White Paper on "Enabling & Empowering Grid Connected RTS Ecosystem"
Acknowledgements

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<td>Approved List of Models and Manufacturers</td>
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<td>AT&amp;C</td>
<td>Aggregate Technical and Commercial</td>
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<td>BCD</td>
<td>Basic Customs Duty</td>
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<td>Bank Guarantee</td>
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<td>BIS</td>
<td>Bureau of Indian Standards</td>
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<td>BOOM</td>
<td>Builds, Owns, Operates and Maintains</td>
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<td>D/E</td>
<td>Debt to Equity</td>
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<td>CAPEX</td>
<td>Capital Expenditure</td>
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<td>CEEW</td>
<td>Council on Energy, Environment and Water</td>
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<td>CEI</td>
<td>Construction Engineering and Inspection</td>
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<td>CERC</td>
<td>Central Electricity Regulatory Commission</td>
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<td>Central Financial Assistance</td>
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<td>C&amp;I</td>
<td>Commerce and Industrial</td>
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<td>CSS</td>
<td>Cross-Subsidy Surcharge</td>
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<td>DISCOMS</td>
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<td>EA</td>
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<td>FI</td>
<td>Financial Institute</td>
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<td>GoI</td>
<td>Government of India</td>
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<td>GCRTS</td>
<td>Grid-Connected rooftop solar photovoltaic</td>
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<td>GRPV</td>
<td>Grid-connected rooftop solar Photovoltaic</td>
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<tr>
<td>GST</td>
<td>Goods and Service Taxes</td>
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<td>IGST</td>
<td>Integrated Goods and Service Tax</td>
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<td>IIISD</td>
<td>International Institute for Sustainable Development</td>
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<td>ISMA</td>
<td>Indian Solar Manufacturers Association</td>
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<td>JNNSM</td>
<td>Jawaharlal Nehru National Solar Mission</td>
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<td>LC</td>
<td>Letter of Credit</td>
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<td>MERC</td>
<td>Maharashtra Electricity Regulatory Commission</td>
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<td>MIDC</td>
<td>Maharashtra Industrial Development Corporation</td>
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<td>MNRE</td>
<td>Ministry of New and Renewable Energy</td>
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<td>NBFC</td>
<td>Non-Banking Financial Company</td>
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<td>NCEF</td>
<td>National Clean Energy and Environment Fund</td>
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<td>O&amp;M</td>
<td>Operations and Maintenance</td>
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<td>PPA</td>
<td>Power Purchase Agreements</td>
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<td>PSM</td>
<td>Payment Security Mechanism</td>
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<td>PSB</td>
<td>Public Sector Bank</td>
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<td>RBI</td>
<td>Reserve Bank of India</td>
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<td>RE</td>
<td>Renewable Energy</td>
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<td>RESCO</td>
<td>Renewable Energy Service Company</td>
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<td>RTS</td>
<td>Rooftop solar PV</td>
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<td>SECI</td>
<td>Solar Energy Corporation of India Limited</td>
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<td>SERC</td>
<td>State Electricity Regulatory Commission</td>
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<td>SEZ</td>
<td>Special Economic Zone</td>
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<td>SGD</td>
<td>Safeguard Duty</td>
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<td>SNA</td>
<td>State Nodal Agencies</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>SPD</td>
<td>Small Project Developers</td>
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<td>SPDA</td>
<td>Solar Power Developer Association</td>
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<td>SWC</td>
<td>Social Welfare Charges</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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Executive Summary

Indian grid connected rooftop solar (GRPV) sector has witnessed a cumulative installed capacity of 4.4GW as of Dec 2019. This can be attributed to a strategic combination of top-down impetus and bottom-up execution approaches. However, despite Government of India (GoI) facilitating measures such as modification of metering regulations, demand aggregation support, incentive schemes for DISCOMs under the recent Phase–II of the Grid-Connected Rooftop Solar Program in 2019, challenges still abound in the sector, compounded further by the ramifications of Covid-19. It is observed that sectors’ growth has been constrained by myriad issues which can be broadly classified under three subcategories namely, institutional and regulatory, financing and quality. Some of the key points that have been largely debated amongst the sector stakeholders, as highlighted in the illustration below, have been discussed in this paper. Further, an attempt has been made to propose mitigation measures that can give impetus to the GRSV sector growth momentum.

![Diagram of Rooftop Solar Issues]

Figure 1 Rooftop solar issues covered in the paper

Institutional & regulatory

DISCOMs lie at the heart of processes involved in rooftop solar installations, be it tendering, inspections, net-(gross) metering procurement and billing, commissioning, etc. However, since the

inception of the GRPV sector, it was evident that DISCOMs are resistant to its proliferation due to the threat of losing out on consumer revenues especially in the case of high-paying commercial and industrial C&I consumers.

The MNRE Ph-II scheme has brought DISCOMs to the forefront by making them the implementing agencies in states. The recent announcement by the honorable Prime Minister regarding setting up of solar cities in states puts a bigger focus on the role of DISCOMs. Thus, it is essential that DISCOMs transition from a passive tendering agency to a more active stakeholder by adopting innovative utility-centric or utility-facilitating business models. Apart from this, DISCOMs may be mandated to develop 3-5-year GRPV deployment plans, developed as an outcome of technical and commercial assessment analysis.

Also, digitization of DISCOMs GRPV end-to-end processes by expanding scope of their online portals to management of GRPV vendors as well as monitoring of plants post commissioning is recommended.

