

Kerala Sets a Precedent in Smart Meter Implementation for India

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The Kerala State Electricity Board Ltd. (KSEB Ltd.) initially pursued the implementation of its smart meter project under the TOTEX model, ostensibly adhering to central government directives under the RDSS scheme. However, this was more than just a straightforward compliance with policy. The KSEB Ltd. management, led by a CMD who was an IAS officer, displayed a tendency to align with central policies, frequently clashing with the pro-people stances of the Left Front government in Kerala. This alignment sparked concerns about a hidden agenda aimed at facilitating privatization by outsourcing metering and revenue functions, thus separating content and carriage in electricity distribution. Recognizing these implications, the Electricity Employees' Federation of India (EEFI) opposed the move, highlighting the risks associated with outsourcing these critical functions. EEFI mobilized public support, engaged with the Kerala government, proposed an alternate model, and pressed the demand through agitations. These struggles have now yielded positive results.

With the opening of the tender for smart meters based on the alternative model on January 17, 2025, Kerala has drawn national attention. Despite installing only a limited number of smart meters, Kerala has emerged as a model by implementing the project at a significantly lower cost than what was tendered for a vastly larger number of smart meters under the TOTEX model. In line with its innovative approaches in various domains, Kerala's alternative strategy for smart meters has set a national example, bringing pride to the EEFI, which spearheaded these efforts.

Protests Surrounding Smart Meters

As part of the RDSS plan, the Ministry of Power approved, during the fifth MCM meeting, the implementation of smart metering for system meters used by KSEB Ltd., which services approximately 1.37 crore consumers. The plan also included prepaid smart metering for consumer meters, with an estimated project cost of ₹8,175 crores. Initially, the plan was to install smart meters for 3.7 million consumers in the first phase, with subsequent phases covering the remaining consumers. The Ministry of Power calculated the life cycle cost for consumer meters over 93 months to be ₹6,000. If implemented under the TOTEX model, the smart metering project would have received a subsidy of ₹1,226.26 crores from the central government, with the remaining costs to be covered by the AMI Service Provider (AMISP) who won the tender, to be repaid by the utility in monthly installments.

Significant protests arose within KSEB Ltd. against implementing the smart meter project on a TOTEX model. Key objections were:

- The TOTEX model is unacceptable because it completely outsources KSEB Ltd.'s billing and metering systems. It's crucial to maintain the self-reliance achieved in these areas over the years.
- Implementing the project under the TOTEX model would impose additional burdens on consumers and KSEB Ltd. Instead, the project should be implemented at a lower cost.
- More funds should be allocated to network development under the RDSS plan, which receives a 60% grant, compared to only a 15% grant for the smart meter project.
- There is no immediate need to replace functioning existing meters with new smart ones; the project should be implemented gradually rather than all at once under a TOTEX model.

- KSEB Ltd. is capable of handling the project independently without the need for a Project Implementation Agency (PIA).
- The potential use of smart meter technology developed by C-DAC should be explored.
- The possibility of utilizing the available optical fiber network through K-FON should be assessed.
- KSEB Ltd. should undertake installation and related tasks to reduce costs.

Despite these protests, misinformation was circulated by proponents of the TOTEX model, claiming that KSEB Ltd. was opposed to smart meter technology. Ignoring the protests, KSEB Ltd. proceeded with tendering the project on a TOTEX basis.

Under the RDSS plan, the tender for installing 3.7 million smart meters was issued on April 1, 2023, covering system meters, government institution meters, high-tension consumer meters, and meters in 14 high-revenue divisions, with a tender value of ₹2400 crores on a TOTEX basis. According to RDSS, the grant constituted 15% of the PAC (approximately ₹360 crores). When the tender opened on May 15, 2023, with three bidders, the lowest bid (from Polaris Smart Metering Private Limited) exceeded the PAC by 44.8%, totaling ₹3475 crores. Consequently, KSEB Ltd. would have had to pay the installing company ₹79.59 per month for single-phase meters, and ₹104.09/₹283 per month for three-phase/CT meters, respectively, becoming a financial burden for consumers. For transformer feeder meters, monthly payments of ₹283/₹288.20 would be necessary. Despite the 15% grant, KSEB Ltd. would have faced costs 30% higher than the PAC.

