

4th IEF-KAPSARC THOUGHT LEADERS ROUNDTABLE

ENERGY SECURITY IN TRANSITION

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RIYADH

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Energy Sector At Crossroads As Sustainability Takes Centre Stage in Policy

- ❖ Participating countries agree for NDCs in COP 21 to contain global warming
- ❖ Brings sustainability at the centre of energy policy formulation
- ❖ Deteriorating air quality in major cities of India & China hazardous for health
- ❖ Triggers public outcry against carbon emission and supports Renewable
- ❖ India embarks on an ambitious 175 GW Renewable energy program
- ❖ This will safely ensure fulfilling a major NDC ahead of time
- ❖ China also pushing Renewable agenda aggressively

Energy Policy Transition -Indian Scenario

- ▶ During FY16 & 17 India generated 896260 and 944850 BU of electricity from Coal, Oil and Gas, registering a growth of 5.3%
- ▶ In the same period the power generation from solar and wind increased from 36054 BU to 58097 BU registering growth of 61%
- ▶ Incrementally the share of solar and wind (22043 BU) had a share of 30% of the incremental generation of 72477 BU
- ▶ As a result the share of solar & wind in the aggregate power generation increased from 3.7% to 5.5%
- ▶ Massive policy push and subsidies are leading to drastic fall in solar and wind tariff to below 5 cents at bus bar and 10 cents at the retail end
- ▶ At these tariff the viability of adding fresh coal based generation capacity is questionable except at pitheads
- ▶ Threatens to cut down, if not halt the consistent growth in coal demand

Energy Policy Transition -Indian Scenario

- ▶ During 2015 and 2016 India consumed 685 and 724 mtoe of primary energy registering a growth of 5.7%
- ▶ Coal consumption rose from 397 to 412 mtoe, but share fell from 58 to 57%
- ▶ Share of Oil/gas grew 8.9% from 237 (34.6%) to 258 (35.6%) mtoe
- ▶ Non fossil fuels contributed 51 (7.4%) and 54 (7.5%) mtoe during this period
- ▶ The share of non fossil incrementally (3 mtoe) was 7.8% of the aggregate incremental consumption of 39 mtoe
- ▶ The fall in share of coal was largely offset by increase in share of Oil & Gas

Energy Policy Transition -Chinese Scenario

- ▶ During 2015 and 2016 China consumed 3005 and 3053 mtoe of primary energy, registering a low growth of 1.6%
- ▶ Coal consumption dropped by 1.4% from 1913 (63.7%) to 1887 (61.8%) mtoe
- ▶ Share of Oil/gas grew 4.2% from 737 (24.5%) to 768 (25.2%) mtoe
- ▶ Non fossil fuels contributed 355 (11.8%) and 398 (13%) mtoe in this period
- ▶ The share of non fossil incrementally (43 mtoe) was 89.6% of the aggregate incremental consumption of 48 mtoe
- ▶ The drop in share of coal by 1.9% was offset partly by Oil/Gas & mainly Renewable

Energy Policy Transition -Chinese Scenario

- ▶ China pursued a low cost coal based development strategy for over 5 decades
- ▶ This enabled it to become a highly cost competitive global economy
- ▶ But it's share in global emission (30%) far exceeds the population share (16%)
- ▶ Air quality in major cities pressed alarm bells and triggered public outcry
- ▶ This has compelled transition in energy strategy

Energy Policy Transition

-Rest of the World Scenario

- ▶ During 2015 and 2016 Rest of the World, excluding India & China consumed 9415 and 9499 mtoe of primary energy registering marginal growth of 0.8%
- ▶ Share of Coal grew by 1.3% from 2931 (31.1%) to 2970 (31.3%) mtoe
- ▶ Share of Oil/gas grew 4.2% from 6514 (69.2%) to 6596 (69.4%) mtoe
- ▶ Non fossil fuels contributed 1427 (15.1%) and 1470 (15.5%) mtoe in this period
- ▶ The share of non fossil incrementally (43 mtoe) was 51.2% of the aggregate incremental consumption of 84 mtoe

- ▶ *If trends in last two years are any indication, China seems to pursue a more aggressive thrust towards renewable than Rest of the World, while Indian thrust measured by outcome remains moderate.*

