



Challenges in Developing Coal Power Plants in Pakistan

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September, 2014



The Hub Power Company Limited

growth through energy

Agenda

I. Pakistan's Energy Crisis - Short Version

- a. Magnitude
- b. Reasons

II. Hubco – The Company

- a. Hub Power
- b. Hub Narowal
- c. Lairab Energy
- d. 660 MW Coal based IPP

III. Challenges for Coal Power Plant Development

IV. Question & Answers



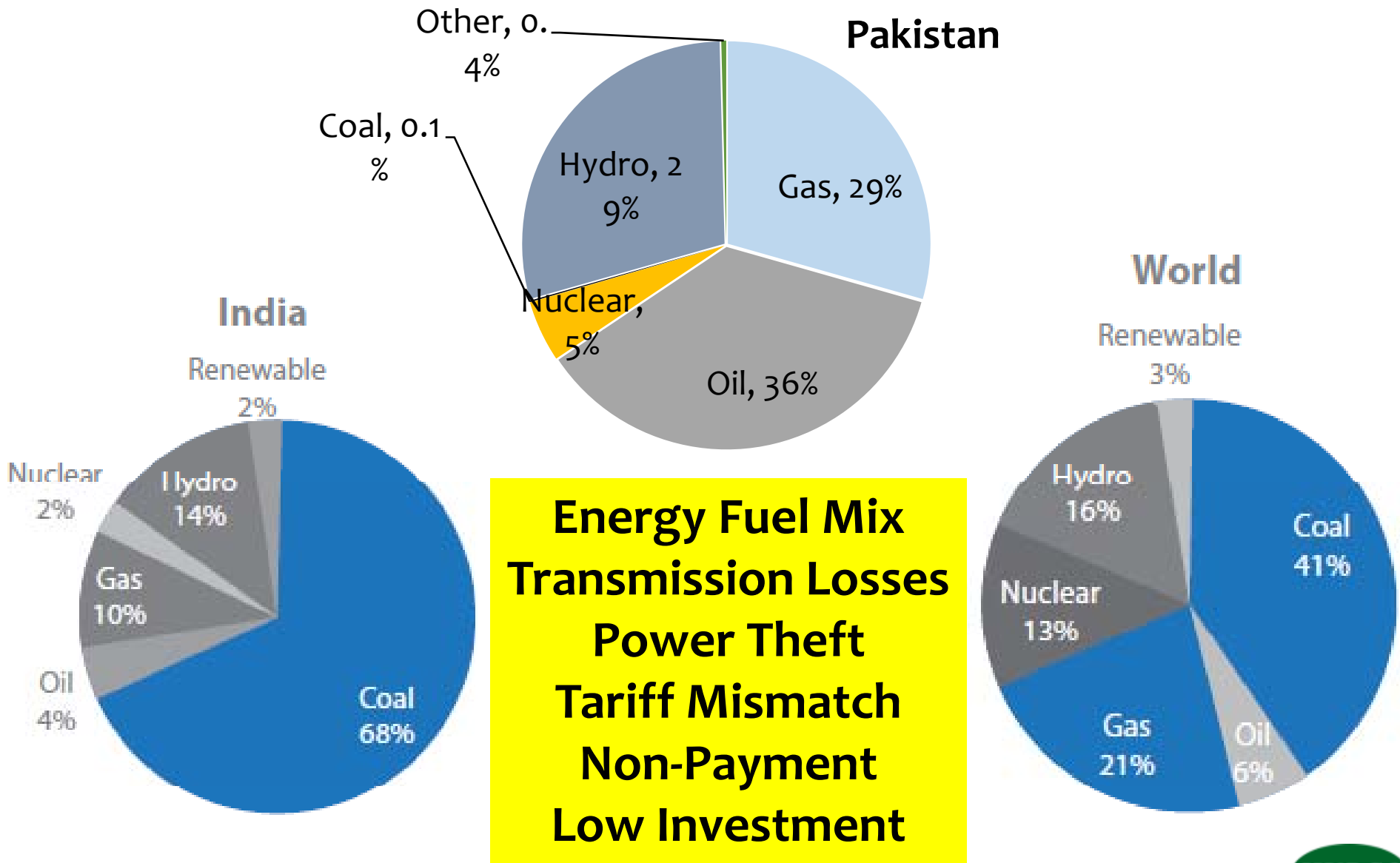
Section I: Pakistan's Energy Crisis - Short Version

