POWER PERSPECTIVES

An initiative by Prayas (Energy Group)

Smart metering of electricity consumers in India: getting it right

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India targets to install 25 Crore smart meters for consumers by 2022. Even with replacement of 19 Lakh existing meters with smart meters, currently, there are very little accountability systems in place to check the efficacy of such a large-scale program. Replacement of conventional meters with smart meters will have implications beyond addressing metering and billing issues in the sector. They hold the promise of performance improvement in the form of quicker detection of outages and losses in the system, better service quality, and load management. To reap such benefits, it is important to closely monitor the implementation of the program. Going forward, smart meters will be the main interface between consumers and DISCOMs, and if the metering systems, and not just meters, do not function properly, it will result in significant inconvenience to consumers. Large scale implementation can be achieved through careful analysis and evaluation by regulators and by focusing on learnings from pilot projects. Against this backdrop, and based on a review of implementation of smart metering programs in few states, this article identifies key issues that need immediate attention, and provides some recommendations to the actors involved.

1. Background

Electricity consumers in India are about to experience a change in how they receive and pay their bills, with the introduction of an advanced smart metering technology. This was brought to the fore, when in the union budget speech for 2020, the Finance Minister announced that all conventional consumer meters would be replaced by smart meters by 2022. Subsequently, a scheme worth ₹ 3.05 lakh crore was announced in the union budget for Financial Year 2021-22 (FY22), which focuses significantly on smart metering. The idea has gathered steam, and primarily under the Smart Meter National Program (SMNP), which is steered by the Government of India owned- Energy Efficiency Services Limited (EESL), 19 lakh smart meters have already been installed in India (Figure 1). While the SMNP aims to replace 25 crore conventional meters, electricity distribution companies (DISCOMs) are pushing for smart metering as well. For example, Andhra Pradesh government is planning to install about 18 lakh smart meters on agricultural connections.

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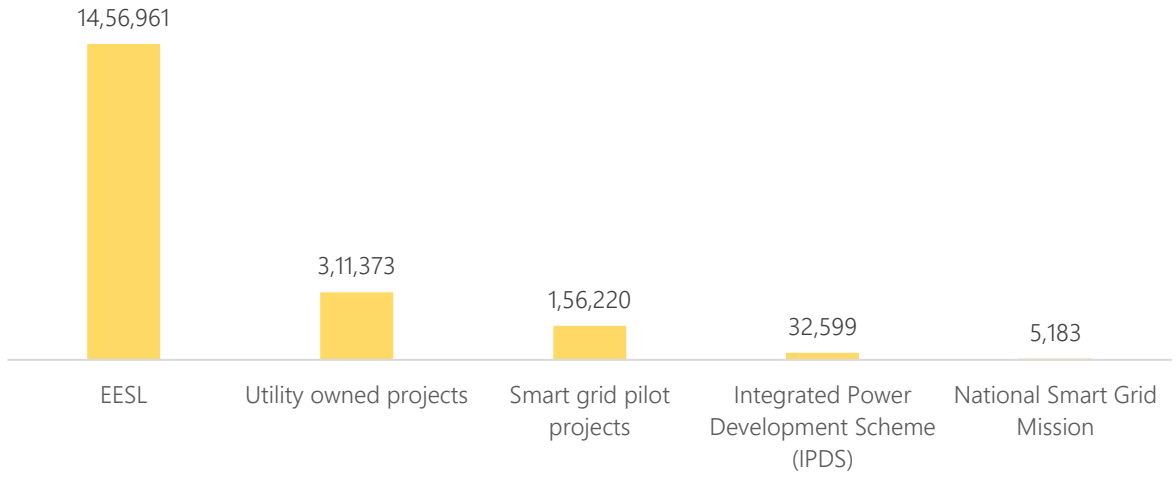
[2] This article is part of an ongoing series called Power Perspectives which provides brief commentaries and analysis of important developments in the Indian power sector, in various states and at the national level. The portal with all the articles can be accessed on: https://prayaspune.org/peg/resources/power-perspective-portal.html. Comments and suggestions on the series are welcome, and can be addressed to powerperspectives@prayaspune.org

Figure 1: Smart meters installed in India as of November 2020



Source: Data compiled from Year-end review 2020- Ministry of Power

These statistics and the policy push show that the large-scale implementation of smart meter installations that has started in a few states, namely, Uttar Pradesh, Bihar, Haryana, Rajasthan and Delhi, will also take place in other parts of the country over the next few years. Over and above this, there seems to be much emphasis, of late, on operating smart meters only in prepaid mode. Prepaid meters will introduce unique complexities with respect to temporary remote disconnections and barriers faced by consumers in recharging on time. Given this development and significant financial investment thereof, effective checks and balances are needed to ensure smooth implementation of these programmes.

