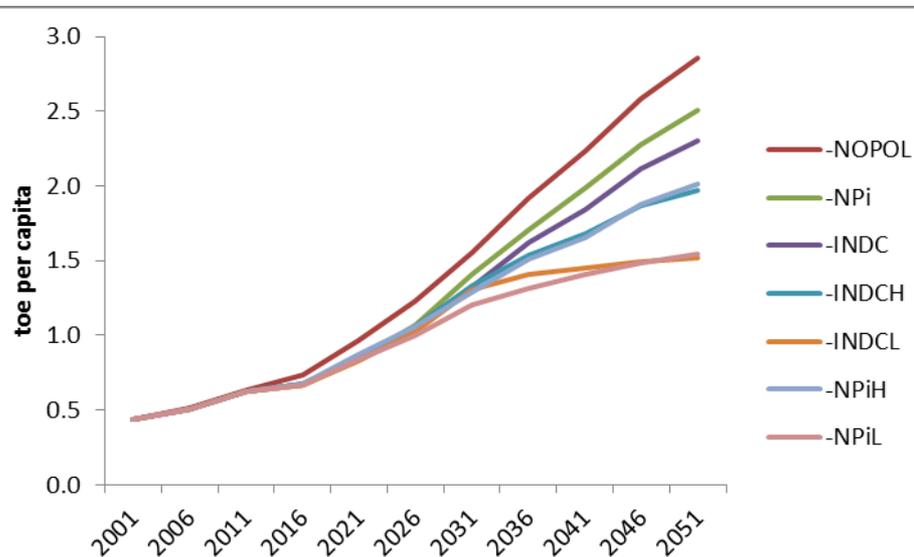
- By 2051, the deepest decarbonization scenarios start indicating fossil based capacities lower than those in 2031 under the NDC scenario
- Role of gas based power plants need to be carefully considered
 - Low utilization in deep decarbonization scenarios
- Utilization low for coal based power plants as well even after forced retirements

Power Generation (TWh)



- Opportunity for leapfrogging to electrification of end-uses early on
- Re-visit decisions to continue new-builds of coal based plants

The story of per capita energy & emissions across scenarios



- Current per capita energy consumption:
 - 0.67Toe (2016-17, provisional)
- Energy growth increases at a decreasing rate
- 2031: 1.2 toe (NPIl)- 1.4toe (NPI)
- 2051: 1.5 toe (INDCL)- 2.5toe (NPI)

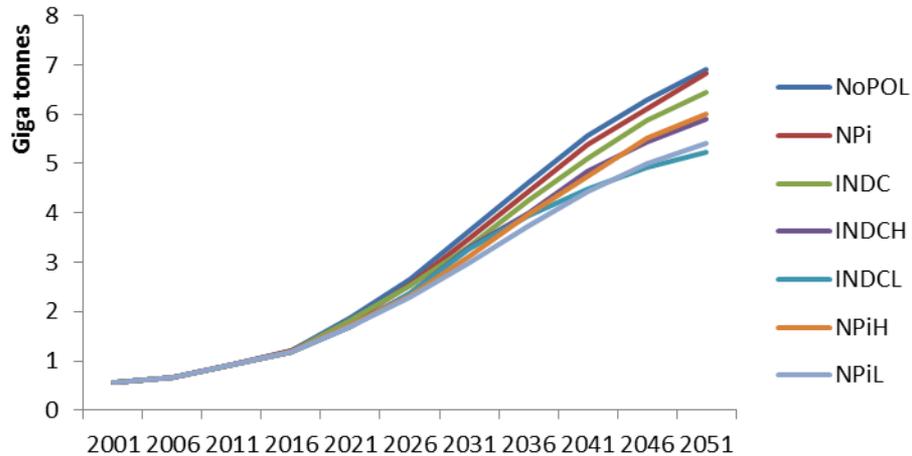
- Current per capita CO₂ emissions:
 - 1.4tonnes of CO₂ (2014)
- Per capita emissions increase at a decreasing rate in all scenarios
- 2031: 3.2 tonnes (NPIl)- 4.2 tonnes (NPI)
- 2051: 3.5 tonnes (INDCL)- 8 tonnes (NPI)