Pakistan's Energy Crisis

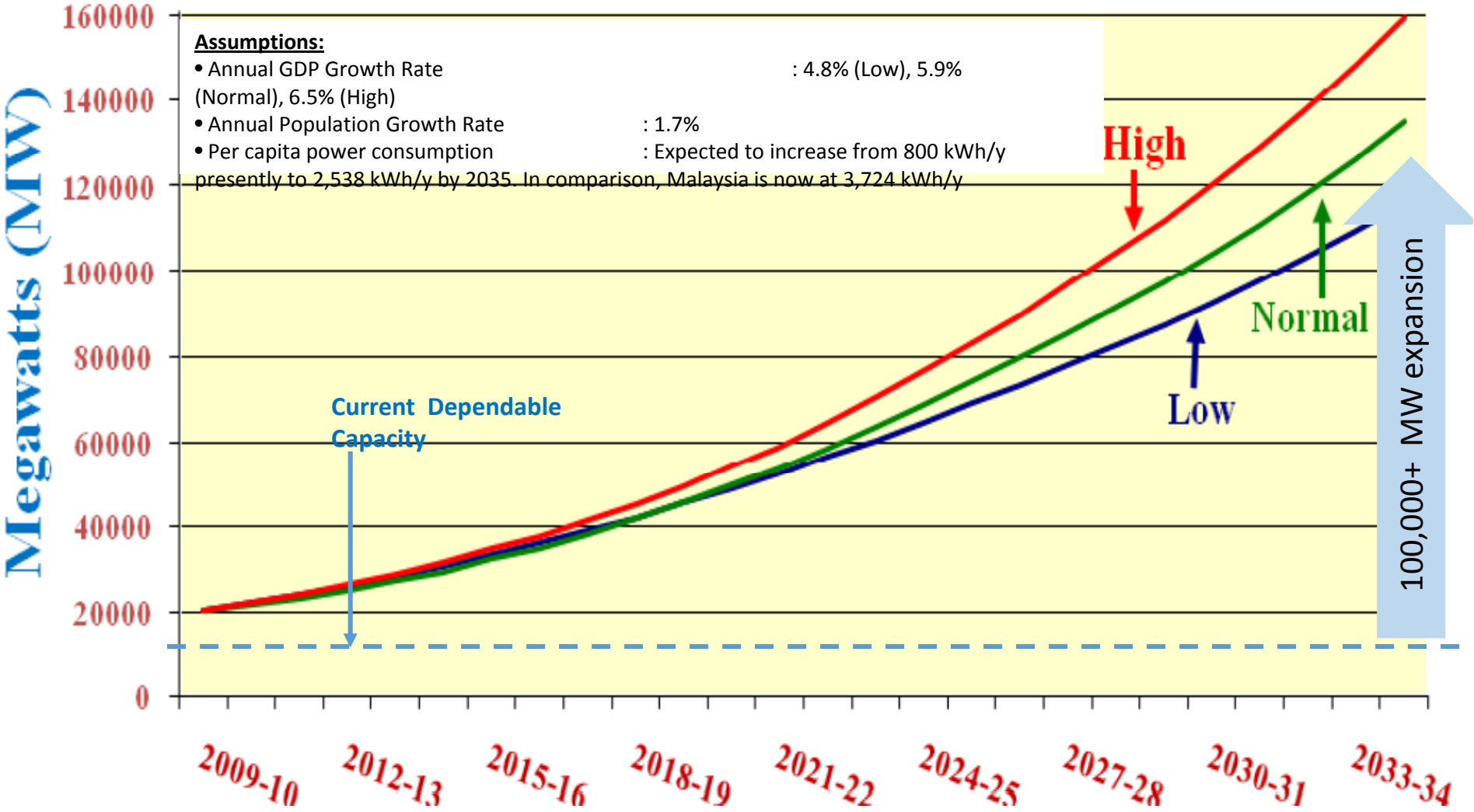


Source: NEPRA State of Industry Report 2013

Energy Crisis Reasons



Country Power Demand Projection



Source: National Transmission & Distribution Co. (NTDC), Pakistan

Section II: Hubco – The Company

Hubco – Operations

Pakistan's 1st IPP	: 1,292 MW Hub Plant
Narowal IPP	: 225 MW
Pakistan's 1st Hydel IPP	: 84 MW Laraib

Total Capacity : 1,601 MW

Generating 10% of Pakistan's electricity

Hub Power Plant – 1292 MW



4x323 MW STG, Fuel: RFO, COD: 1997

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Narowal Power Plant – 225MW



11 Engines, 1xSTG, Fuel: RFO, COD: 2012

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Laraib - Pakistan's 1st Hydel IPP – 84MW

