KAPSARC
مركز الملك عبدالله للدراسات والبحوث البترولية
King Abdullah Petroleum Studies and Research Center

Current Status of Coal in India

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Introduction: KAPSARC's mission and structure

An independent non-profit research center focused on energy economics & policy

Advance understanding of energy economics and act as a catalyst for dialogue, charting a path to better welfare for societies, locally and globally.

Strategic Objectives

Develop sustainable economic frameworks that lead to:

- Lower societal costs of energy supply
- Higher value created from energy consumption
- Better alignment between energy policy objectives and outcomes

Research Programs and Focus Areas

Energy Systems Modeling and Economics	Energy Markets, Fuels & Feedstocks	Energy Transitions, Econometrics & Macro	Human Geography of Energy

Research Programs (Teams)

- Allocating Energy Resources in an Economy
- Energy Flows and Market Impacts
- Spillover Effects of Energy Policy Choices
- Energy Productivity
- Transportation; Modes, Fuels and Technologies
- Energy Transitions

Research Focus Area

Geographic Focus

- **KSA & GCC**
  - Major research focus
  - Seek to be leaders
- **China & India**
  - Major research focus
  - Seek to partner
- **North America & Europe**
  - Selective research projects
  - Included in global studies as required
- **Rest of World**
  - Selective research projects
  - Included in global studies as required

Discussion Papers

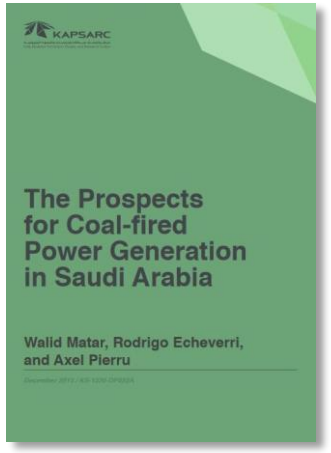
A KAPSARC research paper

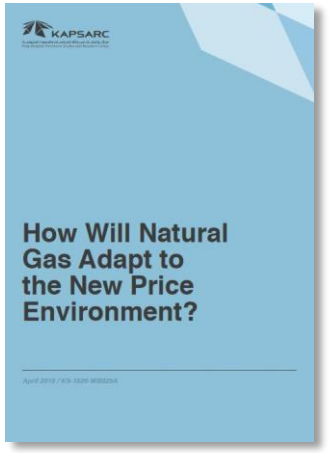
Workshop Briefs

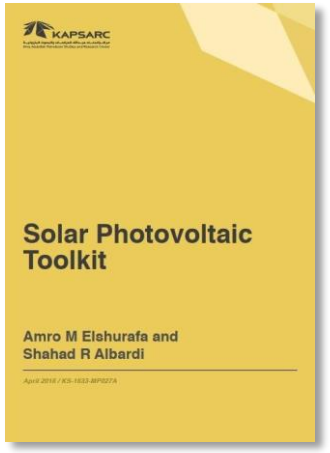
A short, 7-10 page, non-attributional, summary of a KAPSARC Energy Workshop

Tools and Datasets

Databases (such as policy dB, weather … etc.) or “tools” such as models (e.g. CGE model source code or models for collective decision-making processes)