Another point of discussion related to DISCOMs on the regulatory front is that of open access. A few issues pervading this space are grid access charges to compensate the distribution utilities for reduction in cross-subsidies; and regulations preventing generators from using both open access and net metering simultaneously. Allowance of open access for GRPV can enable deployment in establishments with large rooftop space and low consumption, where the excess power is supplied to another establishment with small or no GRPV space. Capping of cross-subsidy and additional subsidy surcharge at a certain percentage of those applicable to non-rooftop solar open access projects by state regulators can enable deployment of incremental GRPV for supplying power through open access route.

Additionally, the GoI enabling a stable and long-term regulations on safeguard duties is also essential to lend more clarity to developers and help them in future course of action regarding bidding and capacity addition planning accordingly. However, the period of imposition of duties should also coincide with burgeoning of the local manufacturing setup so as to ensure that the momentum in the solar sector is not affected.
Financing

For the GoI target of 40 GW GRPV to be achieved, installations in all sectors namely commercial and industrial (C&I) incl. MSME, govt buildings and residential will need to keep growing. In turn, the financing ecosystem has to support this growth in each of these sectors. The C&I segment has seen the most GRPV installations, contributing to 73% of the total installations. However, it has come to light that despite concessional debt funding available from SBI and PNB for lending to the non-subsidized segments, project developers raise debt from alternate sources, which has led to non-utilization of the funds available for this segment. Among other reasons, this can be attributed to preference for speedy disbursement and hassle-free process, which developers find lacking in the public sector bank (PSB). Potential need of debt financing of 2.01 bn has been estimated for RTS installation on Central and State government buildings. This segment has witnessed good traction with an estimated potential of 650 MW cumulatively in the states, as per EY assessment. However, defaults or delays by government agencies/ state owned utilities on payment terms as per the power purchase agreements (PPAs) create apprehensions in renewable energy service companies (RESCOs) to focus on this segment. It is proposed that setting up a payment security fund can address the concerns of RESCOs operating in this segment.

The 100% solarization scheme for government buildings segment has huge potential. This can attract many RESCOs apart from the 4-5 top RESCOs in operation today, who will be interested in forming decent sized portfolios to the tune of 10 MW. However, the Priority Sector Funding program for ‘Renewable Energy’ which is currently capped at INR 15 crore for a borrower and INR 10 lacs for households is observed to be restrictive for a RESCO in building an asset portfolio. This calls for an increase in the capping for the sector to INR 50 crore, which can support lending for an estimated 10 MW portfolio.

Figure 3 Recommendations to address financial issues

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3 6.156 GW GRPV potential on central & state government buildings. 3.5 Crs/ MW. 75 INR/ USD. D/E = 70/30.
Thus far, the uptake in the C&I segment has predominantly attracted big industries/corporate centers. In order to gain large scale proliferation, it is critical to focus on micro, small and medium enterprises (MSMEs) segment. As a segment, the estimated GRPV deployment potential is 18GW. But the segment has not witnessed good uptake due to the reservations of lenders due to the perceived risks of lending to MSMEs. It is proposed that a partial risk guarantee fund which can cover default of a percentage of the sanctioned loan amount can be designed to provide comfort to lenders. Moreover, with the current adverse pandemic situation, MSMEs do not view rooftop solar as a CAPEX priority in the interim period. So far, RESCOs have not focused on this segment due to dispersed nature of this segment, small ticket size and resistance of banks towards lending. A portfolio-based approach to encourage lending to RESCOs for GRPV installations in MSMEs, with adequate provisions and regulations can foster adoption. MNRE can initiate communication with institutions like IREDA, SIDBI, NABARD etc. to understand their interest in administering the CG trust. Moreover, the World Bank or any other multilateral developmental agency can act as a guarantor and initiate discussions with leading lenders to invite them as PFIs for the CGM.

Liquidity concerns have also been highlighted by developers in tenders. The tendering route has been a very significant platform that has bridged the demand in sectors to the available supply. However, various consultations have brought to light the tardy disbursal of subsidies by the state nodal agencies (SNAs) which affect developers’ projections, affecting their liquidity. Furthermore, hefty bank guarantees (BGs) required to block capacities in anticipation of the proposed installations, lock in huge chunks of the developers’ capital. DISCOM initiatives for adequate tracking of disbursal of subsidy by DISCOM/SNA along with revamping of the subsidy process is the need of the hour to provide relief to developers. Also, MNRE can mandate DISCOMs for lowering of BGs or requesting of BGs in tranches during the course of project implementation rather than in one shot after COD.

Quality

On the quality front, the implementation of Approved List of Modules and Manufacturers (ALMM) is a step in the right direction. However, moves such as BIS certification will need to be complemented by more certified labs to expedite certification. MNRE can establish a Quality Compliance and Enforcement Mission to independently monitor and report the quality compliance of GRPV projects and also explore adoption of international standards for design and installation of rooftop solar plants.

It is hoped that projection of key concerns along with possible mitigating solutions proposed in this paper will aid in planning targeted action and gaining desired results of accelerating rooftop solar penetration for the GoI to achieve its ambitious target of 40 GW GRPV capacity by 2022.
1. BACKGROUND

GRPV sector has received significant push from GOI through interventions such as modification of metering regulations, digital streamlining of processes, demand aggregation support, incentive schemes for DISCOMs and USD 1.5 bn of concessional loans. Accordingly, the installed capacity of GRPV rose to 4.4 GW as of December 2019. Although, the sector witnessed an increased growth rate till 2018, the growth momentum slowed between 2018-19 and only 1,104 MW of GRPV capacity had been added in the 12-month period up to December 2019. The Covid-19 pandemic has brought in additional stress to the sector in the form of affected supply chain, shortage of manpower and curtailed logistics. This has resulted in installation of only 1,080 MW of solar capacity in the first quarter (Q1) of 2020, a 43% decline quarter-over-quarter (QoQ), compared to 1,897 MW installed in Q4 2019. Rooftop solar constituted 18% of the installations, adding a capacity of only 194 MW.

