



Solar beats coal cost: Implications

Energy and Natural Resources



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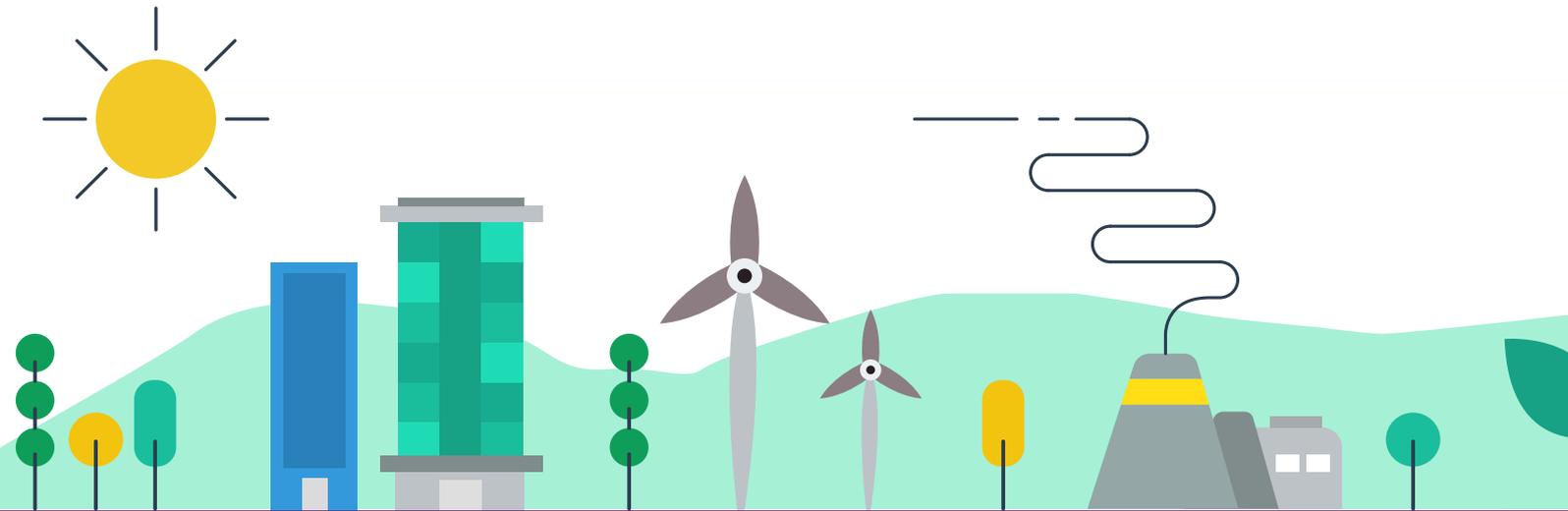
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Key highlights of the paper

1. India's coal demand is likely to reach a peak for thermal power generation during the 2025-27 time frame. This has significant planning implications for the coal and logistics ecosystem
2. The strong demand surge for solar power would be driven by the relative economics; however, technical issues related to grid integration remain a concern. India doesn't seem to be taking adequate action to address this. As per our simulation, day time Plant Load Factors (PLFs) of coal plants are expected fall to 38 per cent in a 100 GW solar power scenario by 2022. Thermal plants in India may not be ready to handle such low PLFs
3. The competition from solar is certain to lead to pressures on coal pricing as well. Coal companies will have to work urgently on efficiency measures and cost reduction
4. The wide scale deployment of solar is expected to impact the revenues of the Indian Railways as coal plants further away from coal sources are less likely to get dispatched as per the merit order
5. Various ecosystem players will need to respond to this high renewable energy scenario in different ways. The ecosystem players include equipment makers for thermal power generation, mining companies and EPC providers. New opportunities are likely to emerge in areas such as grid integration-related services, electricity storage and even electric vehicles.







The global energy landscape is undergoing significant changes due to various technological disruptions. The early signs of this impact are already evident in India. Recent bidding(s) saw the solar power tariffs breach the INR 2.50 per kWh mark¹. This is a significant milestone as the solar power tariffs are now comparable to the variable costs of coal-based power in many cases (not considering the fixed costs of coal-based capacities which are sunk costs or which are needed for capacity support). Technological improvements resulting in the proliferation of low cost solar power is expected to have a far reaching and disruptive impact on the power sector value chain including coal mining, production, thermal power plant construction and the railways.

