Investment mobilization

Utility scale RE power projects in pipeline would need INR ~4.25 lakh crores (US$ ~60 billion, 1 INR = 0.014 US$) of capital infusion for operationalization. This translates into INR 1.27 lakh crores (US$ ~18 billion) of equity infusion and INR 2.97 lakh crores (US$ ~42 billion) of debt infusion at 30:70 ratio. Much of this capital infusion is expected from the private sector increasingly backed by private equity investors, sovereign wealth funds and other specialized institutional investors.

Capital Investment - Equity

~INR 1,27,399 crores

For 84 GW of utility scale RE projects in pipeline

Capital Investment - Debt

~INR 2,97,264 crores

For 84 GW of utility scale RE projects in pipeline

Capital infusion for utility scale RE projects in pipeline (INR crores)			
RE technology	Total CAPEX outlay	Equity mobilization	Debt financing
Biopower	3,216	965	2,251
Floating Solar PV	4,858	1,457	3,401
Hybrid *(Solar-Biomass)*	324	97	227
Hybrid *(solar-storage)*	1,148	344	803
Hybrid *(Solar-Wind)*	22,435	6,731	15,705
Hybrid *(solar-wind-coal-storage)*	1,07,500	32,250	75,250
Hybrid *(solar-wind-storage)*	20,750	6,225	14,525
Solar PV	2,21,291	66,387	1,54,904
Wind	43,142	12,943	30,199
Grand Total	**4,24,663**	**1,27,399**	**2,97,264**

Project commissioning (estimated)	Private sector mobilization (INR crores)		Public sector mobilization (INR crores)		TBD* (INR crores)	
	Equity	Debt	Equity	Debt	Equity	Debt
H1 2021	7,838	18,288	-	-	–	–
H1 2022	4,798	11,195	2,208	5,153	–	–
H2 2021	1,824	4,256	168	392	–	–
H2 2022	3,184	7,428	504	1,175	22	51
Beyond 2022	47,212	1,10,161	9,202	21,471	50,440	1,17,694
Grand Total	**64,855**	**1,51,328**	**12,082**	**28,191**	**50,462**	**1,17,745**

Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

*TBD is To Be Determined meaning these projects are yet to complete competitive discovery of tariffs and select project developer

Employment potential

About ~ 8.7 lakh fresh jobs will be created for operationalizing the 84 GW pipeline of utility scale RE projects. About 10% of these jobs will emerge in 2021-22 and the remaining 90% beyond 2022. Further, a dominant portion of these jobs will emerge in the private sector from operationalizing solar PV and hybrid RE projects.

Fresh jobs created

~ 8,70,775 jobs

For 84 GW of utility scale RE projects in pipeline

Environmental benefits

Over ~4,109 Million tonnes of CO2e emissions are expected to be avoided over the operating lifetime of 84 GW capacity of grid connected utility scale RE projects in pipeline.

Avoided CO_2 emissions
(cumulative over project lifetime)