Slowdown in the economy in 2019 has been a significant factor creating a liquidity crunch in the market, making it difficult for installers to finance rooftop projects. Participation in bids for developers is also fraught with risks due to the uncertain subsidy release timelines as well as huge quantum of bank guarantees being stuck. Existing lines of credit have not been fully utilized. Reasons behind low off take of GRPV amongst MSMEs still need to be addressed. Additionally, several developments on the policy and regulatory fronts in 2018 and 2019 have led to a mixed response in the market resulting in decrease in the pipeline of GRPV projects. A few reasons include the resistance of DISCOMs towards GRPV and their passive involvement in the entire process. Open access as a mode is still seen as restrictive due to the charges associated with it and non-permissibility in many cases. The duty regime is still not regarded as stable or long-term to allow much benefits to local manufacturing. There are numerous financing issues on diverse fronts for C&I, MSME, residential and government building sectors. On the quality front, interventions such as Approved List of Module Manufacturers (ALMM) are a step in the right direction, but more needs to be done on quality compliance and standards.

With a focus on DISCOMs, the GoI has declared various measures under Phase–II of the Grid-Connected Rooftop solar Program in 2019. These measures include incentives for the DISCOMs for achievement of additional capacity, assistance to states in development of online portal and aggregation of demand related to GRPV projects. Central financial assistance (CFA) of INR 11,814 crore has been announced, that includes an amount of INR 6,600 crore specifically to the residential sector as capital subsidy.

However, these initiatives of the GoI seem inadequate to overcome the challenges. Few of these challenges have been focused upon in the subsequent sections along with pertinent recommendations, which if acted upon, can go a long way in moving closer to the target of 40 GW of GRPV installations by 2022.

2. KEY CHALLENGES AND PROPOSED RECOMMENDATION FOR GRPV MARKET

Despite GOI’s aggressive push to increase GRPV installations, sector’s growth has been constrained by myriad issues which can be broadly classified under three subcategories namely, institutional and regulatory, financing and quality. Some of the key subjects that have been largely debated amongst the sector stakeholders, as highlighted in the illustration below, have been discussed in this section. Further, attempts have been made to propose some immediate mitigation measures that can give impetus to GRPV sector growth momentum.

![Figure 5 Issues in rooftop solar](image)

2.1. INSTITUTIONAL & REGULATORY

2.1.1. Passive participation of DISCOMs

The current electricity tariff model of cross-subsidization of agricultural and residential segments by C&I segments has led to rapid uptake of GRPV in the C&I segments. The rapid uptake of GRPV by the C&I segment has made the DISCOMs averse to GRPV deployment due to reduction in C&I consumers electricity requirement leading to reduction in revenues. Furthermore, DISCOMs consider the activities related to GRPV segment as “non-revenue generating” as facilitating a GRPV connection does not contribute to revenues of the DISCOM. This has led the GRPV suppliers/developers often complain about DISCOMs in several states having complex approval processes for GRPV.
MNRE rooftop solar phase-II guidelines have made DISCOMs the implementing agency for GRPV in the various states. The DISCOMs are the nodal agency for handling CFA for residential sector. The phase-II guidelines provide monetary incentives to the DISCOMs to undertake measures such as streamline GRPV process and strengthen internal institutional frameworks to increase GRPV deployments. However, without active participation by DISCOMs, such incentive mechanisms may limit the DISCOMs achieve only the targets mentioned in the phase-II guidelines and fail to increase GRPV deployment. It must be noted that DISCOMs are the key stakeholder in the GRPV value chain since they enable the last mile connectivity for the GRPV plant as well as reliable operations of the grid with influx of GRPV plants.

With the recent announcement made by the honorable Prime Minister of India on the introduction of concept of solar cities where-in a major city in a state should meet its entire electricity needs through GRPV, DISCOM’s role becomes more critical and demands actions beyond conducting one size fits all bids. The task of solarizing an entire city through GRPV is a complex endeavor because of the varied consumer segments and electricity requirement, multiple distributed transactions and varied consumer to grid integrations. This calls for an effective planning of grid infrastructure, supply chain and implementation for handling vast number of applications/queries, ensure on-time and quality implementation. In order to ensure the above, the DISCOMs will have to be aided with digital interventions to undertake the task of consumer outreach, handling large number of applications, GRPV vendor/s management, consumer grievance management and reliable operation of the distribution grid post installation of GRPV plants. Furthermore, DISCOMs should actively conduct programs and adopt innovative business models for ensuring deployment. For instance, instead of a one-size fits all tendering approach, based on the differing awareness level of the consumer segments within a solar city, an adoption of a programmatic approach for promoting a GRPV as a product shall be desired for residential. One such medium for the same shall be creation of e-marketplace models for GRPV, as an additional module in UWP that will map the consumers demand from the application, recommend system size (if need be) and provide a roster of DISCOM approved quality products and vendors with the ratings based on the history deployment. In this portal, the consumer can place order. In the process, various other module such as vendor management, grievance management, grid interconnections and subsidy will interface the data with each other mutually. Further, subsidy module should ensure directly transfer of subsidy to the consumer.