This paper makes an assessment of the impact of rising solar power on the incumbent eco-system and we will deliberate on the following questions:

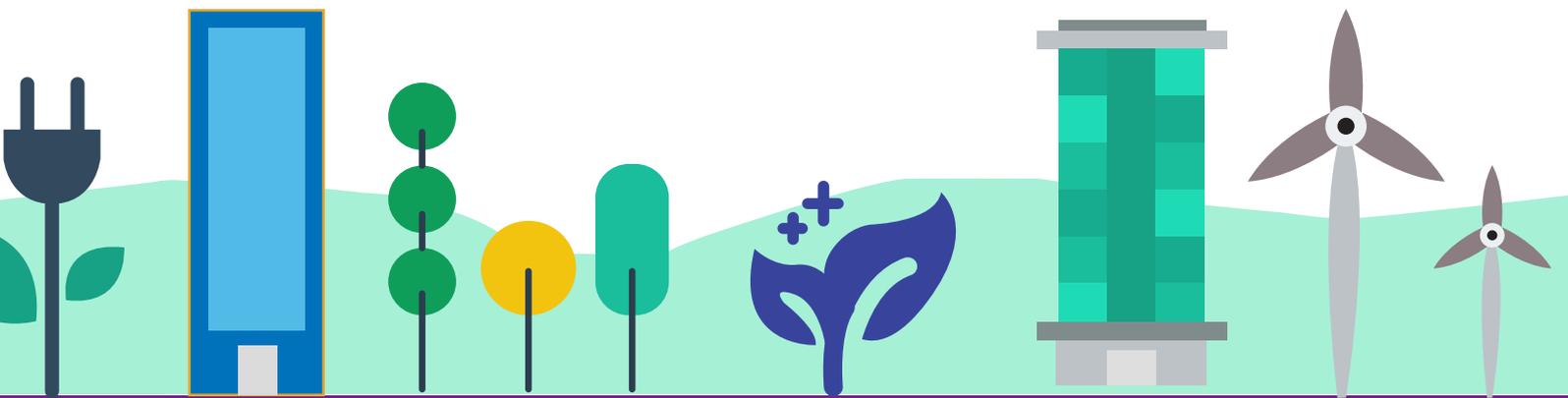
Will India be able to absorb 100 GW of solar power on economic terms by 2022?

As we have shown in this paper, in case the price of solar power remains at the current level of INR 2.44 per unit¹ till 2022, India will be able to absorb 100 GW of solar power. This is from an economic perspective, however, we need to also address the technical feasibility.

What are the likely issues that will crop up in integrating solar power with the grid?

It is clear that several technical challenges will present themselves as power from intermittent renewable sources garner a significant share of the total power fed into the grid, as has happened in other western

1. As discovered in bid for 500 MW solar park in Bhadla, Rajasthan



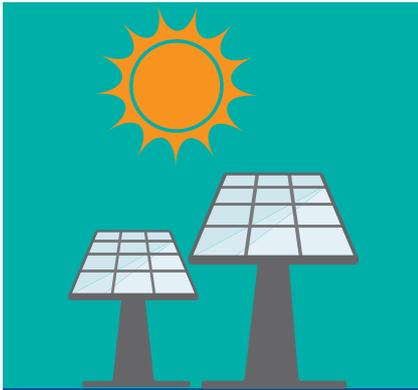
markets such as Germany. It is not clear at this stage, whether the Indian grid will be ready within this time horizon to absorb this huge amount of solar power. In our opinion, there is much work needed to be done to prepare the Indian grid and this calls for an urgent action. If not addressed in time, such costs would add to the power tariffs.

How much will the compression in the demand for thermal coal impact the incumbent supply eco-system?

India's mammoth coal and logistics ecosystem was built to serve the thermal power generation sector. There have been plans to build and expand capacity further over the next 10 years, anticipating secular growth in coal requirements from the thermal power sector. These agencies need to relook at their planning programme to incorporate the impact of high solar to coal and logistics demand, and start planning for coping strategies.

What are the strategic response options for the existing players?

The existing players face significant uncertainty with respect to the future of thermal coal demand in India. The ecosystem that stands to be potentially affected includes mining companies, the mining industry service providers such as Mine Developer & Operators (MDOs), the logistics ecosystem including railways, ports and shipping businesses, the capital equipment providers to the coal mining and handling industry, thermal power generation equipment manufacturers, and Engineering, Procurement and Construction (EPC) companies. The choices they have in terms of approaches broadly fall into three categories: (i) Wait and watch, (ii) Take selective actions to limit resource commitments or diversify, (iii) Take drastic actions. How they evaluate the emerging scenarios and the decisions they take will impact the future of these organisations in critical ways.



How much solar capacity can India absorb economically?

Solar power penetration in the country has seen multi-fold rise in the last two years (3 GW in FY 2015 to 12 GW in FY 2017)² with solar tariffs falling over 60 per cent³ during this period. This trend will gather momentum and will have a considerable impact on the conventional power eco-system in the coming years.

