4. POLICY CHALLENGES TO ACHIEVING MARKET POTENTIAL

Though DRE has the potential to make good on government goals, a range of policy and institutional challenges hold it back, exacerbated by the COVID-19 pandemic.

4.1. POLICY APPROACH

The Government's clean energy objectives are not only driven by a need to cut emissions, improve living standards, and prevent climate- related calamities, but also generate social and economic benefits to the community by way of employment generation and access to reliable electricity supply.

For example, achieving the 40 GW distributed solar target can create more than 500,000 short-term jobs and over 100,000 full-time jobs.[22]

With these factors in mind, and with backing from the central government, a number of states initially created favorable targeted policies for DRE. The key features are detailed below:

Table 2: State-level policies for the distributed renewable energy sector

Name of State	Key Features
Delhi[23]	• An incentive of Rs. 2/unit for an annual generation of power beyond 1,100 units of RTS installed -- valid for first three years from the date of installation. • DISCOMs are responsible for the evacuation of generated power. • There would be a monthly billing cycle and annual compensation for any surplus power produced
Maharashtra[24]	• Starting from 4.5% in 2020, Renewable Purchase Obligation (RPO) target of 13.5 per-cent aimed over the next five years. • DISCOMs will be penalized for the shortfall in RE procurement yearly.
Karnataka[25]	• Average cost of supply (ACOS) paid for power exported to grid as opposed to average power purchase cost (APPC)/ Feed-in-tariff (FiT) followed by many other states. • Compensation is made on a monthly basis.
Telangana	• Subsidy of 30 percent is offered on the benchmark or invoice price of the RTS system installed.[26] • Compensation for surplus power generated will be paid on a half-yearly basis.[27]
Uttar Pradesh[28]	• Allowed range of installation for developers - 1 kW to 2 MW. • Currently permits only gross metering systems. • Compensation is calculated based on FiT decided by the SERC. • Grant of Rs. 30,000 is offered to residential customers. • No incentives are offered for RTS installations in group housing societies.

Name of State	Key Features
Rajasthan[29]	• Average generation from RTS system is capped at 4.8 units per kW of approved installed capacity per day. • Erstwhile provision of carrying forward net surplus electricity available at the end of billing period stands lifted for all segments except domestic.
Gujarat[30]	• APPC decided through auctions held by the state's umbrella entity for electricity services, Gujarat Urja Vikas Nigam Ltd. with an additional 20 paise/unit. • RESCO models are not permitted in the 2019 state policy.
Tamil Nadu[31]	• Maximum capacity of RTS system installation is not allowed to exceed producer's contracted demand with their distribution licensee. • Under the solar net feed-in program, producers are required to install separate meters to track solar power generation and import/export.
Punjab[32]	• Direction to vendors to charge buyers up to 3 kW RTS systems only above the 40 percent subsidy offered by the centre. • State subsidies announced for grid-connected RTS between 1 and 10 kW capacities in the residential sector. • Non-residential sectors are removed from availing subsidies.
Madhya Pradesh	• Limitation in the capacity of RTS system is revised to 30 percent of transformer capacity. • In a bid to ensure timely execution of projects, percentage refund of performance guarantee is offered to developers as per set benchmarks and timelines[33]. • Installation of RTS systems is allowed up to 1 MW capacity[34]
Haryana	• Limitation in the capacity of RTS system - up to 30 percent of transformer capacity for low tension lines and 15 percent for high tension lines.[35]

4.2. KEY ISSUES

However, over the last few years, a number of issues have cropped up in the state government policy towards distributed solar. These are highlighted below:

- **Net Metering:** Although this mechanism was rolled out in a bid to improve the accessibility and affordability of the DRE systems, the scheme is now facing resistance from DISCOMs, since they lose vital revenues from their highest paying and most profitable customers (C&I and affluent residential segments) Most states have capped their solar plant sizes to 1 MW, restricting developers from achieving scale.
- **Reduced Distributed Transformer level share:** More than a dozen states in India have been restricting RTS system size to less than 50 percent of transformer capacity.[6] This acts as a critical deterrent for potential large-size RTS system installers. It is important that the states start analyzing grid areas to assess the permissible share of RE instead of capping distribution transformer (DT) level share across their jurisdiction.
- **RTS additional charges:** State governments have proposed imposing additional charges as a means to recover the costs of the established network and maintenance done by the DISCOMs. Maharashtra has recently proposed levying grid support charges from consumers having a sanctioned load above 10 kW.[7] However, the Maharashtra Electricity Regulatory Commission (MERC) has decided not to levy the grid support charges until the cumulative rooftop solar capacity reaches 2 GW in the state.
- **Renewable Energy (RE) curtailment:** Curtailment of generated power is done by the grid operators for maintaining grid stability in the event of any congestion in the

system. However, RE generating stations have been granted the privilege of must-run status.8 This puts additional load on the DISCOM's already over-burdened distribution infrastructure and entails DISCOM's to carry out significant capital expenditures for system upgradation, a huge ask given their current financial health.