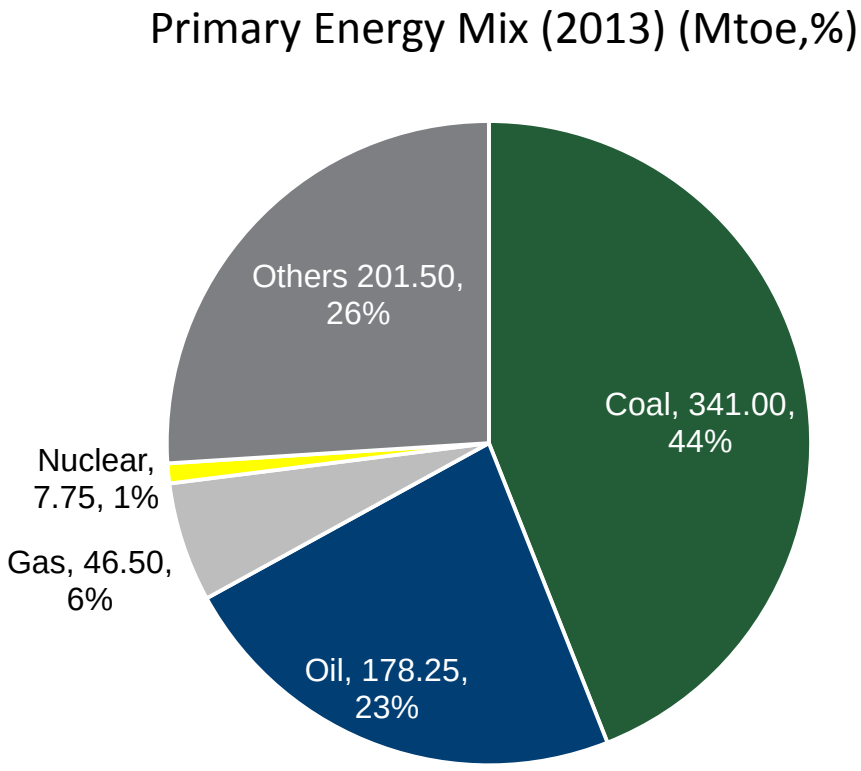




Current Status of Coal in India

Role of Coal

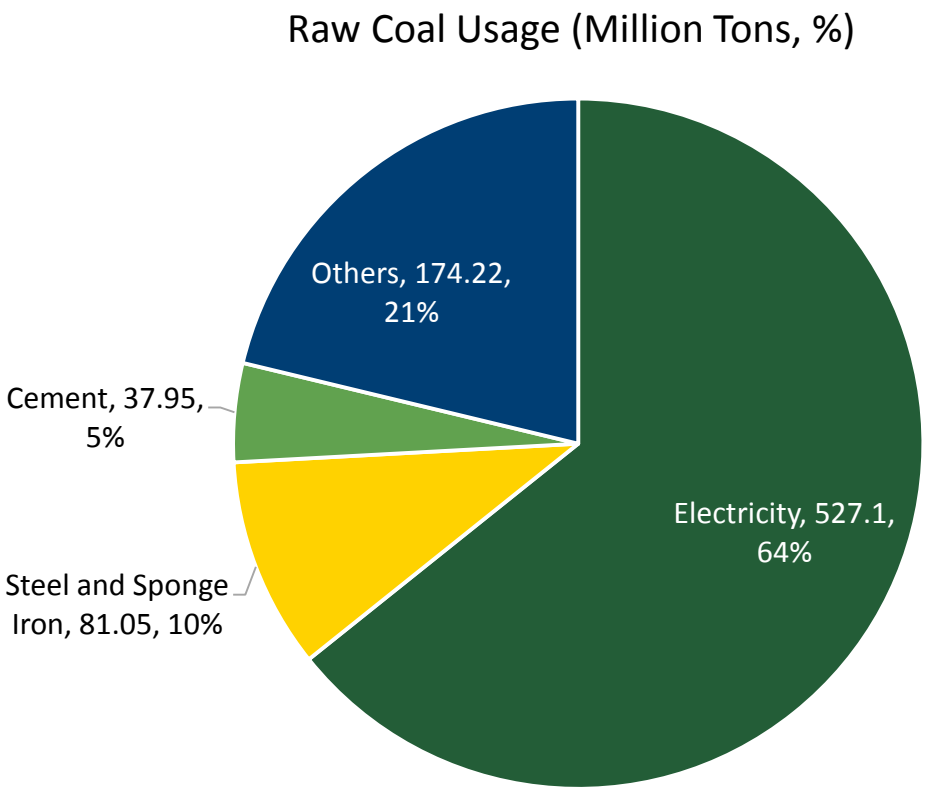
- Coal continues to be a major source of energy for India.
- Fossil fuels are the major drivers of the economy.
- Biomass still used significantly in rural areas.



Source: WEO 2015

Coal Usage Across Sectors

- Power sector consumes the most. Policy issues that affect power sector from generation, transmission, transport and fuel mix will impact coal demand growth.
- Cement, while a large consumer, tends to switch to alternatives such as pet coke when coal prices are high. They use cheaper alternatives to reduce operation costs.
- Steel and sponge iron do not have alternatives to their coal requirements.

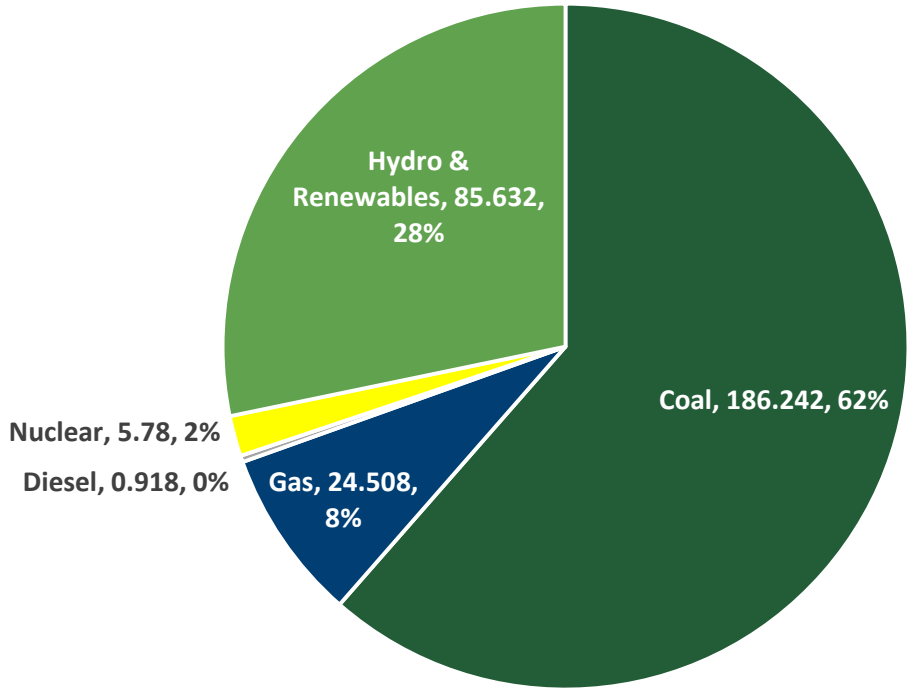


Source: MOSPI Energy Statistics 2014/15 (Provisional)