Implication of policy transition - Indian Context

- ▶ Power consumption in India of around 1000 units per capita is 1/3rd of China
- ▶ 30% population is w/o power and a large section do not get power 24*7
- ▶ India adopted a target of 'Power for all 24*7' in 2015.
- ▶ This requires rise of per capita consumption to 1800 units, after considering planned transition to LED bulbs and energy efficient white goods.
- ▶ Achieving COP21 target of 40% Renewable capacity by 2030 will mean 20% share of generation translating to 360 units per capita
- ▶ Hence thermal generation needs to rise by 50%
- ▶ Accordingly coal consumption likely to grow to over 600 mtoe or 1200 mtpa from current level of 800 mtpa in the 'least coal' scenario

Implication of policy transition - Indian Context

- ▶ Creation of new coal based capacity, except at pitheads is turning unviable due to drastic fall in solar/wind tariff
- ▶ However low PLF of *existing* power plants offer scope for generation of additional thermal power cost effectively
- ▶ The average PLF was 79% in 2007-08 and can reach optimal level of 85% from current level of 60%
- ▶ The power generated from rise in PLF entails only the variable cost of coal and is cheaper than the least cost Renewable power by at least Re 1
- ▶ The benefits of thermal power generation from rise in PLF is manifold

Benefits of higher PLFs are substantial

- ❖ Adopting policy that enables existing coal based power plants to enhance PLF to 85% infuses **400 billion units of additional power at a marginal cost lower than the RE bid tariffs** helping discoms lower their cost of procurement (relative to RE).
- ❖ It **creates an additional coal demand of some 250 mtpa**, that can allow India pursue low cost coal based development for some more time
- ❖ It **generates additional contribution of about INR 100 bn annually (US\$ ~1.5 bn) to the clean environment fund**, which can finance renewable growth.
- ❖ It allows adoption of calibrated approach to gradual capacity addition in renewables thereby gaining from further innovation leading to drop in tariff.
- ❖ The coal based plants can service huge bank debts only by operating at higher capacity and avoid the risk of turning NPAs.
- ❖ It allows time to explore alternate use of coal as feedstock for chemicals

Policy prescription - increase competition and realize cost savings for Discoms

- ❖ Allow gencos to participate in auction for power supply on a half yearly basis, with the rolling annual average renewable power tariff set as the cap
- ❖ The cap will ensure a built in discount of upto INR 0.5 on account of:
 - ❖ The clean environment cess of Rs.400/mt - INR 0.25 &
 - ❖ In case of use of the same to subsidize renewable tariff - INR 0.25
- ❖ In addition further discount will be realised thru competition among gencos
- ❖ The trend of falling solar power tariff will compel the less efficient coal based units to drop out while technologically advanced plants attain high PLF with lower emission
- ❖ Will drive affordability to the centre of power policy & balance it with concerns on environmental sustainability.

Thinking beyond power - develop coal as an alternate feedstock

- ❖ The fertilizer sector is largely import dependent mainly for complex fertilizers, & raw materials - Ammonia & Phosphoric acid & partly for Urea (25%)
- ❖ Allocation of Natural Gas to complex fertilizers has low priority & availability is limited

Proven technologies are available:

- ❖ Coal to Ammonia to fertilizers has been a success in China
- ❖ Coal to oil & chemicals is a great success at Sasole, SA
 - ❖ New processes can make methanol from coal, for use in transportation - as in China

India lags in alternate uses of coal since traditionally coal has been feeding growing demand from power

- ❖ Change in future scenarios should trigger a reconsideration

Sustainable Policy for Energy Transition

- ❖ No further capacity addition in thermal power except those in pipeline
- ❖ Capacity addition only in renewable in a calibrated manner to take advantage of further drop in tariff
- ❖ Meet the rising power demand by enhancing PLF of existing coal based plants & transfer the cost benefit for discoms through auction
- ❖ Continue growth in coal production by existing players & commercial mining
- ❖ Fast track the alternate use of coal as feedstock for chemicals and fertilizers to sustain demand growth of coal beyond 5 years

Compliance with COP21 Commitments

- ❖ The key commitments:
 - ❖ Renewable capacity to have a minimum share of 40%
 - ❖ Reduce emission intensity of GDP by 33% between 2005 & 2030
- ❖ Current share of renewable capacity including hydel, solar & wind is 28%
- ❖ The implementation of 175 GW capacity addition will ensure that the first condition is met ahead of time
- ❖ Assuming avg GDP growth of 7% pa the 2030 GDP will be 5.8 times 2005 GDP. Thus fossil fuel consumption growth allowable is 3.9 times
- ❖ Applying the factor on coal permits consumption of 1.5 btpa by 2030
- ❖ Hence the suggested policy is consistent with COP21 commitments.

THANK YOU

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