Coal faces dispatch risk

Today solar power tariffs are competitive with variable costs of coal power. The inexorable downward trajectory of solar tariffs registered another landmark with a tariff of INR 2.44 per unit⁴ in the recent bid

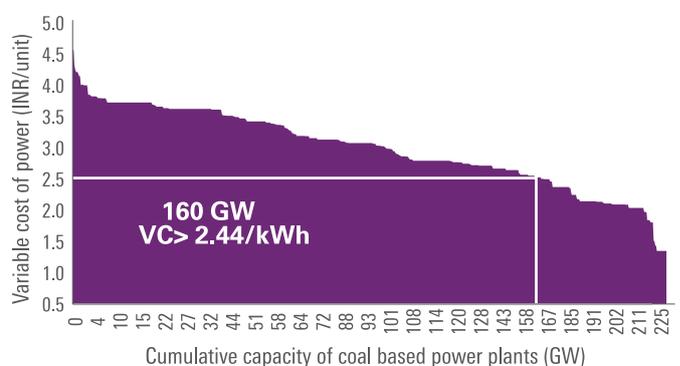
for 500 MW solar plant at Bhadla, Rajasthan. This phenomenon of declining solar power tariffs is not restricted to India alone. Across the globe, solar tariffs have reached record low levels as described in Table 1.

Table 1: Lowest solar tariff bid discovered across the globe in the past one year

SN	Country	Lowest Solar bid discovered (per unit) ⁵	Capacity allotted at lowest tariff	Year of discovery
1	UAE ⁶	2.42 cents (~INR 1.57)	350 MW	September 2016
2	Mexico ⁷	2.7 cents (~INR 1.75)	300 MW	February 2017
3	Chile ⁸	2.91 cents (~INR 1.9)	120 MW	August 2016
4	India ⁴	INR 2.44	200 MW	May 2017

According to our estimates, in FY 2022, 160 GW of coal-based capacity will have a variable cost of power generation of more than INR 2.44 per unit. This suggests that a large quantum of coal-based generation dispatch can be economically replaced by solar within the next five years, as indicated in Figure 1. However, the rising penetration of this intermittent source will increase the complexity of grid management. To what extent this is technically feasible is yet to be answered. The analysis depicted in figure 1 assumes that recently discovered tariffs are sustainable. It is also assumed that large future solar power capacity will come within the tariff range discovered.

Figure 1: Replacement of coal power generation in the day time due to solar power (in FY 2022)



Source: KPMG in India's analysis

2. MNRE website, CEA monthly report (March 2017)
 3. KPMG in India's analysis based on the lowest price discovered at INR 6 per unit for AP's 500 MW solar project in FY 2015 (<http://www.bridgetoindia.com/andhra-pradesh-solar-tariffs-very-close-to-new-imported-coal/>) and latest price discovered for solar power at INR 2.44 per unit in Bhadla, Rajasthan
 4. Only 200 MW out of bid for 500 MW is awarded at INR 2.44 per unit. Rest 300 MW is awarded at INR 2.45 per unit

5. Exchange rate of INR 65 per USD is assumed to convert USD to INR
 6. <http://www.thenational.ae/business/energy/record-low-bids-submitted-for-abu-dhabis-350mw-solar-plant-in-sweihan>
 7. <http://frv.com/en/frv-awarded-a-300-mw-solar-project-in-mexicos-second-electricity-market-auction/>
 8. <https://www.bloomberg.com/news/articles/2016-08-19/solar-sells-in-chile-for-cheapest-ever-at-half-the-price-of-coal>



Coping with the rise in solar power

Solar power penetration of around 100 GW⁹ in the next five years will have a ripple effect on the entire power sector value chain. From a capacity standpoint, this is around a 10X rise in solar power penetration in the electricity grid.

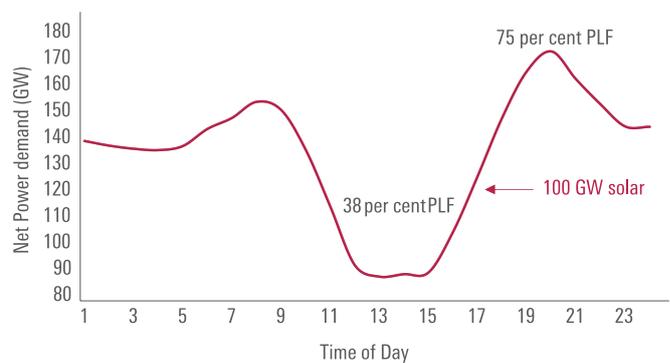
Coal plant flexibility

The average Plant Load Factor (PLF) of coal-based power stations has reduced from 69.9 per cent in FY 2013 to around 60 per cent in FY 2017¹⁰. This may further deteriorate if the best case scenario as per government target pans out. With 100 GW solar penetration, the average PLF will further drop to 49 per cent in FY 2022, which will have multiple ramifications on the stability of the grid, the economics of the Distribution Companies (DISCOMs) and thermal generation plants.