Prima facie, large-scale replacement of conventional meters with smart meters might seem like an advancement that smoothens out the creases in the metering and billing systems. However, the implications of installation of smart meters are manifold. They go beyond the outcomes seen in the previous transition from electro-mechanical to digital meters.

This transition not only calls for system-level changes at the DISCOM's end, but also for adaptation to new systems at the consumer's end. Sufficient trials by DISCOMs are required to ensure technical upgradation of the existing metering and billing system, whereby data, that is automatically received from smart meters, can be integrated smoothly. This will ensure that meters installed at remotest places communicate without difficulty. At the consumer's end, migration to app-based systems and pre-paid billing may require significant participation and the necessary know-how. Recent incidences of automatic disconnections, or system faults that lead to outages, as in the case of Uttar Pradesh, are not helpful in building the necessary confidence in the system. Similar cases of errors in logging into energy management applications and issues with data privacy have been observed in other countries too.

Against this backdrop, and based on a review of implementation of smart metering programmes in five states, namely, Uttar Pradesh, Bihar, Haryana, Rajasthan and Delhi, this article highlights a few key issues that need immediate attention. Along with that, this article provides recommendations to the actors involved.

2. Smart meters and their intended benefits

Before delving further into the challenges of large-scale implementation programmes, it is important to understand what smart meters are. Simply put, widely installed electronic electricity meters, when equipped with communication capabilities are considered smart meters. The Central Electricity Authority (CEA), in its latest publication of technical specifications[3], mentions that smart meters are required to be equipped with features such as bidirectional communication, integrated load limiting switch, remote firmware upgrade, net metering, prepaid, post-paid, and time of day tariff features, over and above facilities for measurement of electrical energy parameters. Smart meters are required to retain data for specified number of days as well. These feature requirements can be found in pre-bid tenders for smart meter programmes of various states, such as Andhra Pradesh, Maharashtra, Delhi, and Rajasthan.

While often being championed as the next big innovation to overcome the power sector' woes, smart meters are intended to benefit both DISCOMs and consumers. For DISCOMs, with full integration of smart meters on the distribution system and at consumers' end, tracking of Aggregate Technical and Commercial (AT&C) losses is much easier. This will imply enhanced revenue collection and facilitate demand-side management. Loss reduction, and thereby improvement in billing and collection efficiency are being claimed as the benefits to justify the costs associated with this large-scale smart meter installation programme. For consumers, installation of smart meters means more control over consumption through records of their consumption history. Smart meters can also ensure better quality of electricity supply. This is because smart meters facilitate quicker detection of outages and eliminate billing errors.

3. Institutional mechanisms to facilitate smart metering

As mentioned earlier, the SMNP, steered by EESL[4], is the largest implementation programme for smart meter installations. EESL's business model of "pay-as-you-save", requires no upfront investment by the DISCOMs. In the role of an implementation agency, often known as Advanced Metering Infrastructure Service Providers (AMISP), EESL is set to design-build-finance-own-operate-transfer (DBFOOT) the meter replacement programme. This involves incurring all associated costs, and charging DISCOMs a flat rate per month, for each meter installed. EESL will transfer the assets back to the DISCOMs at the end of the contract period. The progress of the programme can be tracked on EESL's website, on the SMNP Dashboard. Figure 2 provides an example of the information that is hosted on the dashboard.

