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Rooftop Solar's Time to Shine in Bangladesh

Readiness—from assessing the potential of rooftop solar to ensuring proper monitoring and interministerial coordination—is key to the success of Bangladesh's new rooftop solar programme.

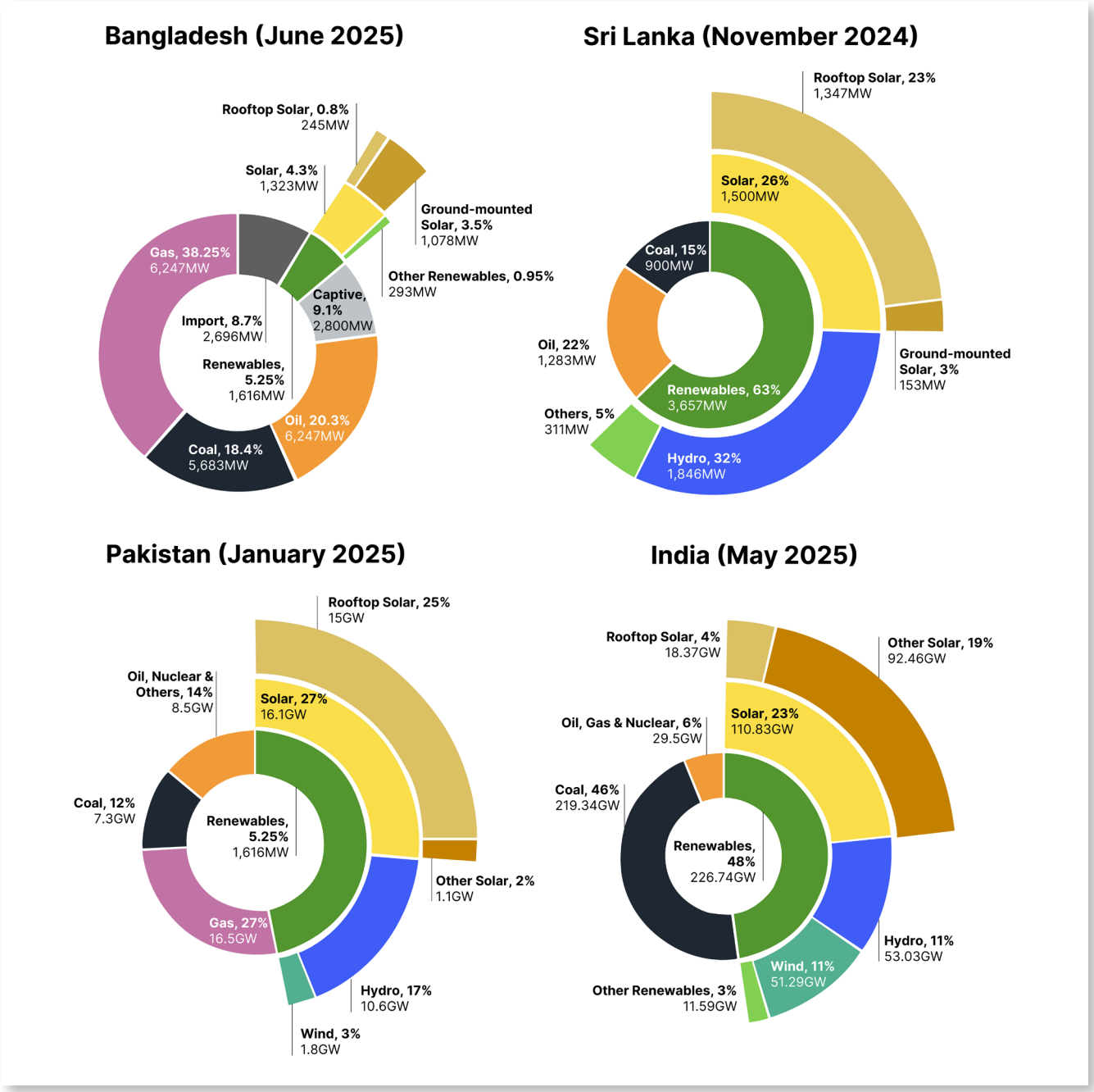
- *Bangladesh's new rooftop solar programme sends a strong signal on the country's commitment to shore up renewable energy capacity amid its limited success thus far.*
- *Achieving new rooftop solar capacity of 3,000 megawatts (MW) in less than six months would require scaling up installations to more than 12 times the capacity of 245MW recorded in June 2025.*
- *With the combined power demand in government offices, hospitals, educational and religious institutions being less than 1,500MW, their sanctioned load is much less than 3,000MW. This limits the possibility of achieving rooftop solar capacity of 3,000MW in these facilities under net metering guidelines.*
- *Rooftop solar is a low-hanging fruit, which can help the country attain its new renewable energy target of 30% by 2040. However, with many unknown factors like actual rooftop solar potential and maintenance issues in the CAPEX model still unresolved, the government must design measures for readiness to dispel stakeholder concerns.*