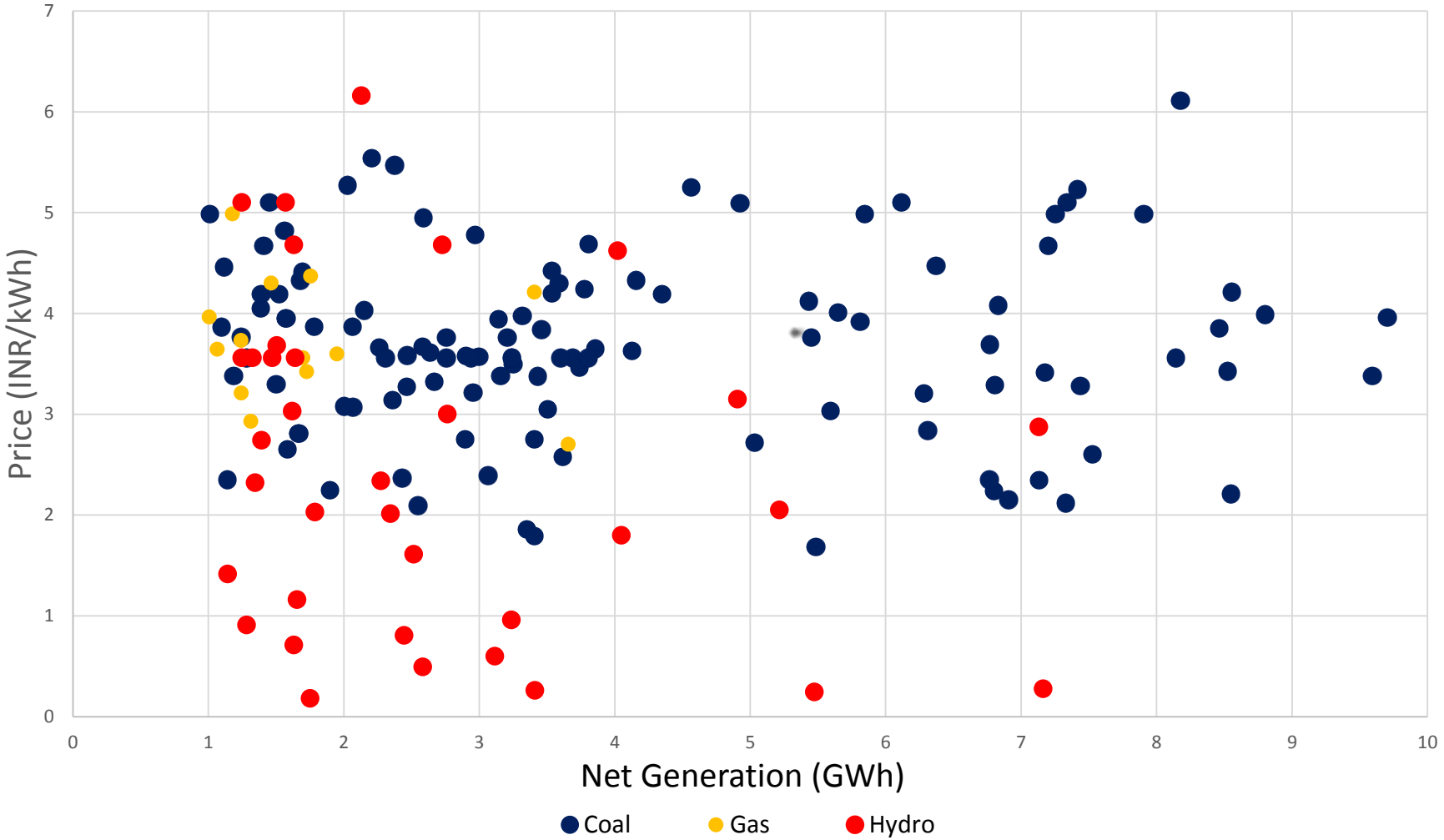
Fuel Mix in Power Sector

- Biased toward coal, given domestic coal resources available.
- Renewables have been growing strongly over the past few years. Recent policy focus due to this confidence.
- Gas is constrained by availability and nuclear suffers due to fuel availability and long build times.

Utilities Installed Capacity (GW, %)