Performance parameters like loss reduction and increase in revenue seem to indicate substantial gains, but the basis of such claims is not clear. This has been elaborated on in Section 4. Additionally, it is not clear how often this dashboard is updated. This is because DISCOMs in Uttar Pradesh have stated in their regulatory information that 24 lakh smart meters[5] have been installed at the end of FY21, but the SMNP dashboard shows a lower number. A different model of financing has also been taken up by DISCOMs,

[3]https://cea.nic.in/wp-content/uploads/2020/04/Tech.-Specification-of-Smart-Meters-1-Ph-and-3-Ph-Feb-2020.pdf

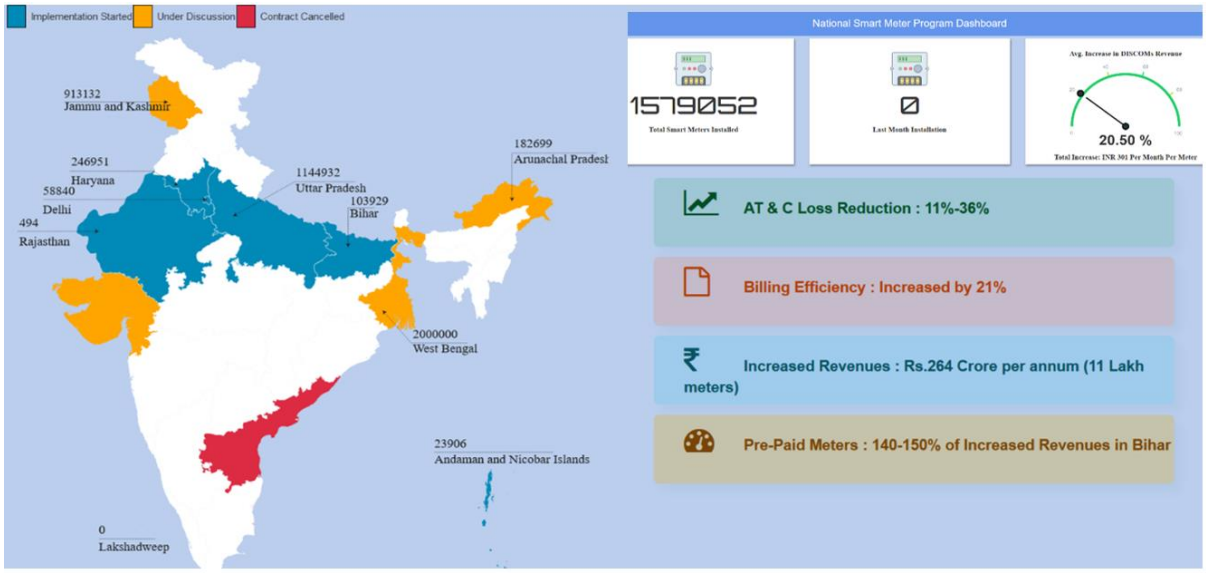
[4] EESL, promoted by the Ministry of Power, is a joint venture company of public sector undertakings such as NTPC Limited, PFC Limited, REC Limited and Power Grid Corporation of India Limited.

[5]https://www.prayaspune.org/peg/publications/item/500-comments-and-suggestions-on-uttar-pradesh-discoms-tariff-process-for-fy22.html

such as Tata Power Delhi Distribution Limited, where upfront capital expenditure is undertaken by the DISCOM itself.

Another national level institutional mechanism involves constitution of a National Smart Grid Mission[6] (NSGM) by the Ministry of Power. As the name suggests, the programme's focus extends beyond smart metering of consumers to upgradation of the electricity grid, and equipping it with advanced communicating technology. Established in 2015, the NSGM has the autonomy to monitor and plan for implementation of smart grid programmes. To facilitate this, there are national and state level project management units, consisting of stakeholders from DISCOMs, regulatory commissions, academia and civil society. It is good that NSGM has governing bodies which meet regularly[7] to track installation of smart grid projects, and this could be further leveraged to track implementation of universal smart metering of consumers. Under the NSGM, model standard bidding documents[8] for appointment of AMISPs have also been finalized after eliciting public comments, in July 2020.