1. Background

Bangladesh is struggling to boost renewable energy capacity amid the energy crisis and spiralling power tariffs. However, the Bangladesh government recently unveiled an ambitious plan to install new rooftop solar capacity of 3,000 megawatts (MW) by December 2025, after more than 15 years of lacklustre growth in the sector. The decision came on the back of a new Renewable Energy Policy approved on 16 June 2025 to achieve 30% renewable energy by 2040. The new programme proposes using public funds for rooftop solar in government offices under the Capital Expenditure (CAPEX) model. Further, it aims to encourage Engineering, Procurement and Construction (EPC) companies to invest in rooftop solar projects in hospitals, and educational and religious institutions under the Operational Expenditure (OPEX) model.

The government also acknowledged the country's modest share of renewable energy in its power mix compared to its neighbours—India, Pakistan and Sri Lanka. On an installed capacity basis, Bangladesh's share of renewable energy in its power sector is around 5% as opposed to Sri Lanka, India and Pakistan's contribution of 63%, 48% and 47% respectively (see Figure 1). Even rooftop solar accounts for a significant part of the three countries' renewable energy capacities in contrast to the tepid progress in Bangladesh.

Figure 1: Comparison of Renewable Energy Capacities, including Rooftop Solar, of Selected Countries



Source: BPDB & SREDA, Bangladesh; Ministry of Energy, Sri Lanka; Renewables First & IEEFA, Niti Ayog, India

While rooftop solar remains a low-hanging fruit for Bangladesh with attractive return on investment, the country should address existing challenges, such as quality issues and lack of monitoring, that have deterred its wider adoption. Bangladesh can draw on the experience of India, Pakistan and Sri Lanka, as it prepares to implement its rooftop solar programme.

2. Bangladesh's Rooftop Solar Journey

Bangladesh installed its first rooftop solar system in 2008, with a modest capacity of 1 kilowatt (kW). The government then issued a directive in 2010 for new buildings and industries to set up rooftop solar to obtain grid connections. The hefty shortfall between the country's growing power demand and installed generation capacity compelled the government to issue an order for new buildings to generate part of their power from rooftop solar.

The government enacted net metering guidelines in 2018 and revised them in 2019 to allow buildings with three-phase connections to generate electricity from rooftop solar, thereby reducing their reliance on grid power, which mostly comes from fossil fuels. At the time of approving net metering guidelines on 28 July 2018, Bangladesh had an installed (non-net metered) rooftop solar capacity of 35.93MW. By June 2025, the combined rooftop solar capacity, including net-metered and non-net-metered systems, had reached 245MW. Between 28 July 2018 and 30 June 2025, the country added rooftop solar capacity of 209.07MW, registering an average annual installation of 30.2MW.

The country's rooftop solar sector remains at a nascent stage, hindered by several challenges, such as lack of quality control and regulatory monitoring, high import duties, a cap on installed capacity and financing bottlenecks.

2.1 Many Small-scale Rooftop Solar Systems are Now Stranded Assets

While building owners have been installing rooftop solar systems to secure grid connections, many of them have been rendered stranded assets due to lack of maintenance.

This has created a negative perception about rooftop solar systems, making building owners hesitant to adopt them.