The story of costs

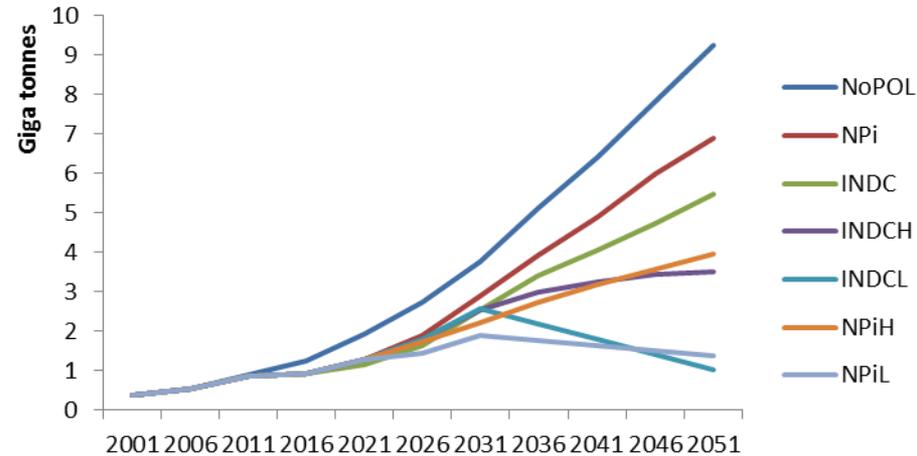
- Deeper decarbonisation scenario shows that overall system costs can be similar or lower to current scenario costs while some decarbonisation lands us with higher system costs
- Early action however, with current costs lands us with higher overall system costs since the relevant options need to be much more economically viable, efficient & reliable at commercial scale

CO₂ Emissions Trajectory

Demand Side Emissions



Supply Side Emissions



- Demand side potential: 2Gt CO₂, Supply side potential: 8Gt CO₂
- Relatively easier to decarbonize supply side through increased penetration of renewables
- Limitations to renewable penetration like integration cost, peak management etc. not taken into account
- Storage needs to be commercially viable at scale for successful uptake of renewables

Key insights from scenarios

- Managing the short term and longer term needs with flexible & dynamic planning essential to prevent lock-ins & efficiently manage existing capacities/stocks
- Deep decarbonisation indicates leapfrog to electric options straight away such as electric vehicles & electric induction stoves rather than moving to relatively cleaner fuels like CNG & LPG first –prevents lock-ins & and early redundancy of infrastructure
- Need for serious consideration towards behavioural changes like electric induction cooking through policy nudges
- Innovative strategies & business models necessary to enable large scale transformations
- Need for large infrastructure requirements for reliable grids, charging stations for EVs, etc.

Coal based power generation: Issues to address (direct & indirect insights)

- Growth in coal generation ~ 6.6% since 2011/12
- Higher growth in coal generation capacities
- Overcapacity situation (for coal & also for gas)
- PLFs low <60%
- Banks in the red – affecting further investments

Elements for moving towards a planned transition?

- Will coal sector remain a booming sector providing high employment prospects in the long run?
 - Estimates of ~half a million direct jobs in coal sector
 - Plan for re-skilling and diverting manpower gradually
- Create a robust electricity market to spur demands for power
 - Need for managing demands in the short/medium term
 - Create markets for increased electrification
- Globally ensure availability of reliable technology at viable costs
- Multiple dimensions need to be addressed to move towards transformational changes
 - Multiple factors & actors to be managed
 - Innovation & systems dynamics matters
- Manage peaks in demands with appropriate policy nudges
- Strengthen grid

Thank you!