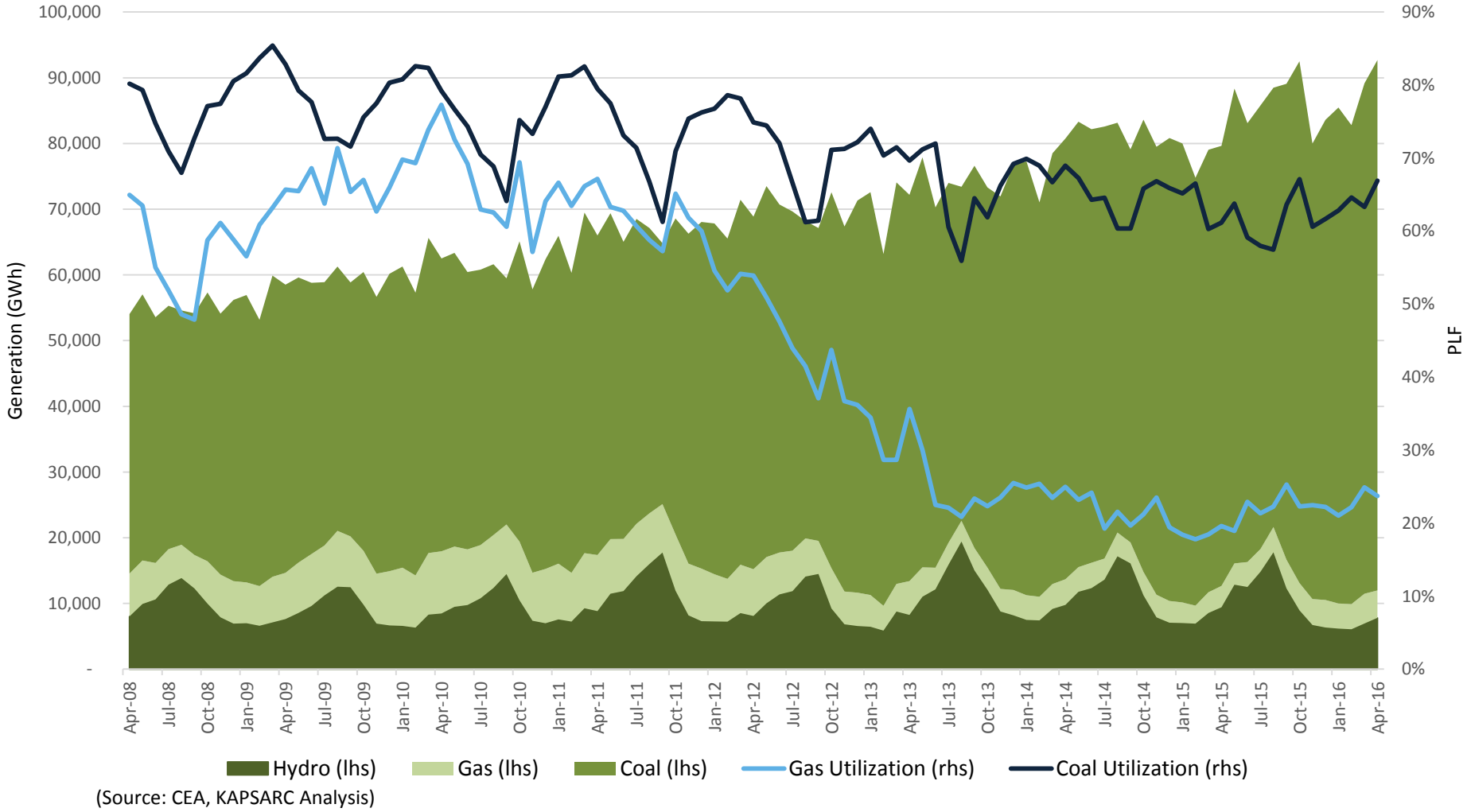
Source: CEA, May 2016



(Source: Central Electricity Authority- Rate of Sale of Power 2013-14), KAPSARC Analysis) 1 US$ = 67.87 INR*

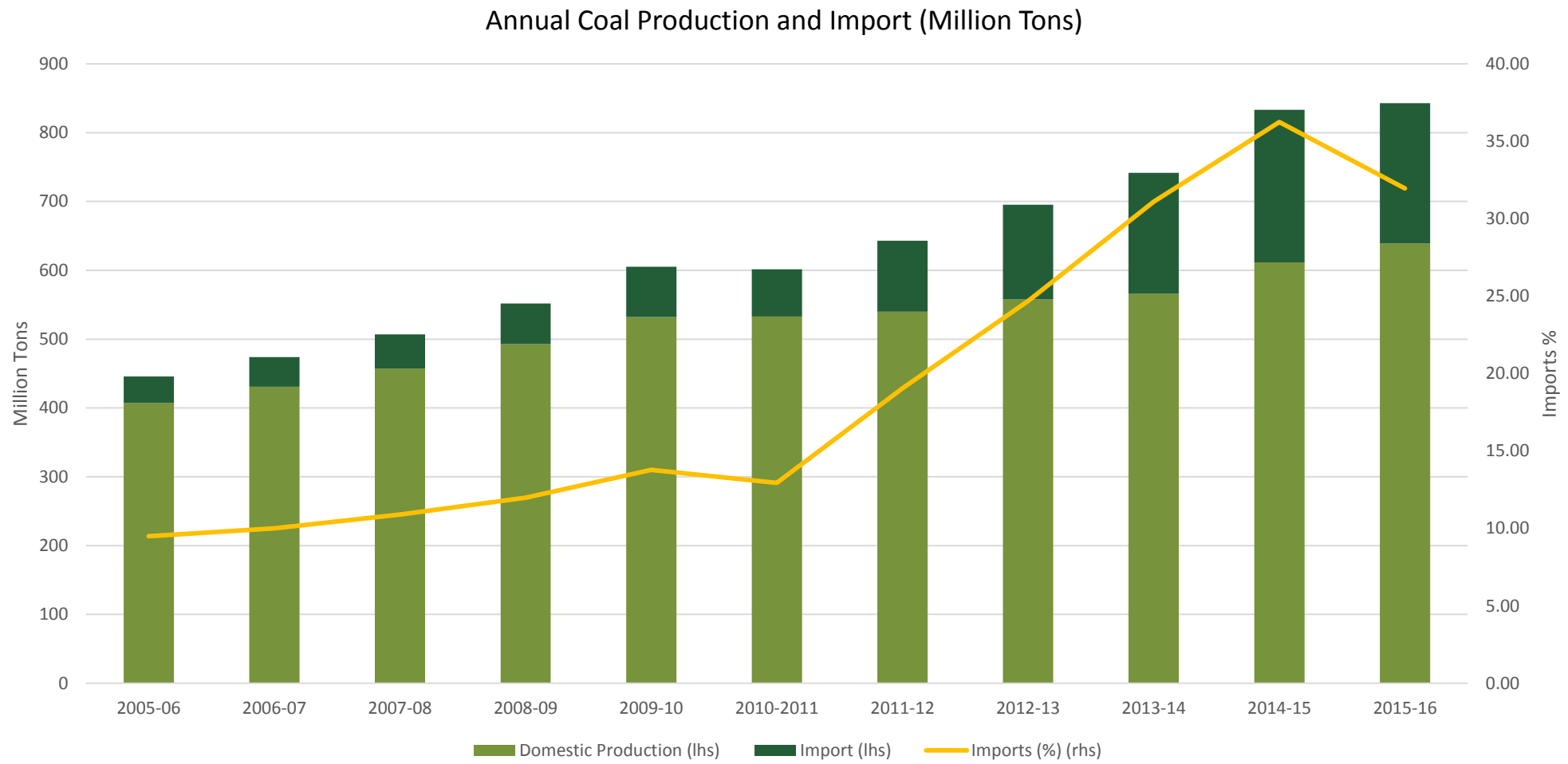
- Coal - based power plants compete on price and scale.