Among the above, net metering has become the most contentious issue as it leads to a loss in revenue from the highest paying customers, i.e., Commercial & Industrial (C&I). For example, in recent times, several states have issued amendments to their distributed-solar policies, which indicate a degree of hostility towards net-metering.

Table 3: State-level amendments to distributed solar policies

State	Date of Amendment	Key Features
Uttar Pradesh[36]	January 2019	Removed net metering for C&I consumers in favor of gross metering, where compensation for power export would be at the weighted average tariff of large-scale solar projects discovered through competitive bidding.
Tamil Nadu[37]	March 2019	Removed net metering for all consumers and only allowed gross metering for residential and Low-Tension (LT) C&I and residential consumers.
Himachal Pradesh[38]	April 2019	Those who have a letter of approval for installation of net-metered solar rooftop after Nov 15, 2018, will be paid a quasi-gross metered rate - 30 percent of the weighted average per kWh rate at which the DISCOM has purchased power from the ground-mounted solar PV projects up to 5 MW capacity located in the state during the calendar year ending December 31.
Karnataka[39]	December 2019	Has removed net metering for C&I consumers as well as HT residential consumers in favor of gross metering. LT residential consumers can avail of either net or gross metering.
Andhra Pradesh[40]	March 2020	The proposed draft amendment to Solar Rooftop Policy 2018 - projects under net/gross metering to not exceed the difference of pooled variable cost and balancing cost or the applicable tariff at the time of commercial operation date (CoD), whichever is less.

All these factors point to the need for a policy environment that both encourages the private market as well as standardizes a meaningful role for DISCOMs to maintain their relevance and alleviate the threat of disintermediation.

4.3. IMPACT OF COVID-19 PANDEMIC

The slowdown in renewable capacity addition could get amplified post the COVID-19 outbreak, with the government's spending capabilities getting limited even further. In such a scenario, it becomes imperative for the government to move towards a more favorable policy environment for DRE.

4.3.1. EXECUTION AND SUPPLY CHAIN DISRUPTIONS

In May 2020, we conducted a survey of rooftop solar developers who are beneficiaries of the US-India Clean Energy Finance Program (USICEF), for which CPI serves as the Program Manager. This was done to assess the fallout from the COVID-19 lockdown and the possible repercussions over the coming year. The survey consisted of 20 questions – 18 objective/ multiple choice and two subjective questions. The objective questions were designed to allow participants to report their qualitative opinions on a quantitative scale.

The COVID-19 outbreak had a negative impact on the balance sheets and liquidity status of respondents with the majority reporting an increase in receivables amounting to 20% and above.

During the lockdown, delays in government approvals, such as for net metering, created the biggest execution bottleneck, followed by labor shortages for construction.

At that time, the prospect of further partial lockdowns and/or reduced economic activity was a cause of significant concern for the respondents. A significant number of respondents felt this could reduce their sales pipeline/order book by 30% or more.

4.3.2. FINANCING CHALLENGES IN TERMS OF LENDER RISK AVERSION

In the above-mentioned survey, the lack of availability of working capital was a concern for those respondents that required capital. Respondents were also concerned that an increase in due diligence timelines of lenders due to fallouts from the pandemic could become a significant bottleneck to access loans. Respondents indicated that positive lender actions such as faster due-diligence and reduced interest rates would have a maximum positive benefit in mitigating financing challenges from COVID-19.

Getting markets to work in DRE.

DISCOMs have become wary of losing revenue from their highest paying residential and C&I customers and thereby have created strong resistance to RTS systems. The role of government policies should be to find a meaningful role of DISCOMs in existing net metering models – as a demand aggregator, as well as value added service provider for billing & collection.

The productive use appliance segment can be made more attractive for participants with the onset of Voluntary Emissions Reductions (VERs). With the phasing out of the Certified Emissions Reduction (CER) regime by 2020, buyers are emerging who want to mitigate their climate impact on a voluntary basis in order to meet their CSR initiatives, sustainable production targets, or for consumer branding. The qualitative aspects of a project, and the resulting depth, rather than just the scale, of the impact created, play a vital role in determining the price of these VERs. The extent to which buyers are willing to pay for attributes such as social impact, health, poverty reduction, climate conservation, play an important role in the realization of the price of these credits. The pricing in this market varies from USD 1 (for a large-scale sustainable energy project) to up to USD 20 (for a small scale clean cookstoves project), with the average price around USD 3-6/tCO2e, which is over 10-20x the average market price of CERs.[41]

5. RECOMMENDATIONS

In this section, we identify some key areas for policy action that could have a significant catalyzing effect on India's distributed energy sector.

5.1. ROOFTOP SOLAR

The GoI's Phase II grid-connected RTS scheme, which provides a central role to DISCOMs for disbursement of central government subsidy, is a step in the right direction. However, the program only covers the residential segment and links the fiscal incentives for DISCOMs to annual installed capacity, which would be difficult to achieve unless the C&I segment is also considered. A more holistic demand aggregation model, which allows DISCOMs to get both a transaction fee for facilitating the installation as well as monthly fee for Operation & Maintenance (O&M) and billing/collection would better allow them to stay relevant and eliminate the threat of dis-intermediation.