Figure 2: Progress of consumer smart metering across India under the SMNP program of EESL



Source: Screenshots from National Smart Meter Program Dashboard as on 22.04.2021

On the regulatory front, the CEA, which publishes regulations for installation and operation of meters[9], has been prescribing technical standards and specification[10] for smart meters as well, from time to time. Recent proposed amendments to CEA's metering regulations mention that all new meters should be prepaid meters. Other than this, the Forum of Regulators (FoR), came up with model Smart Grid Regulations in 2015, elaborating on guidelines for processes, project evaluation, and formulation of a smart grid cell (responsible for formulation, design, implementation of smart grid plans). State Electricity Regulatory Commissions (SERCs) in Assam, Haryana, Karnataka, Telangana, and Tripura have already issued smart grid

[6] https://www.nsgm.gov.in/en/nsgm

[7] https://www.nsgm.gov.in/en/exception_reports

[8] https://www.nsgm.gov.in/en/amisp-sbd

[9] https://cea.nic.in/old/meteringreg.html

[10] https://cea.nic.in/wp-content/uploads/2020/04/Tech.-Specification-of-Smart-Meters-1-Ph-and-3-Ph-Feb-2020.pdf

regulations. Over and above this, Tripura[11] and Haryana[12] SERCs have recently issued draft consumer prepaid metering regulations. These regulations cover aspects of meter procurement, recharging and temporary remote disconnection criteria.

4. Some pertinent questions on large-scale smart metering of consumers

Smart metering for consumers has taken off at great speed, intended to reach a monumental target within a short period of time. The replacement programme is based on the assumption that the future benefits will cover the costs that are incurred now. Given this assumption, it is important not only to quantify such costs and benefits, but also to track them during the years of implementation. In the states where large-scale installation of smart meters has commenced, there have been little to no accountability systems in place (other than in Uttar Pradesh, where the SERC conducted a rollout approval process[13], after being intimated by a consumer representative). This section discusses some necessary accountability measures that should be in place, so that course corrections can be made, wherever necessary.

4.1. What are the benefits & costs of these programmes?

Tracking benefits

The smart meter implementation programme measures benefits through loss reduction, billing efficiency, and revenue increase. As shown in Figure 2, the SMNP dashboard claims an average increase in DISCOM revenues by 21%, by collecting ₹301 more per meter every month. The methodology adopted to arrive at these numbers, however, remain unclear. This also raises questions regarding treatment of arrears, subsidy payments, tariff increases, and the time period considered for assessment, and how these factors were used to arrive at "increased revenue" figures. DISCOMs in Uttar Pradesh, on the other hand, claim a net benefit of ₹ 4,056 Crore[14] in eight years through improvement in billing efficiency.

Hence, in order to track benefits effectively, SERCs should provide assessment frameworks in their tariff or business plan regulations. The assessment frameworks could include parameters listed in Table 1. DISCOMs should track and submit data for these parameters before and after installation of smart meters. While the difference between billed energy and input energy in the system would help calculate distribution losses and billing efficiency, the revenue parameters would shed light on collection efficiency at the Distribution Transformer (DT) level. The revenue figures should not include recovery of past arrears and revenue subsidy provision from the state government. Recovery of past arrears through smart meters should be reported separately. These changes should be tracked and reported quarterly. Currently DISCOMs have different

[11] https://terc.tripura.gov.in/sites/default/files/Draft_Regulation_mfor_Prepaid_Metering-converted_0.pdf

[12] https://herc.gov.in/WriteReadData/Pdf/D20210503.pdf

[13]https://www.prayaspune.org/peg/resources/power-perspective-portal/194-regulatory-accountability-of-smart-meter-rollout-plan-in-uttar-pradesh.html

[14] Pg 12 of UPERC's approval order for smart meter roll out plan: https://www.uperc.org/App_File/SmartMeters-pdf1116201863224PM.pdf

formulae[15] for calculating systems losses[16], billing efficiency[17] and collection efficiency[18]. Without a uniform approach, it will be hard to assess true benefits from smart metering programmes.

Table 1: Suggested format for tracking benefits of smart metering programmes

DT identifier	Before installation				After installation			
	Input energy (MU)	Billed energy (MU)	Revenue billed (net of arrears and subsidy) (₹ Cr)	Revenue recovered (net of arrears and subsidy) (₹ Cr)	Input energy (MU)	Billed energy (MU)	Revenue billed (net of arrears and subsidy) (₹ Cr)	Revenue recovered (net of arrears and subsidy) (₹ Cr)

Source: Compiled by Prayas (Energy Group)

Measuring costs

Modes of financing of costs have been discussed in Section 3. Now, irrespective of the financing model, the question that arises next is how these costs are planned to be recovered by the DISCOMs. Different approaches have been adopted in states for cost recovery from consumers. Uttar Pradesh DISCOMs, during the roll out approval process in 2018, explicitly mentioned that costs are not going to be recovered from consumers, given the claimed net-benefits. However, going back on their words, they have petitioned to recover meter renting costs through annual tariff increase in the subsequent years. While petitioning[19] for FY22 costs, DISCOMs have even mentioned that they are unsure of any net benefits.

