

Consultation Meeting on performance-based PPP solar tender for WASH Utilities

By Center for Water and Sanitation (CWAS), CRDF, CEPT University in partnership with Majhi Vasundhara Abhiyan, Department of Environment and Climate Change, Mumbai

October 2024



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**Center for Water and Sanitation (CWAS)-CRDF-CEPT
University
Majhi Vasundhara Abhiyan Office, Mumbai**

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Abbreviations

| | |
|-----------|---|
| COP | Conference of the Parties |
| CRDF | Center for research and Development |
| CWAS | Center for Water and Sanitation |
| FSTP | Faecal Sludge Treatment Plant |
| GW | Giga Watt |
| MAHAPREIT | Mahatma Phule Renewable Energy and Infrastructure Technology Ltd. |
| MEDA | Maharashtra Energy Development Agency |
| MSEB | Maharashtra State Electricity Board |
| MSEDCL | Maharashtra State Electricity Distribution Company Limited |
| MSME | Micro, Small and Medium Enterprises |
| MW | Mega Watt |
| O&M | Operations and Maintenance |
| PPP | Public Private Partnership |
| RESCO | Renewable Energy Service Company |
| ROI | Return on Investments |
| STP | Sewage Treatment Plant |
| SWM | Solid Waste Management |
| WASH | Water Sanitation and Hygiene |
| WTP | Water Treatment Plant |

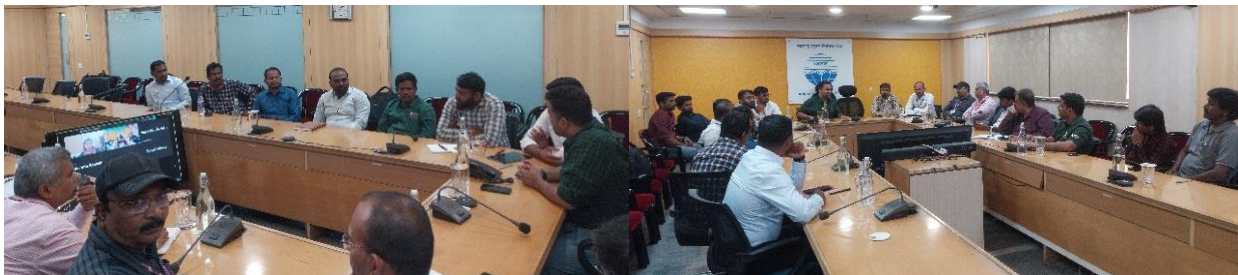
Background

India has achieved its COP28 pledge of meeting 50% of its energy needs from renewables prior to 2030 target. As of July 31, 2024, Maharashtra is 5th in the country with over 7.15 GW of installed solar energy capacity, according to the Ministry of New & Renewable Energy's state-wise report.

Central and state solar policies have driven growth in the solar energy sector by attracting private investment in projects, manufacturing, research, and infrastructure, fostering economic development. Maharashtra's Integrated Non-Conventional Energy Generation Policy 2020 focuses on household electrification and solar pumps for agriculture. Majhi Vasundhara Abhiyan a competition-based initiative to involve the citizens in adopting sustainable lifestyle is encouraging the local bodies in adopting solar for public and private buildings. With recent completion of Abhiyan's 4th cycle, total solar installations reported to be 2.5 MW, generating 11,000 MWh of electricity and reducing carbon emissions by 3.8 million tons. Establishment of the State Climate Action Cell and expansion of Just Transition initiatives, many cities are now developing their climate action plans focused on reducing emissions, particularly in the energy sector. The state is encouraging investments in solar based water supply and wastewater systems. Therefore, a need to explore this mechanism by the urban local bodies was identified to not only transition towards clean energy, but also to reduce their electricity cost.

Integrating Public-Private Partnerships (PPP) in solar operations offers a valuable opportunity to boost renewable energy adoption and can leverage expertise and resources to create a more resilient energy infrastructure. In this regards, Center for Water and Sanitation (CWAS) in partnership with Majhi Vasundhara Abhiyan under Department of Environment and Climate Change, Government of Maharashtra organized a consultation meeting on 10th October 2024 in Mumbai.