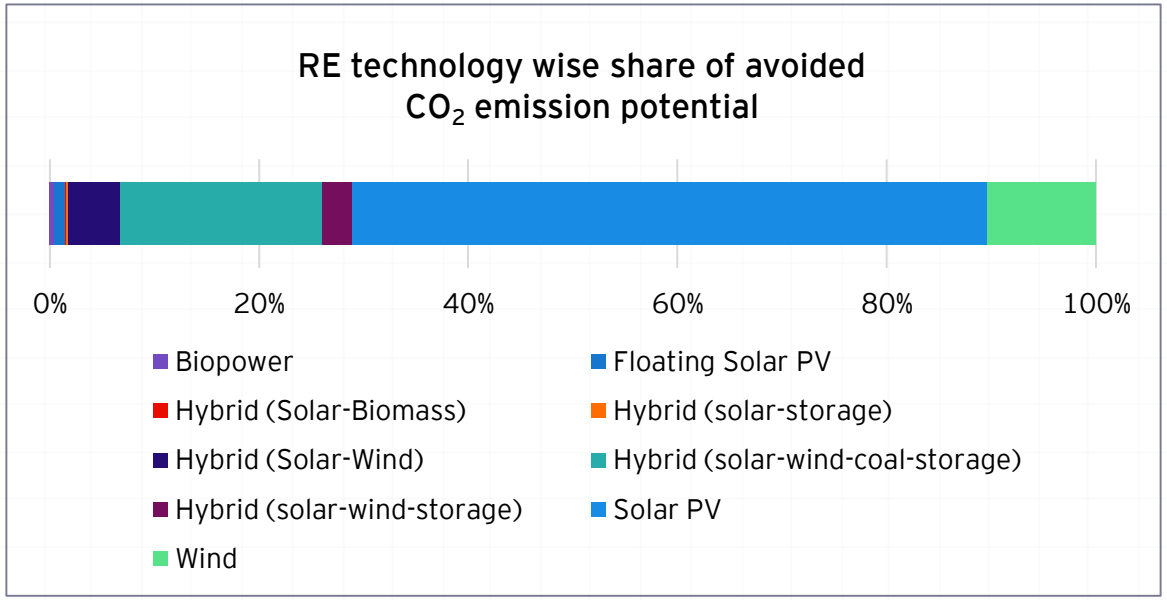
~4,109 million tonnes CO_2e

For 84 GW of Utility scale RE projects in pipeline

Fresh jobs created from utility scale RE projects in pipeline

RE Technology	Estimated timeline for project commissioning					Total no. of fresh jobs created
	H1 2021	H2 2021	H1 2022	H2 2022	Beyond 2022	
Biopower	-	-	645	1,720	5,362	7,727
Floating Solar PV	-	-	-	3,870	6,376	10,246
Hybrid *(Solar-Biomass)*	-	-	-	693	-	693
Hybrid *(solar-storage)*	-	-	-	363	1,268	1,631
Hybrid *(Solar-Wind)*	-	-	1,629	-	30,807	32,436
Hybrid *(solar-wind-coal-storage)*	-	-	-	-	1,81,267	1,81,267
Hybrid *(solar-wind-storage)*	-	-	-	-	22,918	22,918
Solar PV	29,909	13,958	37,939	24,616	4,64,640	5,71,062
Wind	14,470	1,241	7,441	-	19,644	42,795
Total	**44,379**	**15,199**	**47,654**	**31,262**	**7,32,282**	**8,70,775**

*Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI



*Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

Stimulus action to fast track implementation of utility scale RE project pipeline

1 Clarity on waiver of inter-state transmission charges and losses on supply of solar and wind power beyond June 2023

The project pipeline for utility scale RE power generation indicates ~76 GW of solar, 7 GW of wind, 32 GWh of energy storage and 131 MW of biopower capacity expected to commission beyond 2022.

The Ministry of Power (MoP), Government of India vide its order dated 15 January 2021 has superseded earlier orders and waived inter-state transmission (ISTS) charges and losses on transmission of electricity generated from solar and wind projects till 30th June 2023. This waiver is applicable to solar, wind, hybrid power plants with or without storage for a period of 25 years from the date of commissioning subject to meeting the specified criteria.

Moreover, the CERC (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2020 have come into force with effect from 1 November 2020. Under these regulations, the transmission charges for designated ISTS customers (DICs) shall have national, regional, transformer and AC System Components for full recovery. Further, the 'National Component - Renewable Energy' shall comprise of the yearly transmission charges for transmission systems developed for renewable energy projects as identified by the Central Transmission Utility. The yearly transmission charges for the national component shall be shared by all drawee DICs and injecting DICs with untied long-term access (LTA) in proportion to their quantum of long-term access plus medium-term open access and untied LTA respectively.

The CERC (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2020 have rendered the 'waiver of ISTS charges and losses on solar and wind power' obscure and ineffective. This is because the states which plan to buy electricity in bulk from solar and wind projects via ISTS corridors would have to increase their quota of LTA with the central transmission utility. This incremental quota of LTA will attract more ISTS charges than usual for those buyers as per the regulations despite the waiver granted by the order of the ministry. In other words, the waiver granted by the ministry is by the order of the ministry. In other words, the waiver granted by the ministry is obscuring the real cost of power purchase from solar and wind projects transmitted via ISTS corridors.