Recently, DISCOMs in some states/UTs such as Kerala, Jharkhand, Bihar, Andhra Pradesh and Chandigarh are transitioning from a passive role in GRPV market to a more active role through activities such as adopting innovative business models for deployment, financing mechanisms and capacity demand aggregation. It is worth noting that detailed analysis was conducted by the DISCOMs in above mentioned states to understand the impact of uptake of rooftop solar in the states on the DISCOM commercials and operations. Based on such analysis, business models of participating in the rooftop solar market were developed by the DISCOMs. For instance, in the state of Kerala in order to full-fill Renewable Purchase Obligation (RPO), Kerala State Electricity Board Limited (KSEBL) will deploy 500 MW rooftop solar under SOURA program by 2020-21 in two phases. Three models of rooftop solar deployment have been finalized under the SOURA program, in the two models KSEBL will have direct participation as asset owner and power procurer. In order to ring fence its regulated activities KSEBL has filed a petition with the state electricity regulatory commission to create a Special Purpose Vehicle for venturing into the rooftop solar
domain. Similarly, in the state of Andhra Pradesh to address the access to capital issue for residential sector DISCOM facilitated on-billing financing model has been introduced. The DISCOM will target residential consumers falling under Domestic Category-B tariff slab and having a monthly consumption of 140 to 200 units. Consumer has to pay a small percentage of upfront equity for the GRPV plant and for the remaining cost is provided as loan by the bank on preferential terms. DISCOM is responsible for collecting the Equated Monthly Installment (EMI) from the consumers and passing it on to the bank.

It is evident that one of the major success factors in India’s GRPV deployment are the DISCOMs, it is imperative that DISCOMs are mandated/incentivized to adopt business models, prepare medium term deployment targets and adopt innovative measures for assisting in deployment of GRPV.
Recommendations:
Since DISCOMs are the key stakeholder in the GRPV value chain following recommendations are proposed to ensure active participation by the DISCOMs:

- **Medium Term GRPV deployment targets:** DISCOMs may be mandated by MNRE to develop 3-5 year GRPV deployment plans. The deployment plans should be an outcome of technical and commercial assessment. These plans may contain consumer segment wise capacity deployment targets which can be derived based on the goal of extracting optimal value of rooftop from DISCOMs perspective. Based on these plans, revenue loss and grid upgradation studies can be conducted which can be utilized to design compensation mechanisms for DISCOMs as well as modes of participation in the deployment. DISCOMs may leverage the revenue impact studies to provide different metering options to the consumer segments such as net billing for C&I segment while net metering for remaining consumer segments. DISCOMs should be mandated to submit the GRPV deployment plans as part of the Multi Year Tariff Regulations filings. The medium-term visibility generated through these plans are bound to increase investor confidence as well assist the developers in better planning.

- **Adoption of DISCOM facilitated business models:** Forum of Regulators has approved the following DISCOM facilitated business models:
  - Consumer-owned (DISCOM only aggregates)
  - Consumer-owned (DISCOM aggregates and acts as EPC)
  - Third party-owned (DISCOM aggregates and acts as trader between the RESCO and Consumer)
  - DISCOM aggregates and acts as RESCO

  The DISCOMs may be mandated to adopt the approved business model/s by MNRE by attaching this as a condition precedent to receive central govt. incentives for Electricity Sector. MNRE will provide guidance to the DISCOMs on various business models. As a pilot, MNRE may consider utilizing part of the CFA for the solarization of Konark Sun temple and the town of Konark for mandating DISCOM serving the city of Konark to develop at-least two DISCOM-facilitated business models in consultation with Odisha Renewable Energy Development Authority. The outcome of the pilot can be used by MNRE for designing a scheme which incentivizes DISCOMs to adopt DISCOM-facilitated business models for realization of the solar cities idea.

- **Reducing administrative costs for GRPV enablement through digitization of DISCOM’s GRPV end-to-end processes:** Currently, phase-II guidelines mandate the DISCOMs to create online portals for handling subsidy application and interconnection requests by the consumers. MNRE should consider expanding scope of these portal to handle GRPV vendor management aspects as well as monitoring of plants post commissioning. MNRE could drive the digitalization initiative for GRPV in DISCOMs by providing one-time incentive to DISCOMs.

- **Development of e-market place for GRPV:** DISCOMs should enable creation of e-marketplace model for GRPV deployment. DISCOMs will empanel component suppliers meeting the technical and quality standards meeting the MNRE guidelines on the marketplace. Consumers will share images of their rooftop and electricity requirements on the portal, using which GRPV plant sizing will be conducted. Consumer procures the GRPV components through the portal and gets the GRPV system installed by a local system installer.
2.1.2. Open Access

The Electricity Act 2003 laid down the provisions for a power market and competition by allowing open access of electricity which is defined as: “Non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission”.

As per the EA-2003, consumers with connected load of 1 MW or more are eligible to procure power through open access route. The consumer will have to pay grid access charges to the transmission & distribution utilities for utilizing their network. The grid access charges also include charges to compensate the distribution utilities for reduction in cross-subsidies.

For the commercial consumers in India, GRPV tariffs (~ 4-6 INR/kWh) presents an attractive proposition to reduce electricity bill expenditure. However, small rooftop space, reduces the size of solar plant which can be deployed.

On the other hand, there are certain installations such as warehouses and cold storages where large rooftop space is available. However, the electricity consumption in such installations can be met with smaller capacity of GRPV plant. This leads to under-utilization of available GRPV space available.

Allowing open access for GRPV can enable deployment in establishment with large rooftop space and low consumption where the excess power is supplied to another establishment with small or no GRPV space.