The primary aim of this consultation meeting was to review and gather feedback on a model tender document developed for performance-based Public-Private Partnership (PPP) solar projects specifically designed for Water, Sanitation, and Hygiene (WASH) infrastructure for public services. The key participants included private solar operators, urban local body representatives and government officials. Their collective expertise and insights helped identify critical areas that needed attention in the tender document, ranging from technical specifications and performance metrics to financial arrangements and risk-sharing mechanisms.



Introductory Session

Mr. Sudhakar Bobade, Mission Director of Majhi Vasundhara Abhiyan, set the meeting's context by highlighting CWAS's support in transitioning Vita, Karad, and Ichalkaranji's urban services to solar power and praised the PPP-based solar initiative for WASH infrastructure. Prof. Dinesh Mehta, CWAS Center Head, concluded the introductions by thanking everyone for attending on short notice and sharing his experience of installing solar at home, highlighting its environmental benefits and economic savings. Mr. Aasim Mansuri and Mr. Dhruv Bhavsar, Program Leads from CWAS moderated the consultation meeting. Engineers and city coordinators were primarily from Pune, Nashik, and Konkan divisions, including managing directors of solar agencies experienced in industrial solar installations and collaborations with urban local bodies. The General Manager of RESCO projects from MahaPREIT, involved in a solar project for 6,000 MSMEs across Maharashtra, joined virtually.

Presentation on key features of PPP solar contract

Mr. Aasim Mansuri highlighted the idea of this consultation meeting was to bring both the private operators and local government on same platform to get collective feedback on a tender document prepared by the CWAS team for adopting solar power for WASH utilities. Currently cities are facing challenge in repaying the huge electricity costs from regular operations of treatment facilities like Water Treatment Plant/ Sewage Treatment Plant/ Faecal Sludge Treatment Plant/ Solid Waste Management sites. Therefore, transitioning of such large infrastructure facilities on solar power would help in reducing the electricity costs as well as impact positively on the environment. Onboarding a private agency for solar project can bridge the gaps of financing.

CWAS team highlighted the increase in electricity consumption pattern of Maharashtra and potential of solar to meet the energy demands. As well as showcased WASH sector as a key player to bring energy transition through renewable energy having a potential of 2015MW solar installations across 428 cities. Taking the example of Ichalkaranji, regular operations of STP led to higher electricity cost. But due to unavailability of land to set up solar plant, the panels were installed on nearby SWM shed and gradually 20% reduction in electricity bills was noted. State level initiatives through Maharashtra Energy Development Agency (MEDA), Mahaurja and Majhi Vasundhara Abhiyan to increase renewable energy installations was shared.