Coal-based Generation Grows, while PLF declines



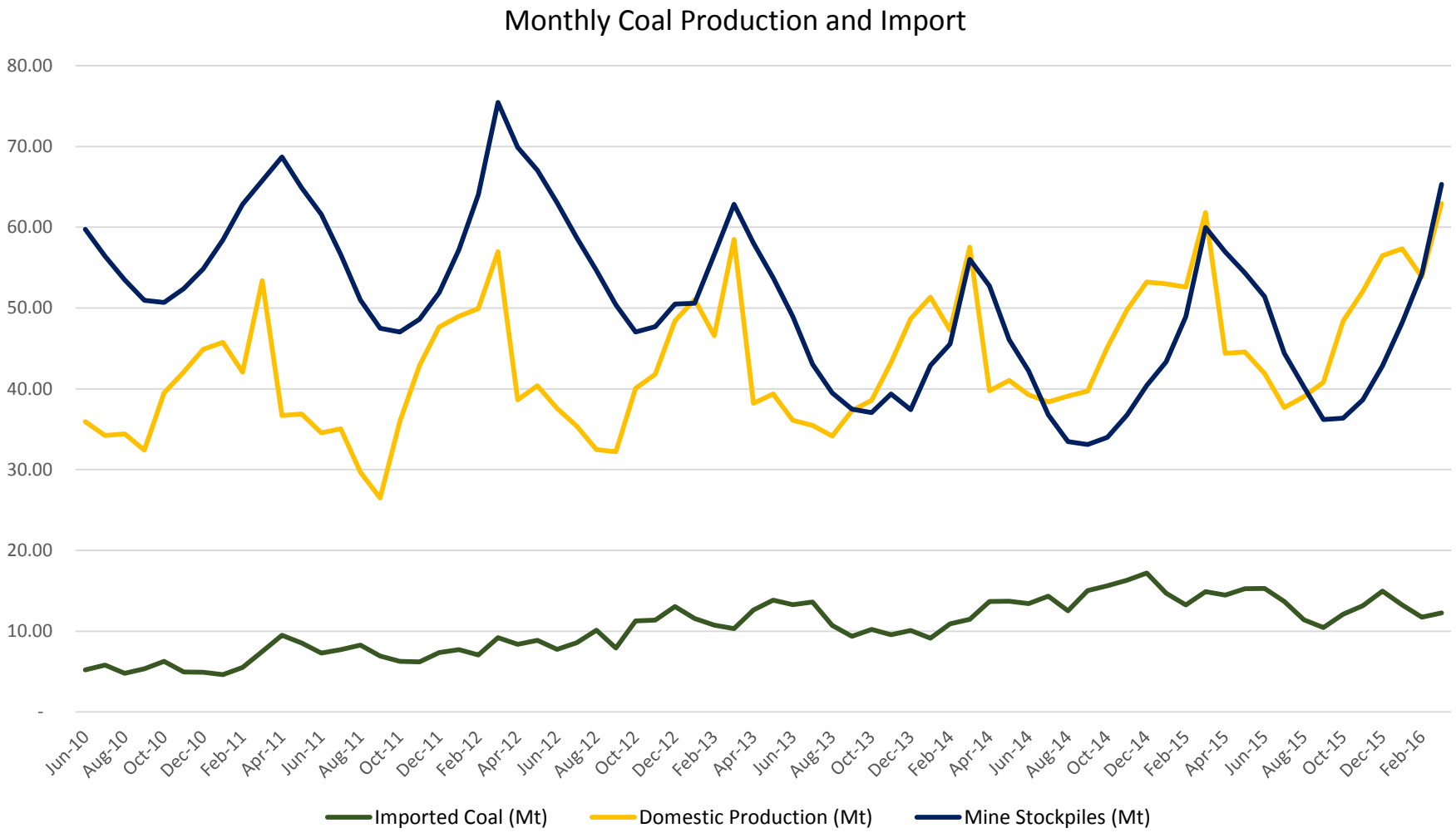
(Source: CEA, KAPSARC Analysis)

- Financially strapped State Electricity Boards not able to procure electricity to meet demand.