In the current scenario, the RE resource rich states of western and southern India namely Gujarat, Rajasthan, Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra prefer to meet their growing demand for renewable electricity from projects located within the state boundary. Some experts may argue that the waiver of ISTS charges and losses on solar and wind power will help resource rich states transform into export hubs for renewable electricity in the country. However, the states importing low cost renewable electricity from resource rich states would have to account for the increased ISTS charges arising from the CERC regulations and therefore will be cautious in evaluating such options in their long term power procurement plans.

Stimulus action

Clarify whether the waiver of ISTS charges and losses on electricity generated from solar and wind projects will extend beyond 30 June 2023 and for how much period. There is a sense of growing uncertainty within the industry that is already grappling with challenges on several fronts to commission the projects as planned. The utility scale RE auctions planned in 2021–22 may not witness the same degree of competitiveness in tariff discovery if this clarity is not provided

If the government prefers to extend the waiver through 2025 or beyond, then it would serve useful to support this initiative through budgetary allocations separately. The CERC can amend the regulations thereafter to reduce the burden of ISTS charges on states / buyers which depend on imported renewable electricity to meet their renewable purchase obligations and other national efforts toward decarbonizing the grid.

2 Set up a mechanism to rediscover tariffs for stranded projects without PPA

Our analysis of the utility scale RE power project pipeline indicates that projects with ~20 GW of contracted capacity from auctions held in the years 2018, 2019 and first half of 2020 remain stranded without PPAs. Notably, ~18 GW of this stranded capacity pertains to plain vanilla solar PV projects auctioned largely in first half of 2020, out of which ~12 GW capacity pertains to manufacturing linked solar PV projects announced in January 2020. Average tariff discovered for all the stranded projects are 12% higher than those for which PPAs are executed. More importantly, the recent auction results announced for plain vanilla solar PV projects in Rajasthan and Gujarat have discovered record low tariffs (<= INR 2.0 / kWh). When compared against these record low tariffs, the average tariff discovered for stranded projects is a whopping 48% higher.

This is one of the most critical challenges, ironically, emerging from falling tariff prices. The state owned DISCOMs, who are the ultimate purchasers of power see the tariffs fall every month or so, and therefore are disincentivized to tie themselves up to long term contracts. This means that there are now a significant number of projects in the pipeline for which long term PPAs have either not been executed, or not become effective, hence stranded.

The central off-takers can explore a tariff rediscovery mechanism for stranded projects in consultation with the project promoters (having first right of refusal). This can turn around many stranded projects with better deals to the DISCOMs, already stressed with high power purchase cost. A national committee representing all stakeholders could devise a robust mechanism for rediscovering tariffs and prioritize these stranded projects in the power purchase plans of the states.

3 Establish a robust coordination mechanism between Central off-takers and State governments toward firming up long term power procurement plans

Utility scale power purchase in India adopts a competitive bidding process, where the tariff is discovered through an auction under Section 63 of the Indian Electricity Act, 2003. Since the tariffs are discovered through a notified process, there is no regulatory supervision of the tariff discovered per se. However, regulatory approval is required for the following:

- Approval of the bid process (procurement approval);
- Approval to the DISCOM to acquire a certain quantity of power (the capacity approval); and
- Approval of the trading margin between and central off-takers and the DISCOM. Usually the CERC has jurisdiction over the procurement approval and the trading margin approval whereas the State Electricity Regulatory Commission (SERC) has jurisdiction over the capacity approval.

The outcome of this structure has been that for hundreds of MW of projects for which LOAs have been awarded post completion of tenders and PPAs executed, either the PSA is not executed, or, even if the PSA has been executed, the capacity approval has been indefinitely delayed.

Even the trading margin which central off-takers have been charging, has been the source of endless dispute.

In the long term, a robust coordination mechanism between Central and State governments involving PSUs, DISCOMs and other stakeholders working toward firming up power procurement plans with regulatory approvals (ex-ante) for the planned RE projects would significantly ease the pressure of getting these projects through PPA and other regulatory approvals (ex-post) after tariff discovery through auctions. Various stakeholders need to come together and take this as a priority not just for environment but also for economic revival.