Limited regulatory monitoring compounds this problem. It allows small vendors to supply poor-quality solar panels and accessories to building owners, who need to meet compliance requirements for securing grid connections.

Bangladesh also does not have proper guidelines for regulating vendors and Engineering, Procurement and Construction (EPC) companies to maintain standards in project implementation and post-implementation upkeep.

2.2 High Import Duties and Cap on Rooftop Solar Capacity

High import duties have impeded the rooftop solar sector's progress. While the government reduced the customs duty on imported inverters from 10% to 1% in June 2025, the Fibre Reinforced Polymer (FRP) walkway, mounting structure and Direct Current (DC) cable are still highly taxed.

Furthermore, rooftop solar installation capacity is currently capped at up to 70% of the sanctioned load. For example, if an industry has a sanctioned load of 1MW, it cannot set up a rooftop solar plant of more than 0.7MW capacity, irrespective of available space. This restriction limits the ability of some industries and commercial buildings to set up plants with higher capacities and maximise savings. (Note: The net metering guidelines are undergoing a revision and the cap is likely to be raised to 100%.)

2.3 Financing Challenge

Most banks and financial institutions are cautious about providing debt capital to industries or commercial facilities for rooftop solar projects. They seek high collateral owing to perceived risks, delaying the project implementation. The complex loan disbursement process under Bangladesh Bank's low-cost green funds also deters building owners from taking loans.

While the Infrastructure Development Company Limited has a financing scheme for rooftop solar, it alone cannot meet the sector's demand. Its target is to finance rooftop solar projects of 300MW capacity by 2026.

EPC companies face challenges in accessing bank finance under the OPEX model, akin to industries under the CAPEX model. Furthermore, there is a confusion among EPC companies regarding their eligibility to receive loans under the central bank's low-cost green funds. Borrowing at commercial rates raises project costs and reduces profits under the OPEX model.

2.4 The Absence of a Push Factor during Energy Supply Crunch

Despite the fragility of Bangladesh's import-dependent energy system following the Ukraine-Russia war, the government's drive to motivate industries, commercial buildings and other establishments remained limited.

3. Lessons from Neighbouring Countries

The rooftop solar experience of India, Pakistan and Sri Lanka could offer valuable lessons for Bangladesh, which grapples with ramping up rooftop solar capacity. This section analyses key takeaways for Bangladesh from its neighbouring countries.

3.1 Push Factor

Pakistan's rooftop solar sector success is an example that push factors, such as an energy supply crunch and unaffordable power tariffs, can spearhead change (see Box 1). While energy supply shortfall could not spark a rooftop solar revolution in Bangladesh in the last three years, the government's decision to roll out a time-bound new rooftop solar programme (installation target of 3,000MW by December 2025) could act as a push factor. The programme includes government offices as one of the potential establishments to set up rooftop solar, and the public sector has easy access to government offices. This may help scale up rooftop solar in Bangladesh.

Further, drawing on Pakistan's experience, Bangladesh can provide a full duty waiver for imported rooftop solar components and start levying duties once it installs considerable rooftop solar capacity.

Cheap solar panels, imported from China, also made rooftop solar a lucrative route to address the energy crunch in Pakistan. As the price of solar panels continues to fall throughout the world, rooftop solar is financially more compelling for Bangladesh.

Box 1. Sudden push factors, such as energy supply disruptions and high tariffs, triggered Pakistan's rooftop solar revolution in 2024

The Ukraine-Russia war severely affected Pakistan's energy supply system, forcing the import-dependent country to raise tariffs in quick succession and opt for load-shedding. Household

electricity tariffs soared to US$0.24/kWh from US$0.08/kWh between July 2022 and July 2024, registering a three-fold spike in two years (households with high consumption). Further, industries and commercial entities paid around US$0.166/kWh in 2024, which was reportedly the highest among South Asian countries. The push for energy independence, led by high tariffs, encouraged building owners to invest in rooftop solar. Access to cheap solar panels from China also helped accelerate the decision to invest in rooftop solar projects.

By January 2025, Pakistan's rooftop solar capacity had reached 15GW, led by a major surge in installation in 2024.

Imported rooftop solar components received tax exemption in Pakistan, enhancing the financial appeal of rooftop solar projects.