Rajasthan DISCOMs have included smart metering costs in their Capital Investment Plan petitions for FY20-FY24. Delhi SERC, through its business plan regulations of 2019[20], has mandated approval of smart metering costs as part of capital expenses, giving DISCOM-wise trajectories for yearly capitalisation and exact amounts to be invested by each DISCOM. Thus, smart meter costs, in these cases, would be passed onto consumers through a tariff increase. Even with installation of more than a lakh smart meters in Bihar, the matter of how to pass-through costs of installation of all prepaid meters in the state is still pending before the SERC since last year[21].

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[15] https://www.prayaspune.org/peg/publications/item/407.html

[16] System losses (%) $= \frac{\text{(Total energy input in the system- Total energy finally consumed in system)}}{\text{Total energy input in the system}} \times 100$

[17] Billing Efficiency $= \frac{\text{Total Energy Billed to DISCOM Consumers}}{\text{Total Energy Sales to DISCOM consumers}} \times 100$

[18] Collection Efficiency (current year) $= \frac{\text{Revenue collected by DISCOM}}{\text{Revenue due to DISCOM (current year)}} \times 100$

Where, revenue collected should not include receivables (pending subsidy payments from previous years recovered in the current year as well as pending revenue payments from consumers from previous years recovered in the current year).

[19] https://www.dvvnl.org/UploadFiles/Dvvnl_Petition/DVVNL%20ARR%20PETITION%20FY%202021-22.pdf

[20] http://www.derc.gov.in/sites/default/files/Business%20Plan%20Regulations%202019%20%281%29.pdf

[21]https://berc.co.in/orders/tariff/distribution/sbpdcl/2330-tariff-order-of-strong-span-style-color-000000-discoms-nbpdcl-sbpdcl-span-strong-for-fy-2021-22

In the absence of proper mechanisms in place, it is uncertain how treatment of costs will be done in most of the states. It is also not clear how costs will be apportioned if there are cost over-runs due to delays or technology upgrade. Costs that are passed through by DISCOMs, in the form of consumer tariffs, need to be mentioned in SERCs' tariff or business plan regulations. Along with this, there is need for quantifying costs and benefits in explicit monetary terms so that if benefits outweigh the costs, and vice versa, gains and losses can be shared with consumers accordingly.

4.2. What are the assessments that are needed to track performance of smart meters?

Pilot projects

Several operational challenges can emerge from on-field deployment of smart meters. This makes it crucial to conduct pilot projects in different geographies before full-scale implementation. While a handful of reports[22] can be found about pilot projects for smart grids[23], there is a dearth of documentation of lessons from pilot projects focusing on consumer smart metering[24]. Lessons from ground-level challenges from already commenced roll outs in states like Uttar Pradesh, Bihar, and Delhi will certainly benefit the smart meter rollout projects in other states.

Mandatory regulatory approval of rollouts

Before implementation, smart meter rollouts should be brought under regulatory scrutiny and be subjected to SERCs' approval, since these projects involve significant investment and impacts on consumers. Among the rollouts that have already taken place, as discussed earlier, only Uttar Pradesh SERC has conducted an approval process. SERCs' approval processes should involve scrutiny of the following:

- Results and learnings from pilot projects
- Basis and criteria for rollout (high loss area/only for high consumption consumers)
- Financial and operational justification involving detailed Cost Benefit Analyses, change in metering and billing costs due to implementation of programme
- Measures for consumer engagement, data protection and security

Additionally, SERCs should direct DISCOMs to submit quarterly updates of the status of rollouts. This has already been mandated by SERCs in Uttar Pradesh[25] and Delhi[26], however, these reports are not available in the public domain. Information that should be reported to the SERC has been captured in the Annexure.