Lifecycle Cost under TOTEX Tender and Monthly Payments per Meter

Meter Category	Lifecycle Cost (₹)		Monthly Payment per Meter (₹) for 93 months	
	Without Grant	After Grant Reduction	Without Grant	After Grant Reduction (including GST)
Single phase Smart Meter	8302.11	7401.87	89.27	79.59
Three Phase Smart Meter	10580.61	9680.37	113.77	104.09
Three phase LT-CT operated Smart Meter, -/5A Accuracy class 0.5S	27219.24	26319	292.68	283
Three phase CT/PT operated Smart Meter -/5A /1A – HT Consumer Meter	27571.71	26671.47	296.47	286.79
3 phase LT-CT operated Smart Meter, -/5A – DT Meter	29769.3	26319	320.1	283
Three phase operated CT/PT Smart Meter, -/5A /1A – Feeder/Boundary Meter	33102.42	26802.6	355.94	288.2

Intervention by Kerala Government

As previously mentioned, the Electricity Employees' Federation of India (EEFI) was already engaged in agitation against the TOTEX model of smart meter implementation due to its perceived hidden agenda of privatizing distribution, separating content and carriage, and directly outsourcing KSEB Ltd.'s Revenue wing. Despite these concerns, the management continued with the tendering process. When the costs became apparent, strong protests emerged against the additional financial burdens the TOTEX model would place on consumers. This led to numerous discussions at both the officer and ministerial levels.

EEFI proposed an alternative model for implementing smart meters on a CAPEX model, which involved utilizing KSEB staff for installation and the K-FON network for connectivity, thereby reducing the overall implementation costs. On August 25, 2023, a high-level meeting was convened under the leadership of the Honorable Chief Minister and the Energy Minister. The alternative suggestion proposed by EEFI received approval from the Chief Minister. The following decisions were made to implement the smart meter project gradually and cost-effectively, without imposing significant burdens on the populace:

1. Develop an alternative model to the TOTEX approach for smart meter installation and secure central government approval for it.
2. Initially install 300,000 meters for commercial and industrial consumers.
3. Have KSEB Ltd. develop its own billing-related services.
4. Utilize K-FON facilities for communication.
5. Use the KSEB Ltd. data center for information storage.
6. Deploy KSEB Ltd. employees for the installation of new smart meters.

Alternative Model

An IT advisory committee, comprising technical experts from prominent institutions, was established to develop an alternative model as directed by the Honorable Chief Minister. Following discussions at various levels, and as per the Chief Minister's directions, an alternative model for implementing the first phase of the smart meter project based on a CAPEX approach was prepared. Under this model, the first phase of the smart meter project would be implemented using KSEB Ltd funds on a CAPEX basis for feeder/border meters, distribution transformer meters, government consumers, and HT consumers, totaling 300,000 smart meters. The Ministry of Energy approved implementing the project on a CAPEX basis.

It was decided to tender the first phase of the project in two packages. Package-1 included smart meters, communication networks, and Head End System (HES) software, while Package-2 included Meter Data Management (MDMS) software and integration work with various software. On May 23, 2024, during a full board meeting, administrative sanction for ₹277 crores was approved for installing smart meters under the alternative model, including costs for upgrading the data center, with a 60% grant under the RDSS plan.

The PAC was set at ₹211 crores for Package-1 and ₹10 crores for Package-2 prior to tendering. The technical bid for Package-1 was opened on October 24, 2024, and for Package-2 on November 15, 2024, with six bidders participating in each package. Subsequently, testing of all categories of smart meters and evaluation of technical demonstrations for integration between meters and HES software

were conducted at Thirumala TMR. Instead of using expensive proprietary software available in the market, the SMITHA (Smart Meter Integrated Testing and Higher Analysis) software, jointly developed by CDAC and CPRI, was used for testing communication protocols. For the first time in India, a power utility employed this cost-effective alternative model using the SMITHA tool. The financial bids for both packages were opened on January 17, 2025.

In the tender for Package-1, the lowest bid of ₹160.9 crores was submitted by Iskraemeco India Private Limited, which was 23.74% below the PAC. In the tender for Package-2, the lowest bid of ₹4.45 crores was submitted by Easiasoft Technologies Private Limited, which was 55.5% below the PAC. This dispelled the speculation from those who claimed there would be significant losses if tendered outside the TOTEX model.

Comparison

Although the TOTEX model tendered 3.7 million meters, the alternative model tendered only 300,000 meters. Previously, more than 3 million single-phase meters were included under the TOTEX model, whereas the current tender under the alternative model included only 150,000 single-phase meters. Despite this smaller scale, the cost per meter comparison reveals the significant financial burden imposed by the TOTEX model. The TOTEX model priced single-phase meters 33% higher than the alternative model, and the cost for LT CT meters was 151% higher under the TOTEX model. Even after accounting for KSEB Ltd's responsibilities for meter installation and data storage, this stark price difference persisted, which included the financial charges levied by meter installation companies under the TOTEX model. Every AMISP (Advanced Metering Infrastructure Service Provider) was making exorbitant profits. A table detailing the price differences across all meter categories is provided separately. While the central government advocated for the TOTEX model to benefit corporations, it's hoped that time will pardon those who attempted to mislead our institution with their propaganda.