*Pakistan has imposed a 10% sales tax on solar panels, effective from 1 July 2025.

3.2 Government Support:

Once at a nascent stage due to the challenges of debt financing, the Sri Lankan government collaborated with the Asian Development Bank (ADB) and designed a conducive net metering system that helped the country transform the sector (see Box 2). Bangladesh's plan to utilise public funds to set up rooftop solar in government offices could spearhead a similar transformation in the sector.

Box 2. Policy and financing support helped transform Sri Lanka's rooftop solar sector

When Sri Lanka launched its net metering guidelines in 2010 to harness rooftop solar, stakeholders had a lukewarm response. Rooftop capacity reached only 80MW in 2017 amid the perceived high commercial risks, such as the non-viability of projects without concessional financing.

The Sri Lankan government collaborated with ADB to address the commercial risks of rooftop solar. ADB provided a credit line of US$50 million, along with technical assistance of US$1 million, through Sri Lanka's Ministry of Finance, to boost the rooftop solar sector in 2017. Notably, the Sri Lankan government provided support to reduce the cost of debt finance to rooftop solar projects. For instance, financial institutions capped the lending rate at 8%, which came down to 4% with the government's contribution.

By the end of 2022, Sri Lanka had registered rooftop solar capacity of 516MW, including projects of more than 70MW installed under ADB's credit line.

In 2024, the Government of Sri Lanka provided funds worth Rs5.84 billion (US$19.3 million) for rooftop solar on public buildings. The country's combined rooftop solar capacity soared to 1,347MW in November 2024.

3.3 A Combination of Government Effort, Policies, and Regulatory Interventions

India's rooftop solar is a story of consistent efforts that not only incentivised scaling-up but also laid the foundation for an ecosystem for proper regulations and quality assurance.

Since Bangladesh plans to install rooftop solar in government offices using public funds, it could consider regulatory interventions for quality control. Quality assurance is important as many rooftop systems implemented in the country as part of regulatory requirement for grid connection do not generate any energy. They have been rendered stranded assets.

Further, the installation of new rooftop solar capacity of 3,000MW in Bangladesh would require regulations for the selection of EPC companies and guidelines for post-implementation monitoring. Bangladesh can look to India's approach of providing capital subsidies while implementing stringent standards for quality assurance and conducting periodic capacity development events for key stakeholders, such as EPC companies and bankers (see Box 3).

Box 3. India's rooftop solar is a story of consistent policy measures, regulations, standards and capacity development

India's rooftop solar capacity, which exceeded 18 gigawatts (GW) in May 2025, can be attributed to the consistent policy and regulatory support extended by the government.

The subsidy offered under the Grid Connected Rooftop and Small Solar Power Plants Programme (Phase I), covering up to 30% of the benchmark cost, helped the sector's expansion. The scheme further covered up to 70% of the benchmark cost for special category states. Government installations also received incentives of up to 60% of the benchmark cost based on the categories of the states (either general or special).

The recent PM Surya Ghar: Muft Bijli Yojana Scheme supported the installation of more than a million rooftop solar systems in households. The scheme provided a generous capital subsidy of up to Rs78,000 (US$936) per household based on installed capacity.

India has clear policies and regulations that outline consumer eligibility criteria for rooftop solar installation, available incentives and technical requirements.

Periodic capacity development measures on installation, operations and maintenance (O&M), policy, regulations, standardisation and business models for EPCs, and financing models for bankers helped promote rooftop solar in India while ensuring quality. The country has developed a best practice manual for rooftop solar that offers insights into policy, regulations and standards. It also consistently raises awareness among stakeholders, encouraging them to adopt rooftop solar.

4. Bangladesh's Strategy for the New Rooftop Solar Programme

With the adoption of net-metered rooftop solar being slow, the government is contemplating a two-pronged approach to meet its target of 3,000MW rooftop solar by December 2025—deploying solar systems on government offices under the CAPEX model, and on hospitals and educational and religious institutions under the OPEX model.

Under the CAPEX model, the government plans to use public funds to cover the upfront capital expenditure. As government offices fall under the jurisdiction of different ministries, the government has instructed the relevant ministries to allocate a budget for rooftop solar projects.