Source: HDR, ICMW

- Strong domestic production, import growth muted

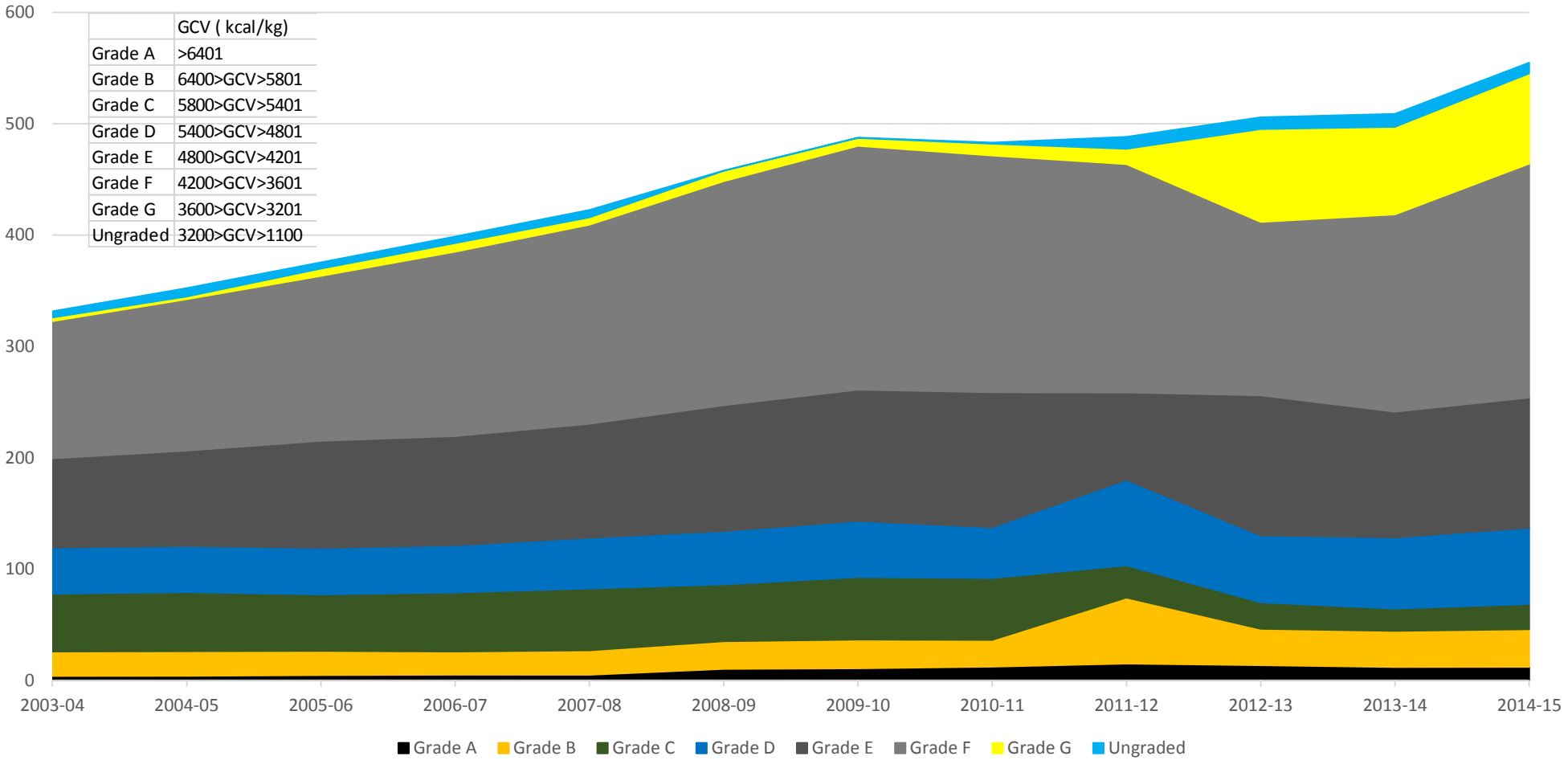


Source: ICMW, HDR Salva

- Imports have declined as domestic production increased and mine stockpiles grew

Future of Coal in India

Thermal Coal Production – Grade wise (Million Tons)