5.2. ENERGY STORAGE

It is imperative for the government to promote a distributed energy-storage policy that can be integrated with the Phase II RTS scheme mentioned in the above section. The role of DISCOMs on the following matters needs to be detailed:

- Channel subsidy incentives for pilot projects with customers.
- Partnerships with private sector ESCOs to install storage at the distribution sub-station level.
- Gross/Net-metering benefits and/or other incentives to end-user (residential/commercial/industrial) for the integration of storage with RTS at the point of consumption.

Instead of promoting a capital-subsidy based model, it is imperative for the government to create a more favorable environment for operational models with the involvement of DISCOMs.

5.3. EV CHARGING INFRASTRUCTURE

While the aim to install charging infrastructure would be an important step towards further implementation of EVs, as well as incentivize private individuals to purchase EVs, the government policy needs to be directed towards creating the necessary charging infrastructure as a public good. Here, it is important to evolve a decentralized approach – with DISCOMs being the implementing agency for a franchise-based model. This would allow for faster execution in states that are in the more advanced adoption stage. In addition, allowing

commercial establishments that produce excess solar power from their rooftop installations to set up retail charging points would be a step in the right direction. This would also solve the DISCOM problem of receiving excess solar power export from such establishments that have resulted in a trend of curtailment.

5.4. SOLAR AGRI PUMPS

The GoI's KUSUM scheme currently has a centralized tendering process. Alternatively, allowing state DISCOM to partner with private installers at a local level could be considered. While the proposal for putting agricultural power subsidy under Direct Benefit Transfer (DBT) would be a positive step, convincing farmers to give up subsidized grid electricity as well as pay for the installation of the solar pump could be tough. To alleviate this, the government could think in terms of an operational model where DISCOMs could facilitate commercial partnerships with solar pump installers and local farmer co-operatives. The DISCOM, through the installer, could pool the excess power generated from solar pumps into a single point of injection into the grid and pay power purchase costs, net of service fees to the farmer co-operatives.

5.5. SOLAR COLD STORAGE

The GoI currently offers a 30% subsidy on solar cold storage installation under its broader rural livelihood subsidy scheme.[42] However, considering the importance of cold storage in the agriculture supply chain, it is vital to create a separate solar cold storage program.

India is the second-largest producer of fruits and vegetables in the world. However over 30% of this is wasted in the supply chain. Lack of reliable electricity in rural producer locations is one of the chief reasons for this wastage. Given the high capital costs (INR 200,000-400,000/unit or USD 2,500-5,500/unit),[43] and the fact that there are only a handful of solar cold storage manufacturers in India, a targeted policy could help to bring down these costs. In addition to the subsidy model, a tax-break model could be used to utilize reserves of cash-rich high net-worth individuals (HNIs). Providing additional tax breaks through accelerated depreciation could enable HNIs to make investments into solar cold storage installations.

5.6. PRODUCTIVE USE APPLIANCES

The government, along with United Nations Development Program (UNDP) and Global Environment Facility (GEF) has launched a scheme for "Scale Up of Access to Clean Energy for Rural Productive Uses" in three states: Assam, Madhya Pradesh, and Odisha. The project aims to demonstrate and develop the market for off-grid renewable energy systems that have rural livelihood applications. Though this program is completely funded on a grant basis, its success would indicate if it can be scaled up commercially. In addition, the project is driven by state nodal agencies of MNRE. If this scheme is to be operationalized in a commercial manner, it becomes imperative for the government to involve DISCOMs and shift the focus of the grants from subsidizing product purchases to providing project development support

to entrepreneurs developing the products. Capital subsidy limits grant usage to the number of equipment/assets that it can fund, whereas project development support to entrepreneurs allows them to both defray technical assessment costs associated with commercial capital raising as well as develop commercially scalable business models that reduce cost of products for end-users. Involvement of local microfinance institutions (MFIs) as project lenders to private participants for the capital deployment could also be beneficial. DISCOMs would be incentivized to participate in such programs as rural customers have the highest cost-to-serve, and hence require direct Government subsidies and cross-subsidization through C&I customers, which severely impact DISCOMs' profitability.

5.7. SMART ENERGY MANAGEMENT

As a result of the COVID-19 outbreak, we expect to witness an increasing trend of social distancing and people working from home. This would entail a substantial increase in home energy consumption and higher electricity bills, which such people would not be accustomed to. Therefore, it is imperative to increase the use of home energy management devices to create a smart and energy-efficient home. It would also be imperative for the government to create a policy to allow DISCOMs to shift to a time-of-day billing model to reduce their power procurement costs as well as defer capital expenditure on system upgradation.

Internet of things (IoT) based energy efficiency retrofits can attach to existing home circuits for monitoring and optimizing energy consumption. It has the potential to help households and small commercial establishments to reduce their energy bill and carbon footprint. It would also help DISCOMs to move towards a Time-of-Day billing as a part of their demand-side management.