On the other hand, the government expects EPC companies to invest in projects under the OPEX model.

The government will follow a competitive bidding process for both CAPEX and OPEX projects and has made provisions to bundle small-scale projects to make them attractive.

5. Assessment of Bangladesh's Approach in the Rooftop Solar Programme

This section assesses the pre-feasibility of the new rooftop solar programme and analyses the benefits and challenges of CAPEX and OPEX models for the intended group of buildings.

5.1 Pre-Feasibility of the New Rooftop Solar Programme

Six key parameters—cross-checking the target with potential, timeline, supply chain risks, regulations, roadmap and capacity of key stakeholders—are considered to evaluate the pre-feasibility of the new rooftop solar programme (see Table 1).

Table 1: Assessment of the New Programme

Particulars	Assessment
Target: 3,000MW	The combined sanctioned load of government offices, hospitals, religious and educational institutions is much less than 3,000MW; consequently, their rooftop solar potential is also low under net metering guidelines (see Box 4). As such, government offices, hospitals, religious and educational institutions are unlikely to accommodate a combined rooftop solar capacity of 3,000MW. Moreover, many government offices are old and may not structurally support rooftop solar systems.
Timeline: Achieving the target by December 2025	The timeline appears too tight to install new rooftop solar capacity of 3,000MW between July 2025 and December 2025 due to several reasons: • The country has so far installed rooftop solar capacity of 245MW between June 2008 and June 2025. This means it will have to boost efforts by more than 12x to achieve 3,000MW by December 2025. • The relevant ministries will allocate funds and then float tenders for rooftop solar in government offices under the CAPEX model. Fund allocation, tendering, evaluation of bidding documents, issuing work orders and project implementation will likely require an extension of the December 2025 deadline. Overall, the plan to install new rooftop solar capacity of 3,000MW by December 2025 appears infeasible.
Supply chain risks	Bangladesh relies on imports for rooftop solar components, such as solar panels, inverters, mounting structures, FRP walkways and DC cable. Imports of solar components for 3,000MW may expose the country to supply chain risks, attributed to a sudden rise in demand. Global disruptions led by widespread geopolitical events could intensify supply chain risks.
Regulations	The Sustainable and Renewable Energy Development Authority (SREDA) is yet to finalise regulations for EPC companies and vendors to ensure quality, from design to installation and maintenance. As such, the pressure on government ministries to meet the deadline, i.e., achieving the installation target by December 2025, may result in the selection of low-quality companies, undermining the intended outcome. The absence of a proper monitoring mechanism in the programme may result in poor quality installations.

Roadmap	The lack of a detailed plan under the rooftop solar programme risks hindering the achievement of significant rooftop solar capacity.
Capacity of Stakeholders	Consultations with the sector's key stakeholders show that only 15-20 high-quality EPC companies operate in the country, and they may not have enough capacity to install 3,000MW in less than six months. Although the government has worked on enhancing the capacity of SREDA—the nodal agency for Bangladesh's clean energy promotion—since its inception in May 2014, it needs to boost SREDA's capacity further. SREDA has a role in renewable energy and energy efficiency policy formulation, providing technical assistance for project implementation, and monitoring. It requires additional technical staff to enhance stakeholders' capacity and coordinate project implementation.

Source: IEEFA analysis

Box 4: IEEFA's ballpark estimate shows that the rooftop solar potential in government offices, schools, colleges, madrasahs and hospitals is much less than 3,000MW

Commercial buildings, including public buildings, consumed 11.01% of grid-based electricity in FY2023-24 (see Note 1). Over the same period, hospitals, educational and religious institutions combined consumed 1.17% of grid power.

While data on the power consumption in government offices is not readily available, we have considered it to be approximately 7.5% of the country's grid-based electricity generation (see Note 2). Therefore, the combined power consumption in government offices, hospitals, and educational and religious institutions becomes 8.67%.

Assuming that Bangladesh's highest day peak demand is 15,000MW, the maximum demand in government offices, hospitals, and educational and religious institutions is 1,300.5MW. The combined sanctioned load in these buildings may reach 2,000MW, considering future demands.