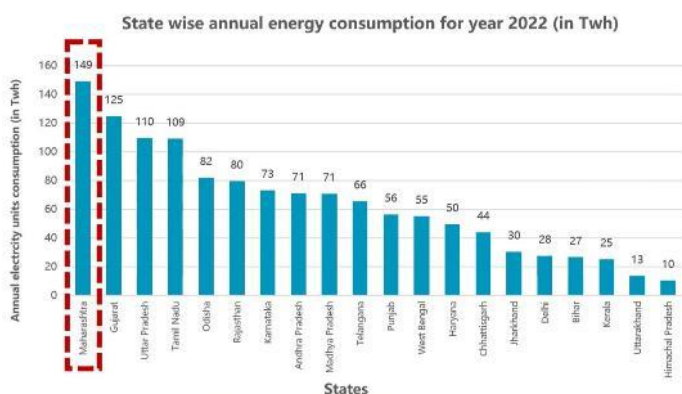


Figure 2 Annual Energy Consumption State wise

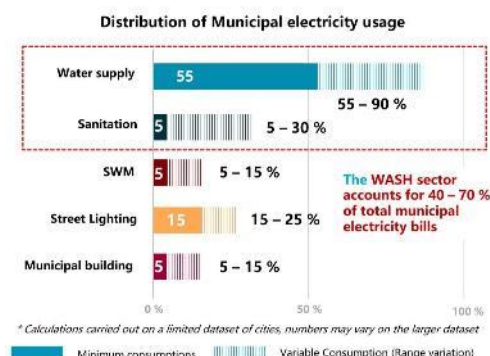


Figure 1 Distribution of Electricity Usage in Urban services

Further the schematic flow diagram of PPP model for a solar project was presented which is adapted from RESCO model. In this case, upfront capital cost as well as O&M cost would be provided by the private agency. A contract would be done with the local body, where capacity of the solar plant will be suggested by them and private operator would plan, design, install and maintain the solar plant for the said duration of 10/15/25 years. Energy generated per day shall be used in operations of WASH utilities. Local body shall pay the vendor based on the performance of solar power plant i.e. power units generated as per panel capacity.

Escrow mechanism will be implemented where a tri party agreement is done between the local body, bank and private agency. Two-month payments amount needs to be maintained by the local body in the bank and payment is done to the private agency based on the solar power units generated. Payment shall be done on the agreed rate fixed for the tenure and post completion of the tenure, the solar plant should be handed over to the local body and all the benefits can be thus relished.

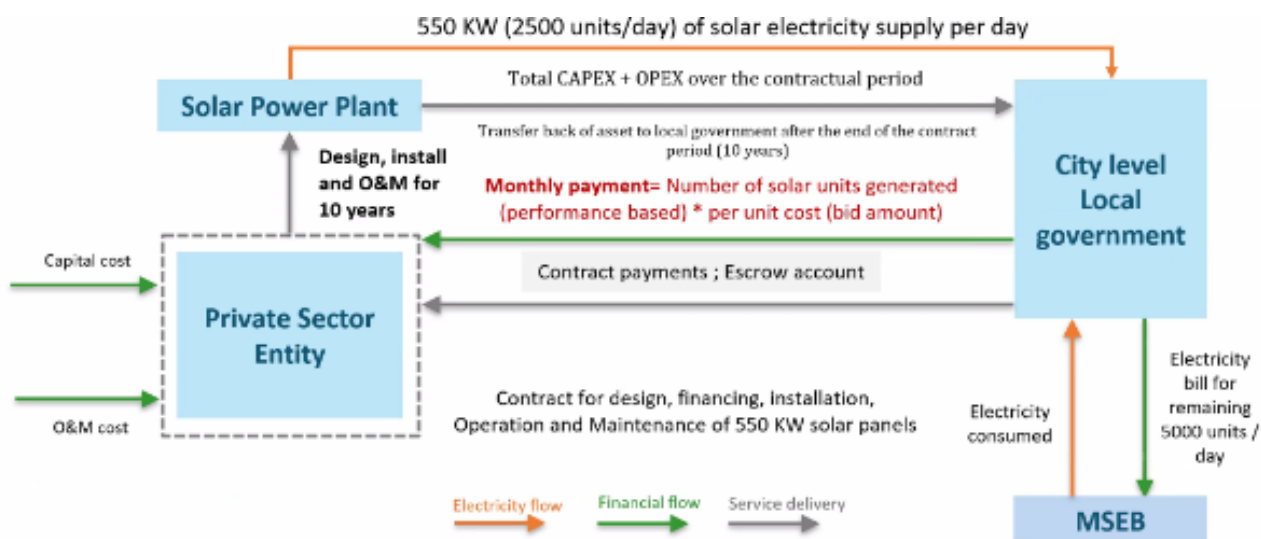


Figure 3 RESCO model Diagram

| Player | Aspect | Risk | Mitigation clauses |
|------------|----------------------|--|--|
| Private | Financial | Delayed Payments | Setting up of escrow account and signing of letter of credit for ensuring the timely payment to the private player |
| | Contract Termination | Payment delay by exceeding 6 months from ULB side | 30 days period notice will be provided to ULB during the timespan, the ULB must arrange the funding and if payment is not paid within 30 days of notice, the private player can terminate the contract with claiming the deposit |
| Government | Financial | Performance based payment | Online performance monitoring system and payment based on energy usage |
| | Technical | Warranty and guarantee and transfer of assets with all approvals | The private player is responsible for replacement of the uni within the contract period based as per the mentioned timeframe and private player will be responsible for ensuring all permissions related to the system operation |
| | Operational | Operational and maintenance risk | The private player will carry out O & M of asset for 10 years and then handover the asset to ULB with proper O & M training |

