Coal the Economic Engine for Development of Pakistan

Irfan K. Ali, Chairman

TharPak Consortium

WCA-EURACOAL Workshop: Does a prosperous world economy need coal?

Tuesday 13 November 2012
Pakistan Energy Crisis

Population:

USA 3rd

Pakistan 5th

Energy Consumption:

USA 9th @

12,924.224 kWh per capita

Pakistan 164th @

430.183 kWh per capita

<table>
<thead>
<tr>
<th>Year</th>
<th>Pakistan Installed Capacity (MW)</th>
<th>Projected Demand (MW)</th>
<th>Gap (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>24,474</td>
<td>6,577</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>36,217</td>
<td>18,320</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>54,359</td>
<td>36,462</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>80,566</td>
<td>62,669</td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>1,13,695</td>
<td>95,798</td>
<td></td>
</tr>
</tbody>
</table>
The Scale of Global Poverty and Energy Deprivation

- **2,560 Million People** Live on Less Than $2 a Day
- **2,000 Million People** Have Limited Access to Electricity
- **1,456 Million People** Have No Electricity At all

Source: Dr. Frank Clemente, Professor Penn State University
Energy is Good: People in Societies with Greater Access to Electricity

- 25% and 90% average percent of population with access to electricity

Source: Dr. Frank Clemente, Professor Penn State University
Out of Poverty: Coal Based Energy has Propelled China Forward

“China is an example for the developing world” IEA, 2007

Note: Poverty measures follow World Bank definition of $1/day income
Source: IEA, 2007; EIA, 2008
Energy Imbalance

Energy imbalances improve in the Americas...

Key:
- Billion toe
- Net importers
- Net exporters

Energy Outlook 2030

Import dependency rises in Asia and Europe...

India Coal Imports

China Net Coal Imports

Source: Forecasts based on early estimates

Energy Outlook 2030
Thar Coal Field

- USGS discovered the resource in 1993
- Estimated at 172 Billion Tons
- 2010 World Bank ban on coal projects
- First mover advantage – sitting idle
- Initial control >2 billion tonne resource
- Remarkable expansion capacity
- Potential to be the Powder River Basin of South Asia
Environmental Importance of Thar

- Demand for expanded energy access is overwhelming.
- The world will exploit Coal for decades and the bulk of the growth will be in developing nations.
- Potential environmental consequences of traditional large scale coal development are real.
- TharPak project can create a viable way forward to limit climate damage from coal development by demonstrating the potential for advanced carbon capture technologies and mitigation of other pollutants from the production process.
- TharPak can serve as “proof of concept” to replicate throughout the developing world to expand energy access while avoiding climate change and other forms of air pollution.
CTL, CCS, EOR, & Emissions

Perfect Synergy: EOR needs the CO$_2$ from CCS and CCS needs EOR to store the CO$_2$. 

Integrated CO$_2$-EOR & CO$_2$ Storage

Legend:
- Red: Assessed basins with resource estimates
- Yellow: Assessed basins without resource estimates
- Light grey: Countries outside scope of report

Map showing locations of CO$_2$ storage and EOR projects around the world.
THE CONSORTIUM

[Diagram showing various companies involved in TharPak]

Copyright © 2012 | All Rights Reserved, TharPak, LLC.
TharPak Advisors

E. Morgan Massey - Director Inter-American Coal, former CEO Massey Energy

Dr. Stanley C. Subolesski - Director Inter-American Coal, former executive Massey Energy Company & OKD Coal, former Department Head of Mining Engineering at VT & PSU

Dr. Michael Karmis - Professor Department of Mining and Minerals Engineering and Director of the Virginia Center for Coal and Energy Research at Virginia Tech

Dr. W. Harrison Wellford - energy advisor to three US Presidents, policy analyst and clean coal advocate

Dr. Timothy R. Carr – Energy & Geology Professor at WVU, The National Research Center for Coal & Energy and U.S.-China Energy Center

Usman Aminuddin - Chief Executive of Attock Refinery and Pakistan Oil Fields. Pakistan’s former Federal Minister of Petroleum and Natural Resources

Kamal Chinoy - Director and CEO of Pakistan Cables Ltd., International Industries Ltd., Pak Chemicals Ltd., International Steels Ltd., Pakistan Security Printing Corp. Ltd. and Atlas Insurance Company Ltd
Mega Energy Complex - Ultimate Objective

Truck & Shovel
20M TPY Feed

80,000 BPD
Ultra Clean Liquid Fuels

CO₂ (6.4M)
39.8M TPY of CO₂

59M TPY Output

600 MW
Captive Usage

IGCC Power Plant
CO₂ (33.4M)
CO₂ Compression & Transfer Plant

39M TPY Feed

Dragline
5,400 MW
Industrial & General Consumers
Thank You

i graci as благодаря děku ji tak tack
dank u kiitos merci danke
σας ευχαριστώ köszönöm شكرًا ačiū
takk dziękuję obrigado grazie
teşekkür ederim მتشხვილოვანი Information: http://www.tharpak.com