Comparison of Tendered Meters under Alternative Model and TOTEX Model

Number	Meter Category	Quantity	Monthly Cost per Meter for 93 Months, including Installation and Data Storage	Monthly Cost per Meter under TOTEX Model (₹) 93 months	Percentage Increase in TOTEX Model Compared to Alternative Model
1	1 phase whole current Smart Meter (with Net-Metering) LT Meter: 5 – 30 A with polycarbonate weatherproof outdoor type meter cover box. Inclusion Holding clamps/channels for mounting and other allied accessories like nut, bolt, washer, etc., for installation of the meter cover box.	150,000	59.98	79.59	32.69
2	3 phase whole current Smart Meter (with Net-Metering) LT Meter: 10 – 60 A with polycarbonate weatherproof outdoor type meter cover box. Inclusion Holding	35,000	73.34	104.09	41.94

Number	Meter Category	Quantity	Monthly Cost per Meter for 93 Months, including Installation and Storage Data	Monthly Cost per Meter under TOTEX Model (₹) 93 months	Percentage Increase in TOTEX Model Compared to Alternative Model
	clamps/channels for mounting and other allied accessories like nut, bolt, washer, etc., for installation of the meter cover box.				
3	3 phase whole current Smart Meter (with Net-Metering) LT Meter: 10 / 20 – 100 A with polycarbonate/SMC weatherproof outdoor type meter cover box. Inclusion Holding clamps/channels for mounting and other allied accessories like nut, bolt, washer, etc., for installation of the meter cover box.	2,000	73.34	104.09	41.94
4	3 phase LT-CT operated Smart Meter (with Net-Metering) -/5A, Accuracy class 0.5S, LT Meter with CTs, control cables, etc.	1,100	112.54	283	151.46
5	3 phase CT/PT operated Smart Meter (with Net-Metering) – HT Meter --/5A of Accuracy class 0.2S with control cables (Exl. DI)	7,630	210.24	286.79	36.41
6	3 phase LT-CT operated Smart Meter – DT Meter(with Net-Metering) -/5A, Accuracy class 0.5S, CTs, control cables, etc. (Exl. DI)	91,760	116.98	283	141.92
7	3 phase CT/PT operated Smart Meter – Feeder Meter -/5A of Accuracy class 0.5S, control cables, etc. (Exl. DI)	3,000	130.31	288.2	121.17
8	3 phase CT/PT operated Smart Meter – Boundary Meter with net metering -/5A of Accuracy class 0.5S with Net metering, control cables, etc. (Exl. DI)	1,200	130.31	288.2	121.17

Future Projects

As we move forward, it will be necessary to gradually install smart meters for other consumer segments. The primary focus will be on integrating the Meter Data Management System (MDMS) with our IT applications. Changing the MDMS software at each stage is impractical, so we have already secured rates for MDMS that will cover up to 5 million consumers. This means that for future phases, there will be no need to issue tenders for Package-2.

Moreover, CDAC has developed a Head End System (HES) software called SEEMA (Smart Electrical Energy Measurement and Analysis), which is currently in pilot testing. CDAC is offering this software at no cost, though KSEB Ltd will be responsible for its ongoing updates. We anticipate utilizing this HES software in the future.

Given these developments, future tenders will be limited to procuring smart meters, with KSEB Ltd handling all other aspects internally. This alternative model, which promotes KSEB Ltd's self-sufficiency, is preferable to the TOTEX model that would leave metering and billing entirely under corporate control. Implementing the smart meter project in this way will significantly reduce costs. Our efforts have demonstrated that technology can be implemented cost-effectively while protecting the institution's interests. Time has validated the concerns we raised during our protests. With the full support of our employees and officers, we are committed to implementing the smart meter project on schedule.

Conclusion

During the period when the Electricity Employees' Federation of India (EEFI) was actively opposing the TOTEX model of smart metering, some critics claimed that EEFI stood against modern technology and progress within the power sector. However, this perception was misguided. Our opposition was never about resisting technological advancement; rather, it was a principled stand against the management's questionable motives and the covert agenda of privatizing the sector.

Technologies such as smart meters are undeniably essential for modernizing the power infrastructure. However, the implementation of these technologies must be thoughtful and strategic, especially when the existing network infrastructure does not yet guarantee a 24x7 power supply. In this context, making meters smart without ensuring reliable power delivery does not address the core issues.

We maintain that smart meter implementation should proceed gradually and with careful consideration during pilot phases. The adoption of an alternative model by KSEB Ltd, which focuses on sustainable and self-reliant practices, exemplifies a positive and strategic approach to modernization. This model not only safeguards the interests of KSEB Ltd but also minimizes unnecessary costs, ensuring that technology adoption aligns with the overall capability and needs of the network.

In summary, our efforts and advocacy have highlighted the importance of aligning technological upgrades with institutional integrity and operational readiness. By embracing a well-considered approach to smart metering, we uphold our commitment to progress while protecting both the sector's interests and public resources. This balanced strategy will guide us in successfully implementing the smart meter project with the support of all stakeholders involved.