Figure 4 Risks and Mitigation aspects

The financial comparison scenario of different options based on business as usual, upfront capital from urban local body and PPP based model, was presented. The session was summarized highlighting added benefits of PPP like increase in generation of green jobs, accessibility to new technologies, private agencies can take risk of deploying printed solar to reduce waste generated from solar panels and utilization of unused sites.

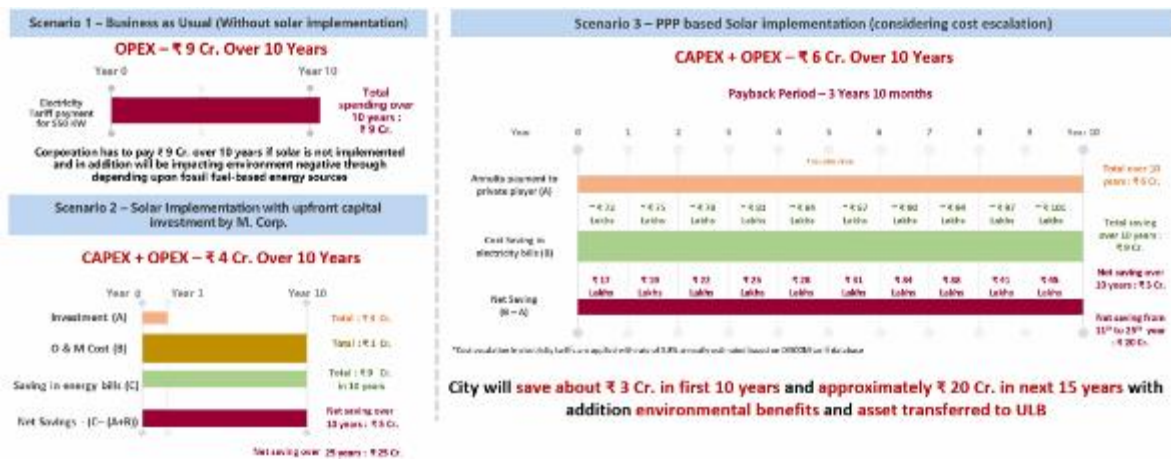


Figure 5 Comparison of BAU and PPP models

Key points from the discussion

Infrastructure planning for Solar Plant

Energy efficiency emerged as a critical first step in the solar transition process. Participants strongly recommended conducting energy audits and implementing energy-efficient equipments, particularly pumps, before investing in solar power plants. This sequential approach ensures that solar installations are properly sized based on optimized energy consumption patterns, preventing oversizing that could lead to excess generation and financial losses for private sector partners. The discussion also explored various installation options, including rooftop and floating solar systems. While rooftop installations are low-cost options, floating solar on water bodies emerged as a viable alternative for space-constrained facilities. Though floating solar systems involve higher capital costs, they offer additional benefits such as reduced water evaporation from the water bodies. The group emphasized the importance of on-site generation, with its advantages in reducing transmission losses and eliminating land acquisition costs.

Performance monitoring

Performance monitoring and accountability measures were extensively discussed. Under this model, private providers would be required to guarantee a minimum daily electricity supply. Participants recommended installing net meters to accurately track generation and consumption patterns. The group also emphasized the need for minimum solar generation requirements with associated penalties for underperformance.