Measures at the central level

Independent third-party energy audits are important to gauge the efficacy of metering and the losses in the system. To this end, recently, the Ministry of Power has proposed to make it mandatory for DISCOMs

[22] Smart grid pilot project in Ajmer: https://www.nsgm.gov.in/sites/default/files/Report-on-Ajmer-SGPP-Case-Study-Feburary-2018.pdf, Lessons from scaling up smart grid projects: https://www.nsgm.gov.in/sites/default/files/Insights-from-SGPP-for-Scaling-Up-Smart-Grids-in-India-February-2018.pdf

[23] https://www.nsgm.gov.in/sites/default/files/SG-Projects-Status-March-2021.pdf

[24] In Gaya and Hajipur, in Bihar, a pilot project was conducted for 10,000 smart meters, but these meters have older versions of technology: https://www.smart-energy.com/news/smart-electricity-meter-bihar-india/

[25] https://www.uperc.org/App_File/SmartMeters-pdf1116201863224PM.pdf

[26] http://www.derc.gov.in/sites/default/files/TPDDL%20-%20TARIFF%20ORDER%20FY%202020-21_0.pdf

to conduct annual energy audits, through the draft Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) Regulations, 2021[27]. Further, for systems integration at the national level and a smooth transition to smart grids, the ministry can conduct consultative workshops, involving state-level actors, focusing on sharing experiences and lessons from implementation challenges.

4.3. How can a consumer centric approach be ensured?

Smart meters will be the main interface between consumers and DISCOMs. Thus, it is important to develop consumer confidence in smart meters. As per media reports, more than six thousand electricity consumers[28] have opted for permanent disconnection in Uttar Pradesh, following their dissatisfaction and distrust in smart meters. This is alarming, and with large-scale planned rollouts in remote parts of the country, more disconnections are likely to take place, if installed meters do not function properly.

Addressing challenges of prepaid meters

What might add to consumers' anxieties is the lack of choice over modes of payment. Smart meters are equipped to remotely disconnect consumers if bills are not paid on time, when one has a post-paid connection. Similarly, upon exhaustion of recharge credit limit, consumers with prepaid connections will face disconnection. The central government's policy push seems to be in the direction of replacing all meters with prepayment meters, to overcome the problem of consumer arrears. In fact, this can already be observed in Bihar, where the replacement programme has solely focused on prepayment options[29].

In the absence of proper alarms or notifications, consumers with prepaid connections will face difficulties. This will further be exacerbated if accessibility to recharging options is not made easy. If one has to recharge online, then cellular network connectivity issues might make recharging a hassle. Similarly, if recharging involves buying coupon codes from physical shops (as was seen in initial years of using non-smart prepaid meters, or for cell phone recharging), disconnection at odd hours, or in remote areas will pose a problem. Much frustration of consumers can be found on Bihar's "Bihar Bijli Smart Meter" app[30], where several complaints regarding meter/ billing or app malfunctioning can be found on Google Play's app review section.

Due to such challenges, mechanisms need to be in place to minimize hassles involved with remote disconnection. South Bihar's DISCOM, in a public notice[31], mentions that disconnection on zero balance will only take place during the day time, between 10 AM and 1 PM, on working days. Also, twenty-four hours' notice shall be given to consumers before temporary disconnection. Further, the DISCOMs have submitted their disconnection criteria before the BERC during the annual tariff process[32], and the

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[27] https://beeindia.gov.in/sites/default/files/2283_0.pdf

[28]https://www.hindustantimes.com/cities/lucknow-news/fed-up-with-smart-meters-over-6-000-power-consumers-say-no-to-power-101617733640593-amp.html

[29]https://www.smart-energy.com/industry-sectors/smart-meters/2-34-million-smart-prepaid-electricity-meters-for-indias-bihar-state/

[30] https://play.google.com/store/apps/details?id=com.sew.scm.eesl&hl=en&gl=US

[31] https://www.sbpdcl.co.in/(S(24k4zsykp04vliusl3opcqe5))/Images/SmartPrepaid.pdf

[32]https://berc.co.in/orders/tariff/distribution/sbpdcl/2330-tariff-order-of-strong-span-style-color-000000-discoms-nbpdcl-sbpdcl-span-strong-for-fy-2021-22

commission has recognized that such criteria need scrutiny and addition to existing supply codes. Similarly, Tripura's draft prepaid meter regulations mention that the cut-off window will be of forty-eight hours.

Given the severity of the challenge that remote disconnections pose to prepaid consumers, even with large-scale rollouts, there are barely any provisions to protect consumer interest in SERCs' regulations. In states like Uttar Pradesh and Bihar, where lakhs of meters have already been replaced, Standards of Performance (SoP) or Supply Code regulations still do not contain performance standards or adequate compensation clauses for smart meters.