Consumers who are currently procuring power through open access route are not allowed to install GRPV plants with net/gross metering arrangements. This is based on the 2018 ruling by Maharashtra Electricity Regulatory Commission (MERC) for the petition file by CleanMax Solar to grant net metering permission for a 991 kW GRPV photovoltaic project at Asahi India Glass Limited situated at Maharashtra Industrial Development Corporation (MIDC), Raigad, Maharashtra. Asahi Glass was already off-taking 3 MW of power through open access. In response to the petition, MERC clarified that generators cannot use both Open Access and Net Metering simultaneously. MERC among other reasons for the ruling mentioned that “If these two arrangements are mixed up, then there are various issues related to grid security, accounting, billing, settlement, etc.”

Recommendations:

- Development of improvement plan for facilitating GRPV deployment: In August 2019, MNRE launched State Rooftop Solar Attractiveness Index (SARAL) to evaluate states based on their attractiveness for GRPV development. DISCOMs should review their state scores, identify improvement areas and develop yearly improvement plans. The improvement plans should focus on addressing at-least one the improvement areas, thereby aim to increase performance of the state in the SARAL ranking as well as creating a conducive environment for GRPV growth in the state.
2.2. **FINANCING**

To accelerate large scale adoption of GRPV, availability and access to finance are critical. The low uptake of GRPV projects in India is thus far largely attributed to project financing matters such as poor availability of long term, fixed rate financing and limited access to affordable finance, etc.

Some of the challenges seen in the financing are listed below:

2.2.1. Debt Financing

GRPV market has USD 1.565 bn\(^7\) line of credit (LOC) for the debt funds however less than 50% has been sanctioned till date. An analysis for financing the cumulative capacity installation highlights that market could have demanded cumulative debt of USD 2.72 bn\(^8\). However, disbursal from the available LOCs has been less than USD 0.5 bn out of which USD 0.16 bn is from SBI\(^9\). Thus, this gap of more than USD 2.2 bn between estimated debt fund required and the infused debt calls for interpreting lost opportunity for cheaper lines of credit.

For CAPEX projects, high equity infusion by asset owners and selective lending to credible players by the banks are expected to be major contributing factors for lower disbursement of concessional loans.

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\(^7\) IREDA - USD 340 mn, SBI – USD 625 mn, PNB – USD 500 mn, NABARD – USD 100 mn

\(^8\) Calculations @ 5 Cr/MW, 70 INR/USD and D/E = 70/30

\(^9\) Disbursed funds: SBI – USD 0.16 bn, PNB – USD 0.0175 bn
Furthermore, the debt requirements for RESCOs and other financing institutions with large portfolios have been largely met by overseas funding or through alternate sources of fund. As of June 30, 2019, one of the large RESCOs in North India had 131 MW\textsuperscript{10} of rooftop assets with estimated requirement of INR 458.5 Crores\textsuperscript{8} of debt financing. However, it has availed sanction of INR 169.27 Crores and drawn only INR 46.33 Crores from SBI. It follows then that the deficit in debt financing is met by the USD 135 Mn offshore funds raised from Norwegian and European MDBs for asset building\textsuperscript{11}.

Conclusively, project developers are expected to have raised debt from alternate sources as against available domestic sources of funds such as SBI and PNB.

2.2.1.1. Complex loan application process for developers:

C&I segment, primarily comprising of large borrowers, has 3.96 GW\textsuperscript{12} of GRPV capacity installed. The C&I borrowers have good credit ratings and better capacity to collateralize assets, increasing accessibility to low-cost debt. Despite high credit worthiness, these borrowers have not utilized concessional loans, as per the expected disbursement, and have even opted for costlier sources. Based on industry consultations, this can be primarily attributed to preference for speedy disbursement and hassle-free process.

Accordingly, critical interventions are required to address the process challenges. Streamlining the overall process with simplified procedures should be instituted to mitigate these challenges. This shall include bringing key structural changes in loan processing activities along with setting dedicated timelines for each of these activities. Based on discussions with developers, it is desired that the total lifecycle of loan process be maximum of 30 days which, as per market consultations, currently takes 45-60 days and sometimes more depending on availability and correctness of documents, inspection time and verification processes etc. The turnaround time (TAT) of the process can be improved through monitoring of applications by the banks’ central committee.

**Recommendations**

Simplifying the loan processing and disbursement process taking outlined measures to attract market interest.

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2.2.1.2. Payment concerns of developers and lenders in Govt. RESCO projects:

One of the key market segments since market inception has been GRPV installations on Government buildings. Based on the observed bids and MNRE reports, state and central government buildings have cumulative GRPV potential of 650 MW and 7.2 GW\textsuperscript{13} respectively. It indicates a potential debt funding requirement of USD 2.01 bn.\textsuperscript{14} However, RESCOs are apprehensive about this segment due to history of defaults/delays in payments by government bodies / government owned utilities and potential increase in credit risk. This has led to decreased confidence in project developers and lenders for this segment indicating a potential loss of opportunity.

SECI has set up a payment security mechanism in order to ensure timely payment to the developers for large renewable projects. The fund has a corpus to cover three months payment for the various VGF schemes approved by MNRE. Multiple levels of payment security in PPAs, such as letter of credit, default escrow agreement, payment security fund, tripartite agreement, and state government guarantee have been covered. A similar structure can be thought of for the

<table>
<thead>
<tr>
<th>Activities</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design dedicated centralized online application process with time bound mapping of loan process lifecycle.</td>
<td>--</td>
</tr>
<tr>
<td>Assign point of contact for applicants and provide escalation details</td>
<td>Within 1 day of submission of completed application with all mentioned documents</td>
</tr>
<tr>
<td>Provide feedback on verification with demand for modification / addition of documents and/ or indication of red flags in the application.</td>
<td>Within 10 days of assigning point of contact details</td>
</tr>
<tr>
<td>Take speedy decision on sanction / rejection of loan application</td>
<td>Within 20 days of submission of revised documents post feedback</td>
</tr>
</tbody>
</table>

\textsuperscript{13} As per MNRE presentation

\textsuperscript{14} Calculations based on 3.5 Rs/unit tariff rate, 14% CUF, default range of 30-50%, project cost 3.5 Crs/ MW, D/E: 70:30, 80% installation of estimated rooftop capacity on central government buildings and 2% LC charges.
government buildings rooftop solar projects to address challenges in the sector which will need support of implementation agencies such as SECI.