According to the draft National Electricity Plan (NEP) - 2016, during 2017-22, a total of 56 GW¹¹ of coal-based power plant capacity is expected to be commissioned. With 175 GW renewable energy target, the net load curve will exhibit strong 'duck curve' characteristics with a maximum ramp-up capacity requirement of ~22 GW/hour (9 per cent of installed capacity) against the current required ramp-up of 10 GW/h (5.3 per cent of installed capacity). This huge ramp-up rate may be manageable at the country level (generally ~20 per cent of plant capacity can be ramped up within an hour) though it may create several challenges at a local level.

In 2022, the net load curve for India after considering the solar penetration of 100 GW indicates the thermal PLF to drop to 38 per cent penetration during the afternoon time slot.

Figure 2: India's net load curve (Jan 2022) - An illustration



Source: Electricity demand pattern analysis Vol-I, Power system Operation Corporation Limited, 2016, KPMG in India's analysis assuming same growth rate for load profile as for power demand

However, unless the technical limits of generation plants are lowered, the grid will not be able to absorb more than 60 GW of solar power capacity.

This paper makes an assessment on other players in ecosystem assuming the government's target for 100 GW of solar power by 2022 is achieved.



9. As per Government of India's target of 175 GW of renewable energy by 2022
 10. National Electricity Plan (NEP), Monthly executive summary, Central Electricity Authority, March 2017
 11. National Electricity Plan (NEP) projects a total coal-based power installed capacity of 248,513 MW in 2022. As per Central Electricity Authority (CEA) monthly report for March 2017, total coal-based power installed capacity in country is 192,163 MW as on 31.03.2017

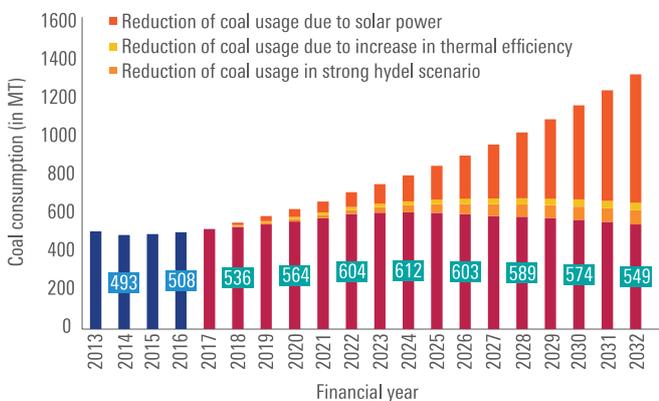
India is inching closer to peak coal demand

Globally, coal usage is on the decline. China accounts for around 50 per cent¹² of the total global coal consumption. As per the recent report by National Bureau of Statistics of China (February 2017), in 2016, the coal consumption in China fell by 4.7 per cent and its share of coal in power mix reduced to 62 per cent from 64 per cent.

In India, for the first time ever, the annual coal-based generation capacity addition is lower at around 7 GW when compared to renewable energy capacity addition of 14.4 GW¹³ in FY 2017. Going forward, India's coal demand for power production is expected to increase at much lower rates than in the past.

In a scenario of high solar power capacity addition, we expect India to achieve its peak coal requirement for the power sector during 2025-27 with peak thermal coal consumption of around 630-660 MTPA. There will be additional demand from unregulated sectors, but they are also likely to start switching to alternatives wherever possible.

Figure 3: Coal consumption forecast for power production¹⁴



Source: KPMG in India's analysis, Coal consumption Annual report 2016-17

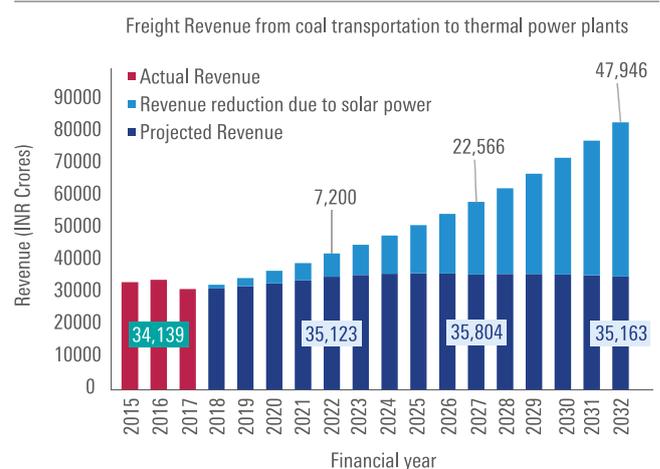
Lower growth in freight revenues for railways

Indian Railways transported around 73 per cent (~371 million MT)¹⁵ of total coal consumed for power generation in the country in FY 2016. During the same period, revenue from coal transportation for thermal power plants contributed to around 31 per cent of the total freight revenue collection. Decrease in coal consumption would significantly impact the revenue collection of Indian Railways.