Payment mechanisms

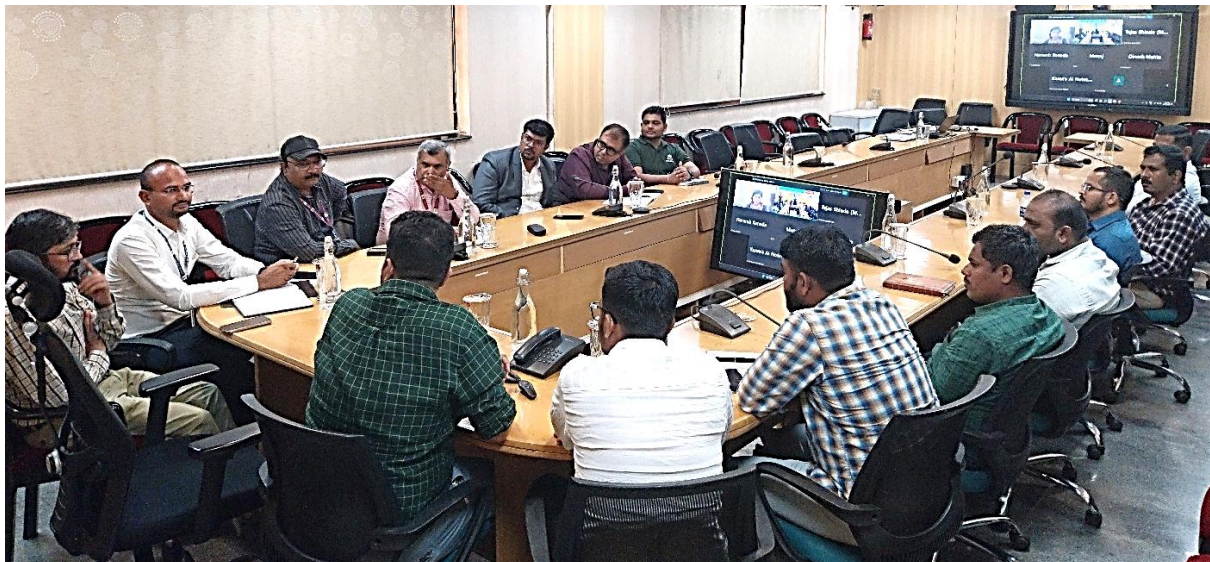
To protect private operators' interests, provisions for minimum payment guarantees were suggested for scenarios where water treatment plants or sewage treatment plants might be temporarily closed for maintenance. A critical concern raised during the consultation was the risk of late payments from Urban Local Bodies (ULBs) to private operators in solar PPP projects. Given the significant upfront capital investment required for solar installations and the long-term nature of these contracts, payment delays can severely impact project viability and operator sustainability. To address this challenge, CWAS explained provision of escrow account with minimum 3 months payment reserve in it and two-part payment in the contract. In two-part payment clause, a) one is fixed part- which is released as soon as bills are submitted by private operators and b) other is variable/ performance based- which is released only after reviewing the actual performance of private operators as per target specified. This will help private operator to get part payment on time so that they can have some working capital to continue operations. This will safeguard interest of both local governments and private operators.

Contract clauses

Equipment lifecycle management was identified as another critical risk area. One of the vendors highlighted the warranty period of inverter is 7 years as compared to 25 years for solar panels therefore, replacement reserve should be considered in the contract. Concerns regarding contract length, lock in period and impact of change in political scenario were also addressed. Contract duration recommendations ranged from 10-15 years, with a maximum cap of 25 years, balancing the need for long-term stability with practical considerations. Vendor qualification requirements generated significant discussion. Given the long-term nature of these contracts and the critical nature of water and sanitation services, participants emphasized the importance of engaging established companies with proven track records rather than startups. Specific experience requirements were recommended to be included in the tender documents.

Risk Management

Several risk factors were identified and addressed during the discussion. Grid reliability emerged as a significant concern, as power grid outages could prevent the utilization of generated solar power. The installation of net meters was proposed as a mitigation measure to accurately account for generation during such periods. One of the vendors presented risk regarding the O&M of small-scale plants as technology involves high investments. Training and engaging the Self-Help Groups can help in reducing the O&M costs for the local bodies. The group addressed crucial clauses, particularly regarding early contract termination scenarios. For situations where contracts might need to be terminated before reaching the breakeven point (typically within the first five years), participants recommended using depreciation rates defined by India's Income Tax Department to calculate fair compensation for the private player's capital investments.