Performance parameters in regulations

SERCs of Rajasthan and Maharashtra have issued new Supply Code and SoP regulations in 2021. While these regulations do not contain performance parameters for smart/prepaid meters in detail, they mention disconnection criteria that can be applicable to such meters. Further, Maharashtra's regulations mention that any existing meter, if replaced, will be replaced with a smart meter and all new connections will only be issued smart meters. It is quite clear that more needs to be covered in such regulations. As a starting point, all SERCs should revise the following performance indicators and their compensation criteria, as has been captured in Table 2.

Table 2: Some changes that are required in SERCs' Supply Codes and SoP regulations

Parameter	Description
Consumer fuse-off	Currently most SoP regulations[33] mention that a fuse-off complaint has to be addressed within 4 hours in urban areas and 12-24 hours in rural areas. With installation of smart meters, it will be easier for DISCOMs to automatically detect fuse-off issues and thus response time, and compensation thereof should be revised as smart metering systems are stabilized over time.
Meter related complaints	Since smart meters will play an important role in temporary disconnection, it is important that any meter related complaint be resolved at the earliest. Provisions should be there to ensure that electricity supply is not interrupted due to faulty meters. Currently, most SoP regulations mention a time standard of 7 days for replacement of meters. Stricter standards need to be in place, especially for smart meters operating in prepaid mode.
Reporting of reliability indices	Smart meter data should be used to enhance accuracy of reliability indices and could be published based on information at the feeder, distribution transformer, division, as well as at the consumer level. With smart meter data, it should be possible to have greater transparency in calculation of reliability indices and hence methodology and underlying data should also be published by DISCOMs.

Source: Analysis by Prayas (Energy Group)

Smart meter data- access and privacy

Once smart meters have been installed at consumer premises, mechanisms need to be put in place to ensure that consumers have the rights to access their own data, which is collected by these smart meters. Further, it should be mandated that the DISCOMs present this information in a comprehensible manner on their websites or mobile applications, which can be accessed by consumers upon logging-in with their unique credentials.

[33]https://www.prayaspune.org/peg/publications/item/418-five-stitches-in-time-regulatory-and-policy-actions-to-ensure-effective-electricity-service.html

This will help achieve full benefits of smart meters by enabling consumers to understand their consumption patterns and plan future consumption accordingly. Consumers' right to their own data has already been guaranteed in Rajasthan SERC's Supply Code regulations of 2021 – this should be replicated by other SERCs. While it is important to provide such information on DISCOM websites or through mobile applications, care needs to be taken to ensure that such applications are not duplicated by ill-intentioned parties.

Along with this, data privacy of consumers remains an unchartered territory, that needs to be addressed urgently[34]. High-resolution smart meter data, through analysis and inference, has the potential to reveal personal information of consumers, such as occupancy, appliance usage patterns, and even sensitive information like entertainment preferences. DISCOMs need to be cognizant of the upcoming data protection legislation in the country and build institutional capacity for following protocols in the future.

5. Going forward: thinking of benefits beyond metering and billing

Smart metering programmes, until now, have been dedicated to reduction of losses and arrears, in the hope of reviving DISCOMs' health. However, going forward, once the infrastructure is in place, smart metering programmes can be leveraged to address various other issues. Some of them are discussed in this section.

5.1. Automatic compensation payments

Smart meters can be programmed to record and communicate real-time data and thus, can be used to record power interruptions. If these recorded interruptions are longer than what is allowed in regulations, automatic compensation could be paid to consumers. Consumer smart meters can enable payment of compensation to consumers, automatically, for not adhering to standards of performance stated by SERCs in SoP regulations. In fact, the recently notified Electricity (Rights of Consumers) Rules, 2020[35], by the Ministry of Power, states that automatic compensation can be paid to consumers in case of (i) no supply to a consumer beyond a particular duration, (ii) number of interruptions in supply beyond the limits specified by the SERC. Even the Maharashtra SERC's Supply Code regulations of 2021 mention that automatic compensation is payable for restoration of supply, wherever smart meters are installed. As technology evolves, such payments will become even more viable, overcoming the present transaction costs that a consumer has to bear to claim compensation.