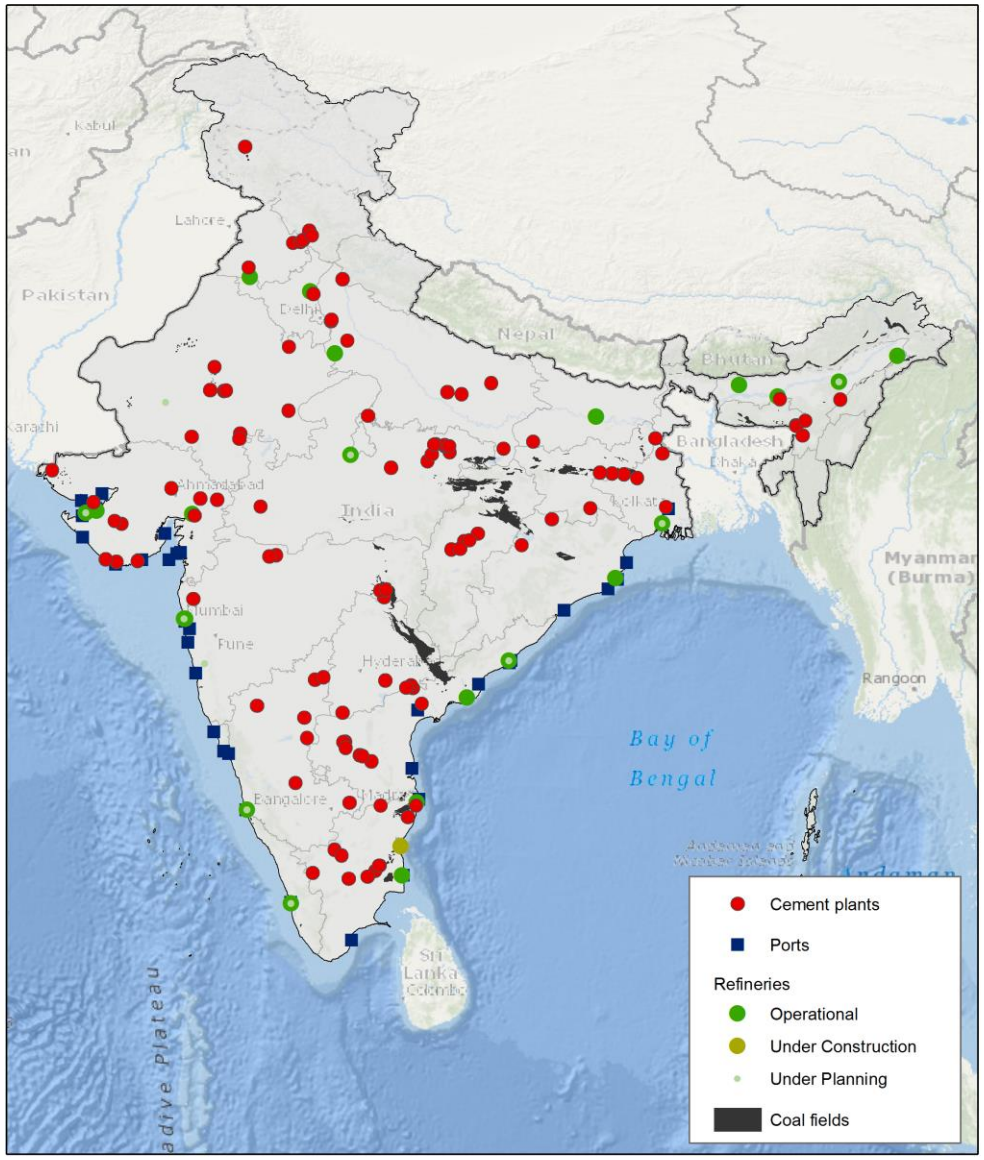


(Source: Coal Directory of India ,KAPSARC Analysis)