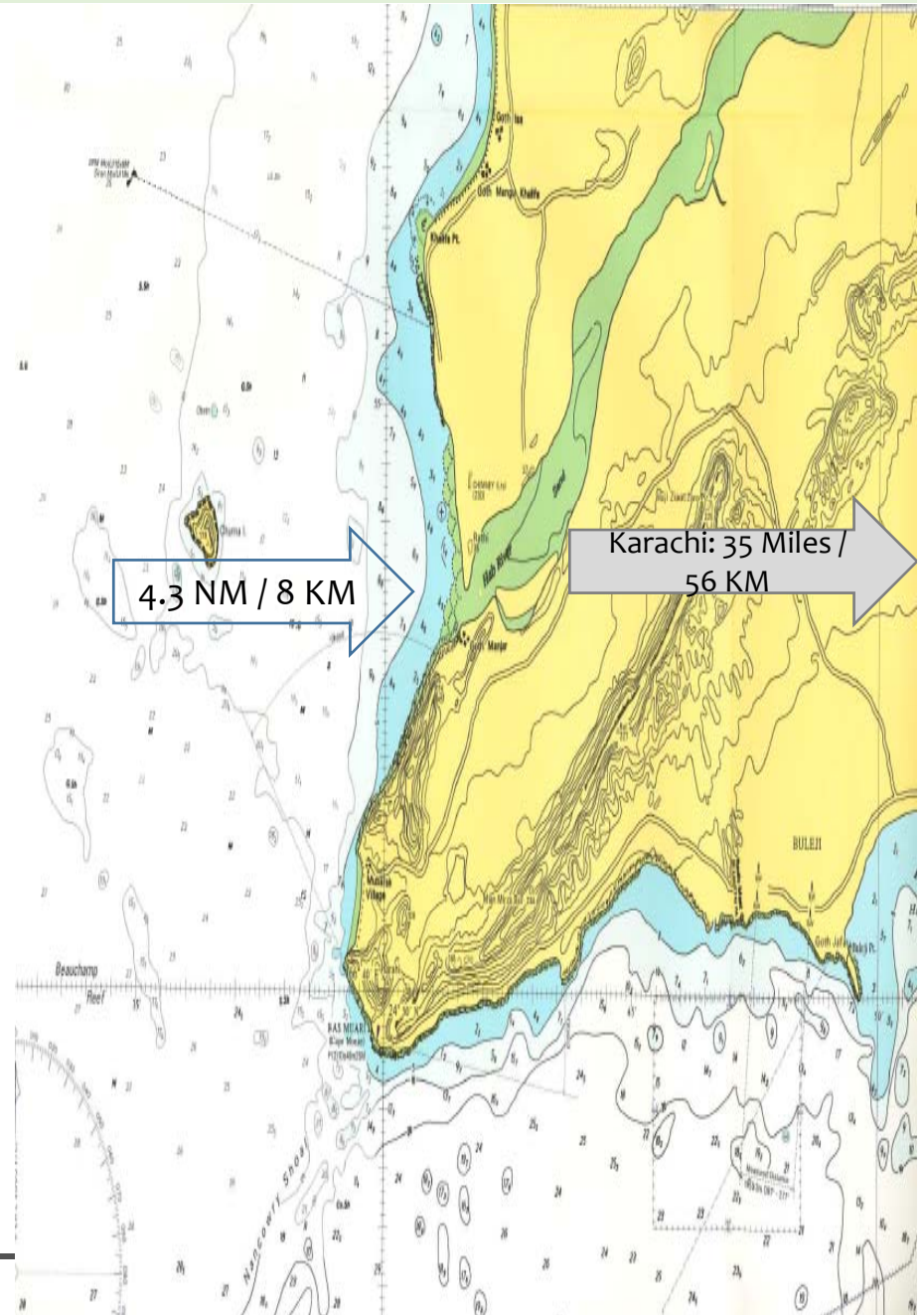


4x21MW, Run-of-River, COD: 2013

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Hubco – Unique Site with a Future



Hub-II – 660 MW Imported Coal Fired IPP

- 2x660MW at Hub Site
- Brownfield vs Greenfield
- Super Critical Technology
- World Bank Environmental Standards
- Existing Grid Connectivity
- Imported Coal 5500 Kcal/Kg NAR
- Coastal location, multiple logistic options



Section III: Risks & Challenges in Coal Power Plant Development

Project Financing Challenge

- Coal is a dirty fuel & is not a favorite for western financing
- Only option is Chinese based Financing
- Chinese institution have little experience in PK Project Financing, most project financed are G-to-G
- Developers should be ready for delays in Financial Close thus exposure to increase in Project Cost
- With number of Power Projects being developed there will be a stress on local debt availability for projects
- Security Structure: IA & PPA guarantees being questioned due to Circular Debt