Due to substantial decrease in cost of solar power and merit order dispatch effects, the dispatch of power during the day time from the load centre coal plants will be under threat especially from the plants which are located 800-1,000 km away from coal mines¹⁶. This is evident from 8.1 per cent decline in coal freight volume (for thermal power stations) observed in FY 2017. The revenue collection from the same witnessed a decline of 8.5 per cent¹⁷ during the same period. Railways also registered a reduction in the average distance travelled by coal by 6.1 per cent from 528 km (FY 2016) to 496 km (FY 2017)¹⁸.

Assuming the coal consumption forecast as shown in Figure 3, by 2022, Indian Railways may witness a potential annual revenue loss of around INR 7,200 crores due to an increase in solar power penetration. Indian Railways will have to adapt to a situation where the incremental contribution from coal freight will be lower.

Figure 4: Potential business lost by railways (assuming railways maintains the same share in coal transportation)



Source: Railway budget for FY 2017-18, Revenue Freight Traffic Statistics on org. basis for month of March 2017, KPMG in India's analysis

12. BP Statistical Review of World Energy, BP, June 2016

13. National Electricity Plan, Central Electricity Authority, December 2016 and Monthly executive summary, Central Electricity Authority, March 2017

14. In strong hydel scenario, 40 per cent PLF is assumed for hydel power generating stations against 10 per cent PLF assumed in base case scenario. Also in strong hydel case, it is assumed by 2027 India will have 93 GW of hydel power generating capacity against 83 GW assumed in base case scenario. (Hydel power capacity is inclusive of net import of hydel power expected from neighbouring countries)

15. Annual report 2016-17, Ministry of Coal and Railway budget for FY 2017-18

16. Coal logistics alone contributes up to 35 per cent of the cost of power production for power plants located 800-1,000 km away from coal mines (<http://pib.nic.in/newsite/PrintRelease.aspx?relid=151913>)

17. Revenue Freight Traffic Statistics on org. basis for month of March 2017,

18. Railway budget for FY 2017-18, Explanatory Memorandum Railway Budget 2016-17, KPMG in India's analysis

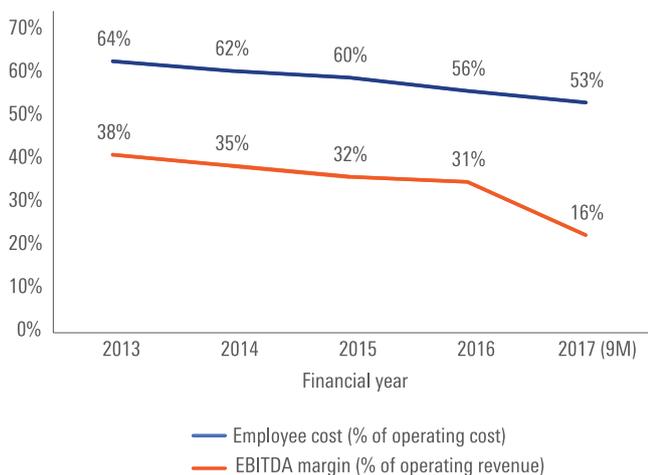
Coal pricing under pressure

Coal mining players are facing pressure to decrease the coal prices in order to compete with cheap solar power. The decline in EBITDA margins of coal mining players is also a matter of concern due to subdued demand and pricing pressures.

During FY 2016, the composite volume of coal production and over burden removal under contractual category increased by about 45 per cent¹⁹. The extent of outsourcing is expected to increase further which will have a positive impact on Coal India Limited's operating EBITDA margins.

On the other hand, according to our preliminary calculations, the current price for domestic coal at around INR 1,920 per tonne (inclusive of all taxes) is equivalent to solar tariffs of around INR 4.1/kWh²⁰ on a net back basis. Solar power tariffs are likely to be competitive against the coal-based power tariffs and day time demand of coal-based power will be lower. Hence, we believe the headroom for sustained domestic coal price hike may be limited due to this consideration. However, the dynamics of the global coal prices will also have its impact in India, and hence a complex set of considerations is likely to influence the pricing of coal and alternate fossil fuels in the Indian market going forward.

Figure 5: EBITDA of Coal India Limited²¹ is on the decline



Source: Coal India Audited Annual Reports, Unaudited Financial Results for 9M 2016-17, KPMG in India's analysis

19. Annual report and Accounts 2015-16, Coal India Limited

20. Assumptions used to compute the implied cost are:

- A distance of 500 km is assumed for coal transportation
- Station Heat Rate (SHR) of 2,450 kcal/kWh for coal-based power plant and Gross Calorific Value (GCV) of 2,975 kcal/kg is assumed for the domestic coal
- Fixed cost of coal-based plant is assumed at INR 2.16 per unit
- Power transmission cost of INR 0.65 per unit is assumed
- Grid integration cost of INR 0.72 per unit is assumed for solar power and first mile transmission cost of INR 0.34 per unit.



21. Coal India Limited contributes around 84 per cent (in FY 2016) to India's total coal production (Source: Coal India Annual report, 2015-16)



How should the incumbents respond?