The net-metering guidelines are undergoing a revision to raise the installed capacity of rooftop solar to 100% of the sanctioned load from the current 70%. If the revised net metering guidelines are approved, the maximum installed capacity in government offices, hospitals, and educational and religious institutions will still fall significantly short of the 3,000MW target.

Note: 1. In the electricity consumption data, public buildings are grouped in the commercial category due to their billing structure. 2. Since electricity for electric vehicle charging, street lighting and irrigation is generally not required during daytime, the electricity consumption in commercial buildings is estimated to be 15% for daytime (electricity consumption for charging, street lighting and irrigation is roughly 4%). As only government offices are included in the new rooftop solar programme, 7.5% is estimated to be the approximate power consumption. 3. The country's highest peak demand occurs in the evening. However, as government offices and educational institutions do not operate in the evening, the day peak demand is considered. 4. A very high sanctioned load is unlikely, as an additional charge per kW is applicable.

5.2 Suitability of CAPEX and OPEX Models

Bangladesh's new rooftop solar programme will likely adopt the CAPEX model for government offices, while expecting EPC companies to invest in hospitals, educational and religious institutions. This section illustrates the pros and cons of CAPEX and OPEX models in the new rooftop solar programme (see Table 2).

Table 2: Comparison of CAPEX and OPEX Models

Model	Pros	Cons
CAPEX model for rooftop solar in government offices	**Quick implementation of projects:** If relevant ministries allocate funds on time, project developers can install rooftop solar quickly in government offices. **Monthly cost savings:** Compared to OPEX, savings are higher under the CAPEX model. **Payback:** As public funds will cover the capital cost, the government office management will not have to worry about payback.	**Interministerial coordination:** As government offices come under the jurisdictions of different ministries, a lack of coordination may delay the release of the budget, affecting the project implementation timeline. **O&M:** The absence of an O&M contract may reduce rooftop solar systems' yield significantly (see Box 5). Without the O&M contract, even a minor problem will take time to fix, causing energy generation losses. **Project awards to low-quality developers:** As the target is to install 3,000MW rooftop solar capacity in less than six months, the pressure may result in the hasty selection of project developers, compromising quality to meet the deadline.
OPEX model for rooftop solar in hospitals, educational and religious institutions	**Quality assurance:** As EPC companies will invest and recover from operation, they will ensure the quality of rooftop solar installations. **O&M:** EPC companies will maintain rooftop solar systems.	**Monthly cost savings:** Less savings for facility owners or management under the OPEX model as EPC companies recover their investment and profit from revenue. **Financing challenges:** Borrowing at commercial rates will limit profits and affect viability, especially in the case of small projects. **Bundling of small projects:** If bundled projects are small-scale and scattered, for example, in rural areas, they may fail to attract companies to invest in the OPEX model. **Delay in implementation:** We learnt from our discussion with experts that Bangladesh currently does not have more than 10-15 high-quality EPC companies. This may delay project implementation. **Impact of load-shedding on projects in rural areas:** As load-shedding is more frequent in rural areas, concerns arise over the generation and recording of solar power generation during load-shedding hours.

		A rooftop solar system under net-metering generates power and feeds it to the grid. However, during load-shedding, it cannot transport electricity to the grid. It cannot store energy without a storage system. EPC companies will, therefore, need to factor in additional risks before deciding on participating in the tenders for OPEX projects.

Box 5: Solar Energy Loss Due to Soiling

The soiling of solar systems refers to the deposit of dust particles and snow on modules. The adhesion of dust particles on solar modules can result in the loss of energy yield if they are not cleaned.

A study by the International Energy Agency (IEA) highlights that global solar projects registered 3-4% of loss in energy production in 2018 due to soiling (Note: While IEA's study extensively covers utility-scale projects with limited focus on rooftop systems, it acknowledges that many of the same principles that apply to utility-scale installations are applicable at other scales). IEA projects that this loss might have reached 4-5% in 2023.