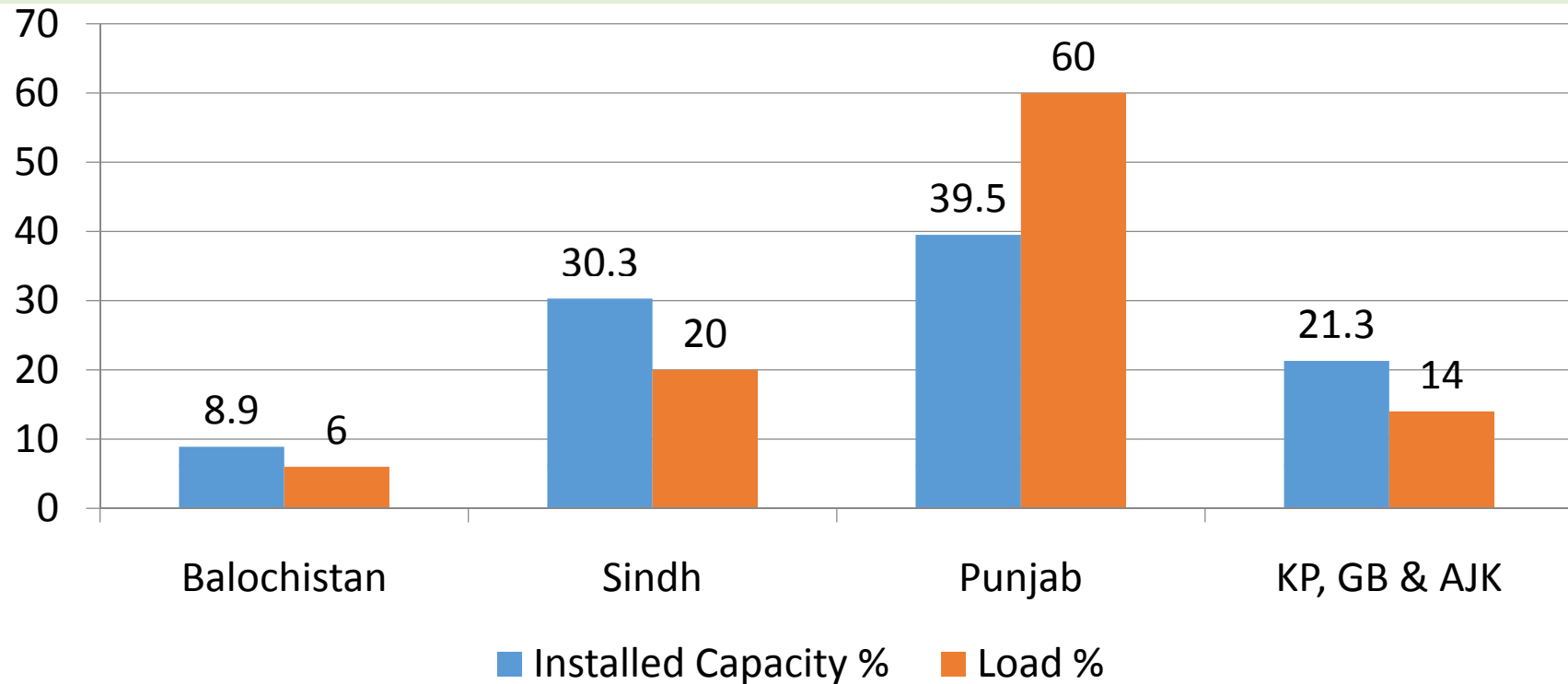


Technological Challenge

- No prior experience of installing & operating coal based power plants in the country – HR Gap
- Fire & Explosion risk due to coal dust, operating regime & equipment selection critical
- Fuel significantly different than gas & oil, solid with different handling, storage & transportation needs
- Un-processed fuel thus variations depending upon fuel origins posing quality challenges
- New environmental mitigations: FGD, ESP, SCR
- Ash Disposal: 1x660 MW plant produces 250KTPA



Power Evacuation Challenge



- Load Centers in the middle of the country
- Transmission infrastructure missing to evacuate power to load centers
- Transmission planning not keeping pace with power asset development, NTDC can do 23 KM per month



Logistic Challenge

- 10x660MW will require say 20 MTPA of Bituminous Coal
- 500 Ships of 40KT are required to bring 20 MT coal i-e 1.5 ships per day
- Ports take 3 to 4 days to off load a ship using on-board cranes, poor port infrastructure
- 1100 trucks required every day to move coal from port
- Moving 10 MTPA on train require 28 trains leaving port every day i-e 1 every 45 mins (don't get caught at a railway crossing)
- Railway requires \$4B investment to upgrade
- Port will require significant investment, PQA is getting bulk terminal will solve part of the issue
- Delays in coal arrival for an IPP means LD's

Social & Environmental Challenge



2
Pictures
Equals
2
Million
Words

- If Environment is not respected will create Social & PR issues
- Weak Regulatory Structure may breed compromises

Powering Pakistan

- Short Term: Coastal Power Plants based on imported coal & few power assets in Thar, invest in power evacuation South to North
- Medium Term: Imported Coal Power Plants in Center near Load Centers & few Run-of River
- Long Term: Large Scale Hydro Assets developed in North like Bhasha, Dasu etc.
- In-between: Wind & Solar as grid Stabilizes

What Can Insurance Industry do for Coal IPP's?

- Very rich database of world wide losses in coal fired plants:
 - Equipment Damages
 - Bodily Harms
- Knowledge can be made available to industry to understand the inherent risks & be able to mitigate them
- Win-Win for both, less accidents, low premium for asset owners & nil loss pay off by insurance companies



Q&A