To achieve estimated rooftop solar capacities on central and state government buildings, SECI and individual SNAs may facilitate the implementation process. However, approaching individual SNAs for state potential may be cumbersome and introduce non uniformity in process. Hence it is advisable to designate SECI to undertake the implementation of the projects at central and state level with strong support from SNAs in coordinating the activities. SNAs in turn can charge a certain percentage of service fee for providing these services.

A short-term solution of payment security mechanism can then be thought of with SECI as the central authority for monitoring the operation of the PSM facility.

Schematic for PSM mechanism can be envisaged as:

In case of central government buildings, SECI will manage PSM funds and act as an interface between SPDs and off-taker. However, for projects involving state government buildings, SNAs will act as point of contact for all transactions for SECI. SNAs will also be responsible for reporting delays/ defaults/ losses to SECI.

A two-tiered structure can be designed to provide robust solution

**Tier 1:** A revolving LC for 1-month billing in case of more than 30 days delay in payment to developer.

**Tier 2:** A facility of pooled fund with 100% contribution from MNRE.

In the event of delay in payment, SPD can invoke the LC to avail the payment delayed. The LC value will be replenished by the off taker on timely basis. The PSM facility may be approached in the event of default and when the LC is exhausted and not replenished by the off taker. For such defaults with
delays of more than 30 days, project developer can seek 50% of the invoiced amount as first loss guarantee from the fund facility. Post verification of the claim SECI will disburse the fund within 21 days. In case off-taker still fails to pay the developer within certain period (90 days) then developer will approach the facility manager for the balance 50% as a second loss support to address payment default.

**Recommendations**
- One-month revolving Letter of Credit (LCs) shall be issued by the off-taker to developer for mitigating the risks of payment delays for first month.
- Setup a pool of fund to provide payment support for one quarter consisting fund contribution of 100% from the Government. Based on preliminary estimates\(^1\) size of pool fund will be USD 26.96 mn to USD 44.93 mn considering a default rate of 30% to 50%.

**Action points:**
- SECI to be set up as central implementing agency for RTS projects on central and state government buildings.
- SECI to implement a PSM facility for rooftop solar projects constituting funds from National Clean Energy Fund (NCEF)
- Activities of key stakeholder can be outlined in a matrix as:

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Activity</th>
</tr>
</thead>
</table>
| SECI        | 1. Act as central implementing agency  
2. Undertake bidding process, float tenders with defined terms and conditions  
3. Set up a PSM facility for the benefit of developers  
4. Undertake operational activities for PSM facility |
| SNA         | 1. Provide support to SECI for demand aggregation  
2. Coordinate the PSM activities with SECI for defaults/delay in payments from state government bodies  
3. Report payment delays & defaults by the off-taker |
| Developer   | 1. Timely submission of invoices per contractual obligations  
2. Report default in payments with supporting documents to SNAs and SECI for availing PSM facility at state and central level. |
| Off-taker   | 1. Issuance of LC for estimated one-month LC  
2. Replenishing the LC if invoked due to payment delay/ default |

**2.2.2. Priority Sector Lending Program**

The Priority Sector lending program has a capping of INR 15 crore for loans that can be lent to a developer. However, this limit is restrictive as is evident from that fact that the government has approached the
Reserve Bank of India to remove the Rs 15-crore limit for loans granted under the priority-sector status for renewables\textsuperscript{15}.

We view this issue from the point of view of the vast potential identified under the 100% solarization scheme of government which aims to solarize all government establishments. As per government updates, a potential of 6.156 GW still exists in this segment. RESCO is considered as the preferred business model as it takes away the concern of initial investment and ensure the long-term optimal operational of the plant. For the market to open up and for larger quantum of projects to be taken up in a time period, more local RESCO players apart from a few top RESCOs in operation today, will have to come up to work on the sizeable potential in this segment. As the segment and the overall sector matures and grows, it will lead to these RESCOs being capable of taking up decent sized portfolios of say at least 10 MW. To support portfolios of the aforementioned size, debt financing support needs to be available. In this perspective, it is recommended that the PSL capping be increased from the current INR 15 crore to INR 50 crore approx. to enable lending for a portfolio size of 10 MW.

Of course, this may not lead to solving everything with regard to PSL. The banks may still end up lending to other sectors under PSL to complete their quota of 40% PSL as there is no sub-target for financing RE projects. However, this viewpoint seems pertinent when we look at it from the lens of rooftop solar, which may require greater support in the future than is currently available under PSL.

\begin{table}[h]
\centering
\begin{tabular}{|l|}
\hline
\textbf{Recommendations} \\
\hline
\quad \textbullet \quad Increase in capping of PSL limit for RE to include the interest of RESCOs in asset portfolio creations \\
\quad \textbullet \quad It has been found that not all banks may have lent under PSL for solar in the same spirit as prominent banks like the State Bank of India. MNRE can send an advisory to banks to lend more under PSL for GRPV. This advisory can have an overview of the improving landscape of the GRPV sector, projecting the huge potential and constant government focus on this sector. MNRE may also write to the Finance Ministry to circulate the advisory to lenders. \\
\hline
\end{tabular}
\end{table}