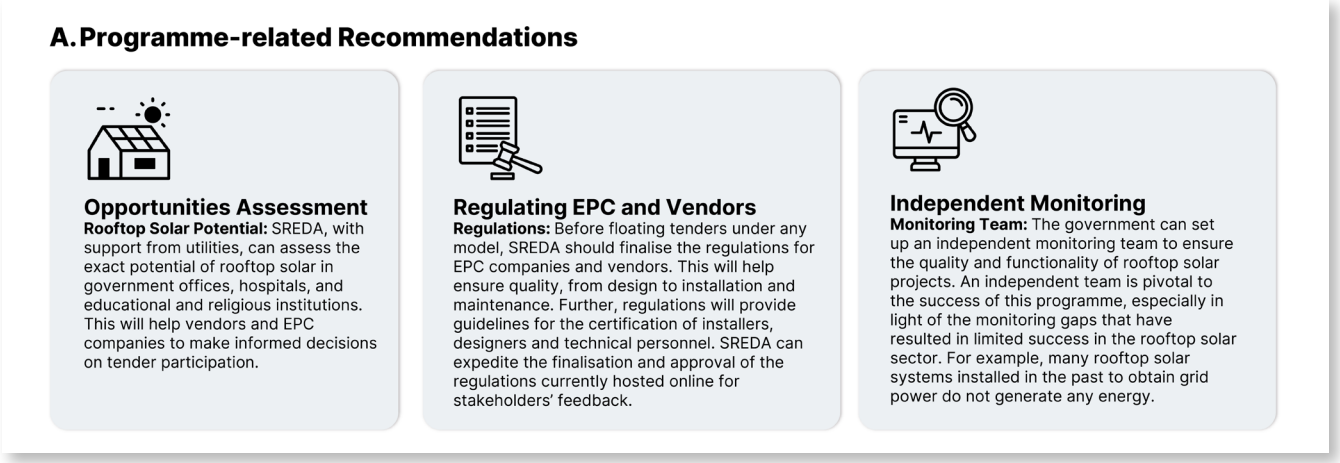
During our consultations, several Bangladeshi EPC companies corroborated this finding, noting that solar energy loss is more severe in the country due to soiling.

6. The Way Forward

The Bangladesh government's new rooftop solar programme is a positive step towards advancing the country's energy transition. However, the programme faces several uncertainties, such as ascertaining the rooftop solar potential of designated buildings, maintenance challenges under the CAPEX model, and recording of solar energy generation during load-shedding that government agencies must strive to address. Otherwise, due to insufficient information or perceived risks, developers may express only modest interest in government tenders for rooftop solar projects.

This briefing note proposes three levels of recommendations to help prepare the country for implementing an ambitious rooftop solar plan, backed by both public and private capital (see Figure 2).

Figure 2: Recommendations to Streamline Bangladesh's Rooftop Solar Programme



At the programme level, SREDA, supported by other utilities, can assess and document the rooftop solar potential in government offices, hospitals, educational and religious institutions, based on the sanctioned load. It should finalise regulations for EPC companies and vendors for quality assurance. As the country's rooftop solar sector is still at a nascent stage, the capacity development of key stakeholders and government agencies is important for the new programme's success. Besides, the government should establish an independent monitoring mechanism to ensure that projects operate smoothly. Further, the government should consider providing a full duty waiver for imported rooftop solar components to boost the country's renewable energy sector.

A suitable plan should be devised for the CAPEX model in government offices to ensure interministerial coordination for the timely release of funds. To avoid disruptions in solar energy yield, periodic maintenance is essential in the CAPEX model. By creating a fund from monthly cost savings, government offices can enter long-term maintenance contracts with EPC companies for their rooftop solar systems' optimal performance.

OPEX projects in hospitals, educational and religious institutions in rural areas are likely to face challenges as these areas are exposed to more load-shedding, and the net metering systems

cannot transport electricity to the grid during load-shedding hours. The utilities should supply uninterrupted power to areas with rooftop solar projects under net-metering, without which EPC companies will need to factor in additional risks before investing in the OPEX model in rural areas. For small-scale and scattered projects under the OPEX model, the government can assess the rationality of viability gap funding. Further, as EPC companies will require a greater volume of debt finance, the central bank can allow them to access its low-cost green funds, enhancing the viability of OPEX projects.

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