The electricity grid of the future will be increasingly dominated by renewable energy sources including distributed energy that will be set up closer to the consumers. The intermittency and volatility in the grid will rise and technology solutions to address this issue will become important. The evolution of storage technologies will potentially transform the grid and could hasten the achievement of peak coal within the coming decade. In this section, we highlight some of the response options available for the incumbents in the power sector value chain to adapt to a grid with rising solar penetration.

Power Generating Companies (GENCOs)

Consider renewables-based capacity growth; enhance the flexibility of thermal power plants

While, coal capacity already under construction might be required to meet the peaking power requirements, the average PLF of coal-based plants will reduce significantly. Further, the emerging storage technologies can potentially mitigate the need to build new coal-based capacity if the combined cost of solar and storage reaches parity with the cost of thermal power for peaking load capacity.

This will also lead to reduced revenue inflows for operating plants that have merchant capacity or do not have long term PPAs with 'take or pay' capacity charge agreements.

The response options for GENCOs include:

- Realigning future capacity investments towards renewables
- Investing to enhance the flexibility of the operation of coal-based plants over a high range of PLF, including at below the currently specified technical minimums in several cases
- Planning for reduced recovery from existing coal-based plants in a lower utilisation scenario unless protected by long term 'take or pay' agreements.

Distribution Companies (DISCOMs)

Explore solar rooftop business models to retain consumer base

While, the solar economics have already become attractive, the cost differential between utility scale and rooftop projects is high. Currently, the higher price of power from solar rooftop projects is attributable mainly to the soft costs component comprising customer acquisition costs, installation labour costs, permitting and inspection costs.

Our analysis suggests that reduction in soft costs by anywhere around 40 to 50 per cent of the soft costs are possible by utility driven solar rooftop model. This would be equivalent to a reduction in solar rooftop costs by INR 0.70 – 0.85 per unit²² making it economically attractive to procure power from solar rooftops today. Accordingly, we believe it is an opportune time to develop a model framework for a utility driven solar rooftop model. This will help utilities diversify their power mix in an economically sustainable manner and retain customer base.

DISCOMs should strengthen IT systems to manage flexible demand

Agriculture demand in India contributes around 18 per cent of the total power consumption²³. Solar power will help DISCOMs meet the day time power requirements of agriculture in an economic and sustainable manner.

DISCOMs should invest in improving the infrastructure and leverage IT to enable remote agriculture feeder

22. KPMG in India's analysis

23. indiastat.com

management. This would enable DISCOMs to make the optimum use of the rising solar power generation using time-of-day-flexible agriculture demand.

Indian railways

Diversify freight mix and offer logistics services to protect revenue

Revenue from coal freight (for thermal power plants) represents around 27 per cent of total freight revenue in FY 2017²⁴. Going forward, the revenue from coal freight is expected to remain stagnant or increase only marginally (without taking into account the potential negative impact of national waterways on coal railway freight demand). Railways needs to invest in increasing the share of non-coal freight and diversify the freight mix. In addition, bulk transportation customers of Indian Railways, including coal customers, face daunting logistics and cargo management challenges which today are addressed relatively inefficiently through a fragmented and unorganised service provider ecosystem. Railways can play a valuable role in integrating, aggregating and servicing the demand for end-to-end efficient and reliable transport services to its bulk customers, to sustain its modal share and protect revenue streams.

Thermal power EPC companies and Equipment Supplier Ecosystem

Apart from upcoming 56 GW¹¹ of coal-based power capacity, it is possible that no new coal-based capacity would be required till FY 2027. However, more than 38 GW²⁵ of coal/lignite based power plants in the country have completed 25 years, and decommissioning of this capacity may potentially lead to demand for new plants. There will also likely be new business opportunities to improve the flexibility of coal-based power capacity.

However, EPC companies and equipment suppliers of thermal power plants and coal mining companies should plan for value protection in a potential scenario of severely compressed power demand and 'renewable heavy' scenario. This includes an assessment of:

- When is the right time to take actions to limit the resource commitments to the thermal business?
- What actions are appropriate at different points in time based on scenario probabilities?
- Long term strategy: What is the long term value maximisation strategy of the business for the given scenarios – stay to compete in a concentrated market, or exit to protect value?

Coal mining companies

Focus on better cost management

Coal India Limited envisages increase of coal production to 1 billion MT by 2020²⁶. Further, Ministry of Coal recently allocated seven coal blocks to state mining corporations for commercial mining²⁷ and most of the commercial blocks will start production post 2020. However with rising RE and subdued power demand, the demand growth for coal for thermal power will remain low. In fact, we expect India to have a coal surplus situation based on these production estimates.

Given this backdrop, better cost management becomes important for ensuring the competitiveness of coal, and hence off-take in a merit order power dispatch scenario. Further, coal players need to invest in technologies to reduce the ash content at the source to reduce the transportation costs.