2.2.3. Fostering growth of GRPV in MSMEs through financial interventions

2.2.3.1. MSME’s off taking potential challenged due to low or no credit rating

Micro, Small and Medium Enterprises (MSMEs) as off-takers of solar have a potential of 18GW\textsuperscript{16}, which translates to almost half of the GRPV target set up by MNRE. Despite the potential for MSMEs, significant off take of GRPV has not been witnessed in the sector. Among the major issues impeding GRPV in MSMEs is the lack of access to low cost financing. Lenders are hesitant to lend to MSMEs due

\textsuperscript{15} https://www.bloombergquint.com/business/india-wants-no-cap-on-cheaper-priority-sector-loans-to-renewable-energy-projects

to critical concerns such as low credit rating of MSMEs, lack of credit history and operational roadblocks such as lack of visibility of business horizon impacting payback. Thus, to propagate lending amongst MSMEs, it becomes imperative to allay the concerns of lenders, making them more comfortable to lend to MSMEs. A credit guarantee mechanism (CGM), which can partly cover for the risk of lending to MSMEs and compensate lenders for any default, can provide the necessary comfort to lenders. A fund pool of USD 200 million providing 50% coverage has the potential to leverage around 1.5 GW of RTS installations17.

Recommendations:

**Partial risk guarantee fund to support lenders for MSME borrowing:** The credit guarantee fund (CGF) can cover 50% or more of the sanctioned loan amount. The mechanism should strike a balance between coverage on the higher side which may lead to lax due diligence on the side of lenders and coverage on the lower side which may find no takers if the lenders consider the coverage to be inadequate. It has been seen that across various countries, the extent of CG coverage is decided on the various parameters such as type of firms (normal or innovative or startup firms), credit scores of the firms, number of employees. The coverage can either be a constant coverage type for all types of MSMEs or it can be a variable coverage type depending on the rating of the MSME, with lending to a lower rated MSME loan being protected with a higher coverage. This will promote lending to the lower rated MSMEs too.

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2.2.3.2. Additional stress to MSMEs due to COVID Crisis

Moreover, with the current adverse situation brought about by the COVID-19 pandemic, MSMEs are under immense distress. Consultations with developers have put forward a situational analysis that MSMEs do not view rooftop solar as a priority in the interim period and for the ones who will still be interested in installations now, it is highly unlikely that they will opt for a CAPEX model for the interim period. Thus, some focus also needs to be on supporting lending to Renewable Energy Service Companies (RESCOs) in exploiting the potential of GRPV in MSMEs, at least for the near-term and medium-term futures. However, RESCOs have not been a dominant player till date in the MSME segment as RESCOs themselves have been daunted by the dispersed nature of this segment and small ticket size. Further, banks are not willing to lend owing to low creditworthiness and unpredictability regarding the long-term business horizon of MSMEs. At this juncture, it becomes pertinent to render support to RESCOs which incentivizes them to address the potential in both the residential as well as MSME segments. A CGM which provides respite to lenders, but also takes a portfolio-based approach of assessing loans can help in attracting RESCOs to this sector. The portfolio approach is a panacea irrespective of COVID-19 and is not just limited to MSMEs. It has good potential to impact broader C&I consumers also.

These frameworks individually highlight their utility in their areas of supporting CAPEX amongst MSMEs and promoting RESCO lending for installation in MSMEs. However, during implementation, both these frameworks can be combined into a single framework for the sake of administrative prudence.
Portfolio-based approach to encourage lending to RESCOs for RTS installations in MSMEs: A CGM with a portfolio-based approach of approving loan applications which incentivizes RESCOs to aggregate is recommended. The CGF can be triggered only when the portfolio as a whole defaults. From the perspective of the financial institutions, this option may be riskier than the previous option. Therefore, to promote the portfolio lending mechanism, an incentive mechanism may need to be developed wherein a higher CG coverage cover may be provided to the lender. Regarding the selection of assets in the portfolio, it is recommended that the portfolio can comprise of assets from a few clusters spanning different industries to diversify the risk associated with creating a portfolio of MSMEs from the same industry. However, from the point of view of ease of inspection by the lending branch, the portfolio may end up comprising MSMEs from clusters in the adjacent geographical area.

Action points:

- The trust which will be in charge of managing the CGM can be administered by an implementing entity chosen from among institutions like IREDA, IIFCL, IREDA, PFS, SIDBI, NABARD, etc. MNRE can initiate communication with these institutions to understand their interest in administering the CG trust.
- The scheme can be open for participation for all types of eligible participating financial institutions such as PSBs, private sector banks and NBFCs. The World Bank or any other multilateral development agency can act as a guarantor and initiate discussions with leading lenders to invite them as PFIs for the CGM.
- MNRE can capitalize the trust from its source of funds.

2.2.4. Liquidity issues caused by delayed subsidy disbursement and high bank guarantees

2.2.4.1. Delayed subsidy disbursement

Consultations with developers have brought to light the issue of tardy disbursal of subsidies by the state nodal agencies (SNAs). There are instances of subsidies not being released even after more than two years have elapsed since the commissioning of projects. Even though MNRE has been sanctioning subsidies to SNAs to be disbursed to developers, stakeholders have expressed concern that many SNAs delay disbursements even after having received MNRE sanctions. Delay in release of subsidies has caused huge cashflow problems for developers as the service charges are paid upfront to the SNAs for getting projects sanctioned. For instance, service charges for 97.5 MWp SECI GRPV tender was 5% of the Quoted Project Cost/ MNRE benchmark cost, minus incentives. Capital amounting to around 30% of the project cost remains stuck with SNAs and the remaining 70% isn’t enough to meet the cost of the materials and overhead costs. The Standing Committee on Energy 2019-20 in its Demand for Grants noted that roof-top systems are not remunerative due to high maintenance cost and delay in
disbursement of subsidy\textsuperscript{18}. With this perspective, it is essential that processes leading up to subsidy disbursal such as inspection of site by authorities are revamped. Furthermore, the entire subsidy process including site inspection, subsidy application by developer, and subsidy release by MNRE to DISCOM and by DISCOM to vendor/installer shall be tracked, timelines shall be framed and compliance shall be ensured.