Way forward

The consultation meeting on solar PPP for urban services effectively facilitated dialogue between local bodies and private enterprises already operating or interested in the solar energy sector. The proposed PPP model garnered interest from both sides and their willingness for partnership. Officials from the local bodies mentioned about low returns on investment when selling excess power to MSEB. Also, as the private agencies would have a fixed cost for purchase throughout the tenure, yearly rate fluctuations from regulating body will have no impact and a good ROI would be achieved. Therefore, local bodies are ready to explore this partnership. Also, the model ensures continuous energy access and reduction in air pollution at a larger scale.

Solar vendors appreciated this opportunity given to be a part of consultation team for developing a model tender document and associated with the environment department. Risks related to payment terms was a major concern for them and understanding the challenges of local bodies provided a better perspective for further collaborations.

CWAS team informed incorporating suggestions from consultation workshop in the revised contract document for further review. The workshop concluded by thanking all the participants for their enthusiastic participation and valuable suggestions.



Agenda and List of participants

| Time | Agenda |
|---------------|---|
| 14:00 – 14:30 | Welcome, Introductions and Context setting |
| 14:30 – 15:00 | Presentation by CWAS team on solar installations at WASH utilities and PPP based model tender document |
| 15:00 – 16:15 | Discussion on risks and mitigations measures <ul style="list-style-type: none"> • Risks as perceived by private operator and ULB while doing a solar project. • Identification of various mitigative measures for perceived risks • Outline of key terms and conditions, including investment commitments, revenue • e-sharing mechanisms, and performance indicators. • Contract form formats and special conditions |
| 16:15 – 16:30 | Concluding and closing remarks |

| S.No | Participant Name | Designation | Organization |
|------|-----------------------|--------------------------|---|
| 1 | Mr. Sudhakar Bobade | Director | Majhi Vasundhara, DoECC |
| 2 | Mr. Girish Panjwani | Managing Director | Greenlance Energy |
| 3 | Mr. Prem Nayak | Regional Finance Manager | TATA Power |
| 4 | Mr. Harshit Shinde | | TATA Power |
| 5 | Mr. Vikram Shinde | Manager | Rainbow Energy |
| 6 | Ms. Manoj Patil | Managing Director | Deccan Rays Solar and Energy Projects LLP |
| 7 | Mr. Heram Ranade | Managing Director | Skybless Pvt Ltd |
| 8 | Mr. Pramod Unde | Ex. Engineer | Pune Municipal Corporation |
| 9 | Mr. Aslam Sheikh | City Coordinator | Pune Municipal Corporation |
| 10 | Mr. Sagar Zaware | Nodal Officer, MVA | Shirdi Municipal Council |
| 11 | Mr. Manoj Gawadi | City Coordinator | Akluj Municipal Council |
| 12 | Mr. Harshvardhan Mane | City Coordinator | Mohol Municipal Council |
| 13 | Mr. Dhananjay Shelke | Electrical Engineer | Akkalkot Municipal Council |
| 14 | Mr. Somnath Mali | Electrical Engineer | Vita Municipal Council |
| 15 | Mr. Abhay Shirolkar | WS Engineer | Ichalkaranji Municipal Corporation |
| 16 | Mr. Sardesh Naik | WS Engineer | Dahiwadi Municipal Council |
| 17 | Mr. A. A. Ghodaye | City Coordinator | Pandharpur Municipal Council |
| 18 | Mr. Avinash Kandre | City Coordinator | Maindargi Municipal Council |
| 19 | Mr. Mahesh Gharate | City Coordinator | Panchgani Municipal Council |
| 20 | Prof. Dinesh Mehta | Center Head | Center for Water and Sanitation |
| 21 | Mr. Aasim Mansuri | Sr. Program Lead | |
| 22 | Mr. Dhruv Bhavsar | Sr. Program Lead | |
| 23 | Ms. Upasana Yadav | Program Lead | |
| 24 | Ms. Apoorva Bhate | Research Associate | |
| 25 | Mr. Karan Patil | Research Associate | |



CENTER FOR WATER AND SANITATION

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at the CEPT University in Ahmedabad, India. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them for delivery of water and sanitation services in an efficient, effective and equitable manner.