24. Railway budget for FY 2017-18, KPMG in India's analysis

25. CEA database, KPMG in India's analysis

26. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=115635>

27. <http://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/government-signs-allotment-pacts-with-state-psus-for-7-coal-mines/articleshow/54678304.cms>

Potential strategic response options for incumbents

Industry/sector	Nature of impact	Category of response for consideration	
		Defensive Actions	Re-alignment actions
Generating Companies	<ul style="list-style-type: none"> Lower utilisation of assets Lower revenue and returns even with fixed capacity charges. 	<ul style="list-style-type: none"> Invest in increasing the ramp up-ramp down flexibility in coal power generation Review plans for new coal-based plant investments For plants without long term 'take or pay' agreements, plan for cash flow impact of lower utilisation. 	<ul style="list-style-type: none"> Invest in energy storage solutions to store power Consider investments in renewables generation to sustain growth Build a distinct set of capabilities to compete profitably in the Solar Generation PPA market.
DISCOMs	<ul style="list-style-type: none"> Reduction in power purchase cost depending on the flexibility in coal-based power capacity Rise in solar rooftop penetration. 	<ul style="list-style-type: none"> Re-align tariff structure to better reflect the cost of grid management. 	<ul style="list-style-type: none"> Invest in demand supply management systems to integrate more solar and wind generation with grid Develop the right business model to participate in solar rooftop market.
EPC companies	<ul style="list-style-type: none"> Potential scenario of highly subdued demand for new thermal capacity beyond 2022. New business opportunities would be significantly different from traditional business opportunities in thermal power. 	<ul style="list-style-type: none"> Reconsider plans and resource commitments in Thermal Power EPC business, based on alternate scenarios. For example – what are the long term 10-15 year alternate scenarios? What are the trigger points when action needs to be taken? 	<ul style="list-style-type: none"> Invest to develop strengths in storage business, improving flexibility of coal-based power capacity business, grid management business and solar roof top business.
Coal mining companies	<ul style="list-style-type: none"> Subdued coal demand growth Peak coal demand for thermal generation expected in the near future (for the power sector). 	<ul style="list-style-type: none"> Realign production targets to future coal demand scenario considering solar penetration Reassess outsourcing capacity creation commitments in the light of the demand scenario Focus on cost reduction measures to maintain margins. 	<ul style="list-style-type: none"> Improve overall efficiency to compete on costs with solar Invest in clean coal technology to address sustainability concerns.
Thermal Generation (BTG, BoP) and Coal Handling Equipment Manufacturers	<ul style="list-style-type: none"> Potential sharply reduced demand scenario from 2022 onwards. 	<ul style="list-style-type: none"> Reconsider expansion plans Develop future demand scenarios, response strategies, and trigger points for action. 	<ul style="list-style-type: none"> Consider new growth opportunities in renewables space, in refurbishment and renewal of older thermal plants and in areas related to meeting environmental norms.
Indian Railways	<ul style="list-style-type: none"> Very limited growth in coal freight (for power sector). 	<ul style="list-style-type: none"> Review any planned investments in coal carrying rolling stock, storage infrastructure and new lines. 	<ul style="list-style-type: none"> Develop strategy to increase other cargo share Develop value added logistics services to protect revenues.



What could prevent the realisation of this 'renewable dominated' scenario?

While we have presented a likely scenario of how the rising solar levels can change the power sector dynamics within the next five to seven years, we note below certain factors which could lead to different outcomes than what we have projected.

Delay in the evolution of storage cost curves

A key element supporting the rise of solar and variable renewables is the evolution of storage technologies. If the pace of storage technology evolution slows down, it could impact the ability of the system to absorb vast amounts of time variable renewables. While significant investments are happening in storage technologies, they are at a relatively early stage compared to solar PV or wind and hence there is more uncertainty in their cost trajectories going forward.

Unprepared grid infrastructure

In India, one possible barrier is the ability of our grids to take in large amounts of intermittent generation in the near term. While investments are being made in the transmission infrastructure at the national level, the timely execution of these projects, especially at the state level, is an important factor in ensuring the smooth pace of solar capacity additions.

Disruption in the Chinese solar manufacturing ecosystem

Today, China and Taiwan account for over 67 per cent of global module supplies²⁸. A hard landing of the Chinese economy, and a scenario where some of

the large manufacturers go bankrupt and close down, could hamper global supplies and consequently impact the prices of solar panels. In the same scenario, the availability of resources for R&D for technological evolution could get hampered and delay the further cost reductions of solar panels.