4 Expand the domestic lending base for hybrid RE power projects in pipeline

The Government of India in its recent budget for FY 20–21 announced capital augmentation of SECI and Indian Renewable Energy Development Agency Limited (IREDA) with equity infusion of INR 1,000 crores and INR 1,500 crores respectively. This is a commendable initiative and is welcomed by stakeholders at large.

Green banks and windows: A recent report from the Center for American Progress (CAP) and India's Council on Energy, Environment and Water (CEEW) has recommended that the Government of India should assess potential platforms to develop or deploy catalytic finance instruments within or alongside key existing public sector financial institutions. According to the report, such green window mechanisms would help expand clean energy markets within the purview of the specific financial institutions – for example, IREDA. The report also mentions that IREDA has signalled its interest in operationalizing a green window facility, to be capitalized by an initial US$20 million and to be augmented by another US$80 million from other agencies. The green window is geared toward catalytic financial interventions to crowd in private sector capital for underserved clean energy market segments.

Our recommendation is that IREDA and other domestic financial institutions should establish such Green windows specifically catering to high risk Hybrid RE power projects in the pipeline. These projects blend solar, wind, energy storage and stranded thermal power generation capacity for peak power supply or round the clock supply of renewable electricity.

5 Promote electrification of end use to boost demand growth

According to the Central Electricity Authority (CEA), installed capacity for power generation has grown at a Compound Annual Growth Rate (CAGR) of 6.7 % from FY 01 to FY 20. However the peak demand for the same period has grown at a CAGR of 4.4%. Rapid growth in infirm solar and wind power capacity addition and slower than anticipated demand growth are the primary contributors for the widening gap. The incidence of the COVID pandemic has further exacerbated the problem of slower demand growth in the present scenario.

There are ample opportunities for boosting electricity demand inorganically, meaning nudging specific end use applications to adopt fuel shift from fossil to electricity.

The power sector stakeholders stand to gain the most from the demand boost driven by electric mobility transition in passenger and commercial vehicle segments. Subsidies and incentives targeted for electric mobility transition will have higher economic value from bridging the demand supply gap in the power sector. Stranded project pipeline facing subdued demand will have greater opportunities to operationalise their assets planned.

McKinsey & Company estimates that almost half of the energy fuel commodities consumed in the industrial sector can be electrified with technology available today. Electrification of the fuel that industrial companies use for energy has several benefits. Although, electrically driven equipment is only slightly more energy efficient than the conventional options, it has lower operation (labour) and maintenance costs. With low carbon electricity supply, the greenhouse-gas emissions of the industrial site can lower significantly.

Up to a heat demand of approximately 400 degrees Celsius for industrial applications such as washing, rinsing, food preparation, drying, evaporation, distillation etc., electric alternatives to conventional equipment are commercially available. Electric heat pumps for low and medium temperature heat demand and electric powered mechanical vapor recompression equipment for evaporation are already used on some industrial sites.

The government should incentivise industries adopting these processes to gradually electrify their operations. The initial cost of electrification could be significantly higher for Micro, Small & Medium Enterprises (MSMEs) but with government support targeted for technologies demonstrating lower lifecycle costs, the resulting electricity demand growth could significantly bridge the demand supply gap in the power sector.

Similarly in the residential sector, government could target promoting induction cooktops over gas stoves in both urban and rural areas to propel electricity demand growth. This will not just enhance the revenue for electric utilities but also reduce the import dependency of petroleum products for LPG. The Saubhagya scheme launched by the central government in 2017 has already achieved much of its goals for expanding last mile connectivity for electrification of villages and individual households in rural areas. Given that the electricity distribution utilities are serving a large expanse of rural consumers, there is a strong business case to boost electricity demand in rural areas for all kinds of home appliances (including electric cooktops) to reduce LPG cost burden for consumers, import burden and dependency for the government and simultaneously shore up revenues for electric utilities, a win-win-win.