- Declining coal quality and the need for emission controls. Impetus for imports

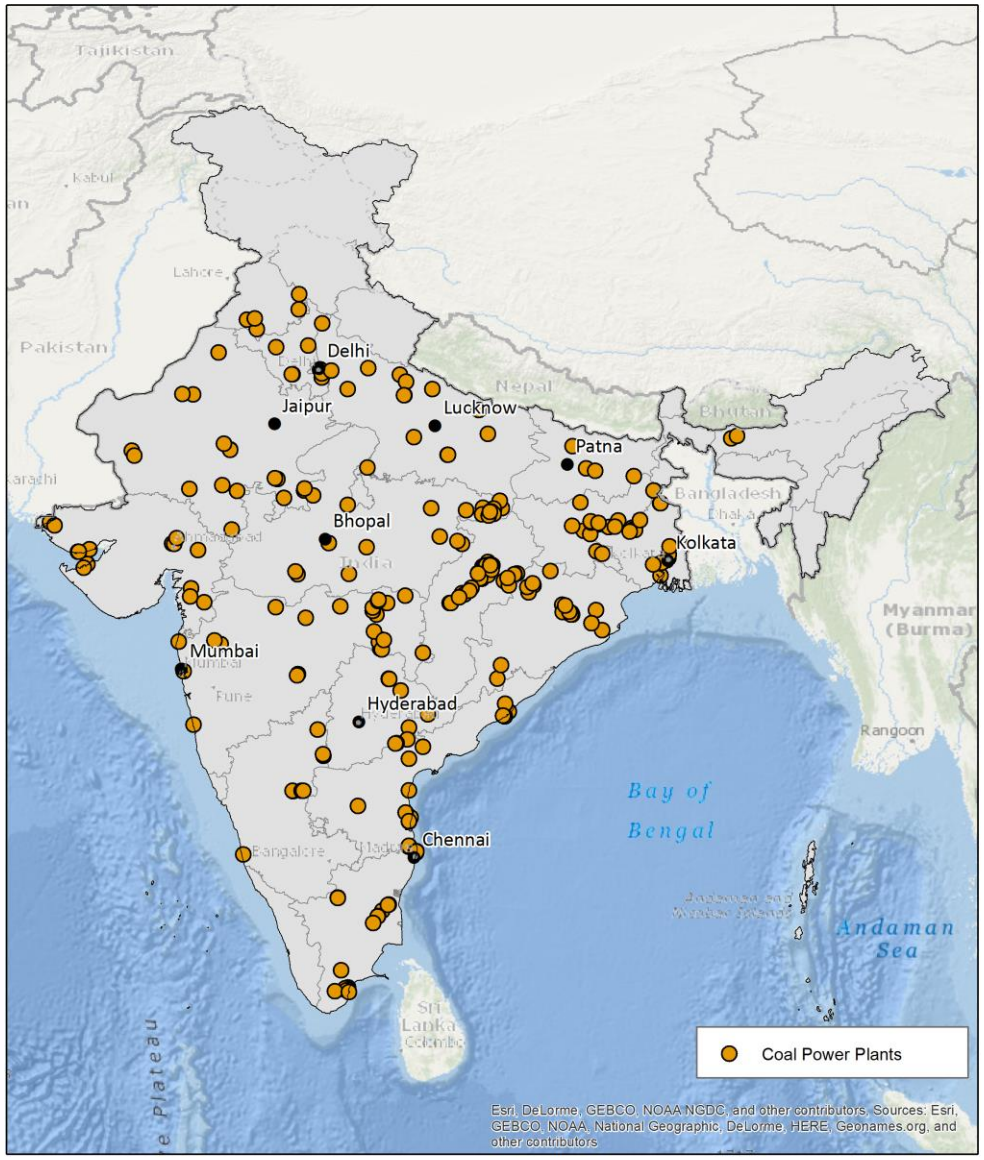
Cement

- Cement plants are located near demand centers and limestone mines. Higher CV fuels can be transported further inland. Hence, imports of pet coke and coal from overseas. Location of cement plants on the western and southern regions means low CV domestic coal is expensive to transport.
- Ports on the western and southern regions facilitate in imports.
- Economic growth will mean higher cement production and coal requirement.



Power

- Power plants widely distributed across the country. Need to be near load centers and coal mines.
- Predominantly subcritical power plants. Only recently have super critical power plants been commissioned. Ultra Supercritical is still in single digits
- Domestic coal quality often responsible for technology choices.



Data Source: KAPSARC
Date: January 27, 2016

0 500 1,000 Kilometers

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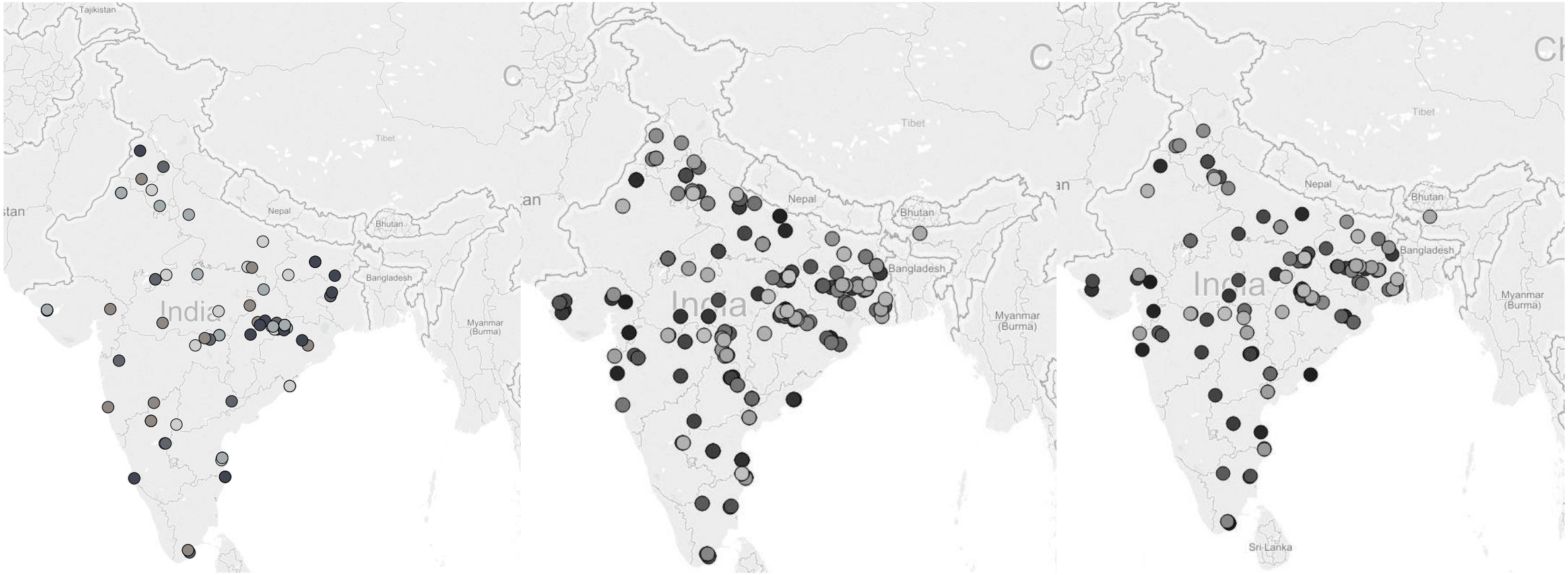

Super Critical Power Plants

Sub Critical Power Plants

Sub Critical Power Plants (more than 25 years old)

(Source: KAPSARC Analysis)

- Old sub critical power plants need to be replaced with super critical plants.
- Poor quality coal meant that value could be better captured by pit-head based power plants.

Policy Implications

Policy Implications

- Coal washeries being set up to wash poor quality coal. Progress has been slow due to commercial reasons.
- Renovation and modernization of sub critical units still seen as a cost effective mechanism to maintain boiler fleet.
- Debt recast and electrification push should see states becoming more prudent, financially.
- Moves to reform the coal market should see a jump in supply.

- Push for coal production expected to increase supply, however, quality concerns mean imported coal will have a market.
- Rationalisation of coal linkages and supply will see more efficient movement of coal
- Use of NTPC for solar bundling/counter party risk will support coal generation
- Renewables push is ironically triggering more coal based generation.

Conclusions

- Cheap coal remains critical to Indian economic growth
- Recent higher production hasn't been absorbed
- Changes in power sector, the biggest consumer of coal, will impact growth
- Policy changes in boiler fleet, mining and transportation will enable India to use coal more effectively

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Thank You