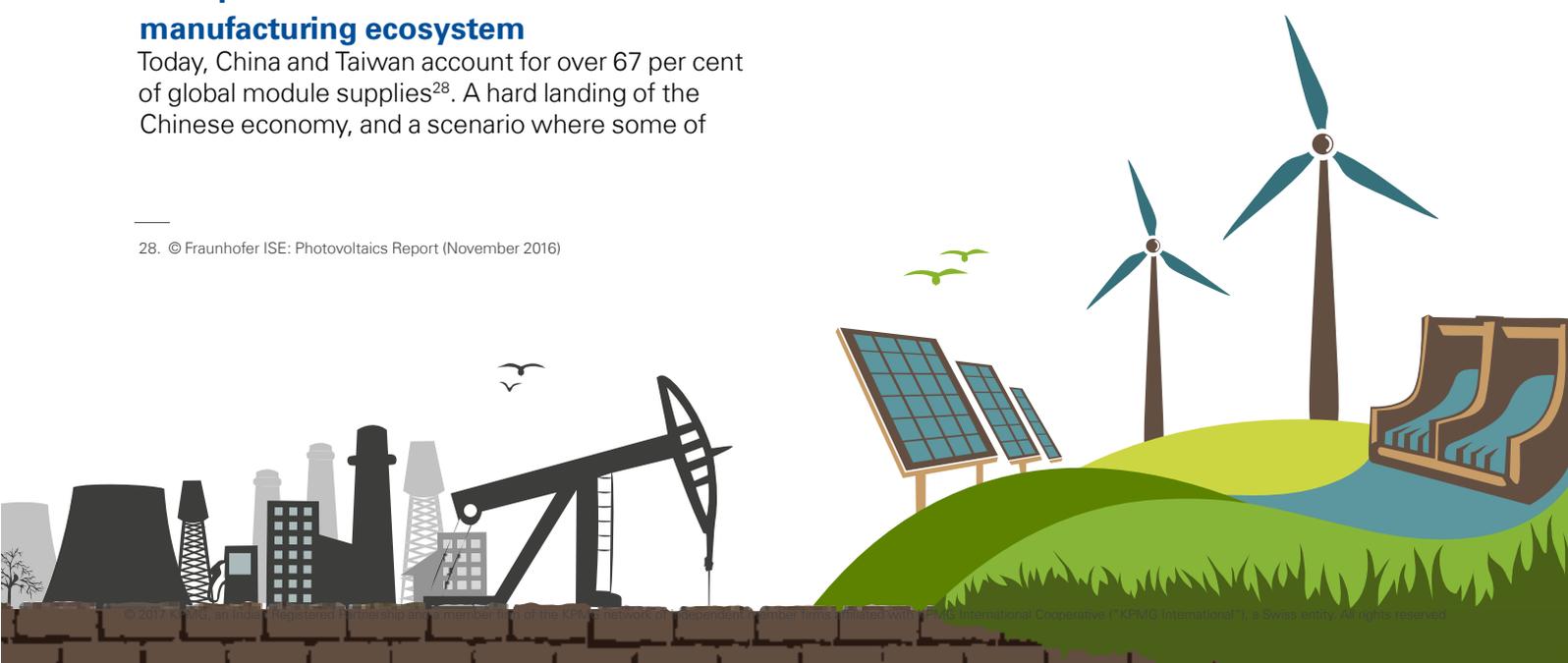
A steep fall in the Indian currency

A large part of the solar system cost is import linked. A scenario where the Indian currency depreciates significantly would lead to a rise in solar costs for India relative to coal. This would delay the rise of solar. For the same reason, it is important for the government to plan a hedge against this scenario by adequately encouraging localisation and the creation of a domestic ecosystem

Returns to investors

Unsustainable returns at current tariffs may reduce the new capacity build-up of solar power as investors would like to have reasonable returns for their investments.

28. © Fraunhofer ISE: Photovoltaics Report (November 2016)



Conclusion

Grid parity can economically justify the solar capacity adoption to achieve government set targets from the current levels within the next five years. However, managing this shift in the electricity mix requires adjustments by existing incumbents to their business models.

First, the PLF of coal-based plants could drop significantly lower than the current numbers during the daytime. Investing in making coal plants flexible will be important to manage grid stability.

Second, India will likely reach the peaking coal levels for the power sector by 2025-27. This can potentially change the coal sector dynamics and will put pressure on coal mining companies to manage costs and production in an efficient manner.

Third, the freight revenue for railways from coal is likely to be much lower than anticipated. Diversifying freight mix and services would be important for the railways to maintain its revenue stream.

Finally, the evolution of storage technologies can herald a clean energy paradigm for the power sector. Battery technology costs are on a rapid decline and investments are already underway to develop smart and sustainable electricity grids. Solar power combined with cost effective technologies will lead to electrification of transport and convergence of sectors such as power and transport. This will help reduce fossil fuel import bills for the country and contribute towards a low carbon economy.

The existing incumbents have both defensive as well as proactive options to adapt to the emerging high RE scenarios. Existing EPC and equipment manufacturing players will need to re-align themselves to the changing ecosystem in the power sector. This is also a huge investment opportunity to help India leapfrog towards an efficient power market that will be able to meet the growing electricity requirements of the country in a sustainable manner.

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