**Recommendations:**

- **Unified Web Portal process extension:** The Unified Web Portals (UWPs) of state DISCOMs to track the rooftop solar application process also has a subsidy module which presently has been designed to track the DISCOM/SNA application process for subsidy and subsequent MNRE approval. Further, this module can be extended to also include the tracking of commissioning dates, application of subsidy by developers and subsequent disbursal of subsidy by DISCOM/SNA. Appropriate timelines can be incorporated in the portal for each process and timely alerts can be activated which remind the responsible party about compliance to the set timelines. The portal can also be tweaked so that this process and the alerts generated can also be monitored by MNRE at its end for strict compliance.
- Operationalizing a Grievance redressal system within the UWP for highlighting any hurdles faced by developers regarding delay of subsidy release

**2.2.4.2. Bank Guarantee commitments**

Hefty bank guarantees (BGs) are required to be produced by the developers during government tenders to block capacities in anticipation of the proposed installations. The tender capacity is estimated by the government agencies based on a general understanding of the market size. However, the ultimate installed capacity depends, to a large extent, on market conditions and on the ability of the vendors to source leads/customers interested in installing GRPV system. If the estimates are off the mark, the developers are stuck with submission of high quantum of BGs based on their high initial estimates. For instance, in one of the IPGCL administered bids, the installers could eventually install 15 MW under the 40 MW tender for the government/social sector, however, BGs were collected for entire 40 MW allocated capacity under the tender. Similarly, SECI could only achieve 30% of the total of 500 MW tenders floated. Moreover, there are multiple DISCOMs and each of them demand separate BGs to participate in their tenders. This blocks a huge chunk of the developers’ working capital without any certainty of business.

This issue of huge BG commitments getting stuck for long periods calls for lowering of BG, with alternate measures to replace the comfort of BG for the tenderer.

\textsuperscript{18}http://www.indiaenvironmentportal.org.in/files/file/Demands%20for%20Grants%20of%20the%20Ministry%20of%20New%20and%20Renewable%20Energy%20for%20the%20Year%202019-20.pdf
**Recommendations:**

**Treatment of BGs:** Lowering of BGs or requesting for BGs in tranches (construction phase BG and maintenance phase BG) rather than in one shot can alleviate the burden on developers. Section 73 of the Contract Act requires the party claiming damages to demonstrate that the damages compensate it for the “loss” suffered by it. In this respect, the courts have held that bank guarantees can be encashed only based on reasonable compensation for the losses suffered by the other party. Hence, there is no ground for encashment of any bank guarantee, and by implication, there should be no ground for the state nodal agency or DISCOM to seek any bank guarantees from the developers.

**Action points:**

- DISCOMs can study the processes, conduct a need analysis to identify aspects which require revamping to ensure timely disbursement of subsidy and finally implementation of the identified changes through necessary IT/systems interventions.
- MNRE may seek a legal advice on removing BGs or explore alternate avenues which are more bidder-friendly such as requesting for lower value construction BGs with shorter validity periods for the construction phase and higher BGs for the operation and maintenance phase. Accordingly, a clarification can be sent under the Rooftop Solar Phase -II guidelines that would be binding on DISCOMs/State implementing agency.

### 2.3. QUALITY

The quality of the GRPV installations is not consistent. Although, individual component quality standards are used in the Indian rooftop solar market such as IS 14286 for design and type approval of crystalline PV modules, no standards are followed for design and installation of the systems. This may be one of the reasons that a few installations have failed to withstand the inclement weather conditions for which they have been designed. Even large scale GRPV developers are reported to have installed low quality equipment’s and products coupled with poor O&M.

More importantly, segments like MSMEs have limited advantage to access quality equipment and products with “low cost” being the driver for implementation. Though the recently introduced BIS compliance will improve this situation, absence of adequate and state-of-the-art certified labs may constrain and slow down compliance, resulting in implementation delays.

MNRE’s guidelines, fee structure, and deadlines on the implementation of Approved List of Modules and Manufacturers (ALMM) with effect from September 30, 2020 (in addition to BIS certification) is a welcome move. However, more measures related to quality compliance and adoption of international standards are required.
Recommendations:

- Facilitate establishment of more certified labs to expedite certification
- MNRE to establish a Quality Compliance and Enforcement Mission:
  a. to create a cadre of experts to independently monitor and report the quality compliance of GRPV projects.
- MNRE can explore adoption of international standards for design and installation of rooftop solar plants. Some of the IEC standards which can be modified for Indian conditions and adopted are:
  a. IEC 62548 (Photovoltaic (PV) arrays - Design requirements): Sets out design requirements for PV arrays including DC array wiring, electrical protection devices, switching and earthing provisions.
  b. IEC TS 62738 (Ground-mounted photovoltaic power plants - Design guidelines and recommendations): Sets out general guidelines and recommendations for the design and installation of ground-mounted photovoltaic (PV) power plants.
  c. IEC 60364-7-712 (Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems): Applies to the electrical installation of PV systems intended to supply all or part of an installation.