5.2. Direct Benefit Transfer of subsides with the help of smart meters

Smart meters can be employed for better targeting of revenue subsidies that are provided by state governments. Targeting of subsidy has been an issue because consumption by agricultural consumers is mostly subsidised, and since many of them are not metered, subsidies are often disbursed on the basis of estimated sales[36]. Smart meters will ensure timely measurement of consumption and subsequently timely disbursal.

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[34]https://www.prayaspune.org/peg/resources/power-perspective-portal/259-handling-smart-meter-data-privacy-concerns-preparedness-and-safeguards.html

[35] https://powermin.gov.in/sites/default/files/webform/notices/Consumers_Rules_2020.pdf

[36]https://www.prayaspune.org/peg/publications/item/419-elephant-in-the-room-implications-of-subsidy-practices-on-discom-finances.html

In September 2020, the Government of Andhra Pradesh (GoAP) announced[37] a scheme for Direct Benefit Transfer (DBT) of subsidies, to all agricultural consumers, through installation of smart meters. Power supply to these consumers will continue to be free, and the programme aims to track agricultural consumption accurately. Eighteen lakh smart meters are planned to be installed across the state, and subsidies are said to be routed directly to new bank accounts that will be opened in the farmer's name. The entire project is being funded by the state government, and AMISPs – who will have the responsibility of surveying, designing, supplying, installing, providing online meter readings, and comprehensive maintenance for the next five years – are being sought through competitive bidding.

While timely meter reading and money disbursal will heavily depend on stable cellular network coverage in agricultural fields, meters installation may need special casing to protect against typical surges and weather impacts. Burning of switchboards due to voltage fluctuation issues is common, and this will affect meter functioning. In such a situation prompt response is required for meter repair or replacement. Such concerns call for implementation only after comprehensive pilot projects are conducted. Soon after the scheme was announced, a pilot project was commissioned in Srikakulam district. Lessons from the pilot project cannot be found in the public domain. Full scale rollouts are expected to be done in FY22.

5.3. Use of data for performance improvement

DISCOMs need to effectively utilise the data collected from smart meters for performance improvement. Such data can facilitate quicker detection of outages in the system, and identify load theft. It will also aid load research and help in more accurate demand estimation. Depending on such analysis, DISCOMs can formulate their capital expenditure plans for distribution network augmentation. Intellismart[38], an initiative by EESL, is offering data analytics services for DISCOMs to understand smart meter information. Going forward, such services will become even more necessary. Thus, to reap full benefits of smart metering, DISCOMs also need to invest in capacity building, to effectively handle large volumes of information.

6. Getting it right

Smart metering of electricity consumers is being implemented with great speed, country-wide. However, there has been inadequate monitoring of rollout programmes so far. Not only is there a dearth of lessons from pilot projects in the public domain, not much consistent information can be found about the status of implementation programmes either. Uncertainty remains surrounding costs of these programmes and how they will be passed onto consumers.

Perhaps this new technology has potential for huge benefits. However, it will require careful implementation, which would only be possible through careful analysis, evaluation and learnings from pilot projects. This is where the SERCs can play an important role in holding DISCOMs accountable, and formulating regulations to ensure consumer protection.

Given all this, getting it right is much "smart"-er than getting it done fast!

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[37] Through government order, GO no. MS-22, dated 01.09.2020, can be accessed on: https://goir.ap.gov.in/

[38] https://intellismartinfra.in/

7. Annexure

Information about smart meter rollout programs that should be reported by DISCOMs to the SERC

Parameter	DISCOM 1	DISCOM 2	...DISCOM n
About meter replacement program:			
Name of area for scheme implementation			
Consumer categories covered in meter replacement scheme			
No. of meters under each consumer category			
Target no. of days for replacement			
Replacement start date			
Replacement end date			
Reason for replacement (high loss area/ DSM measure, etc.)			
Financial benefit estimation per meter:			
– Savings in power purchase cost due to loss reduction (in ₹)			
– Savings in cost due to O&M cost reduction (in ₹)			
– Savings due to increase in collection efficiency (in ₹)			
– Savings due to any other reason (in ₹)			
Implementation agency(s)			
Roles and responsibilities of implementation agency(s)			
Payment option in smart meter (prepaid/post-paid)			
Technology used in smart meter (GPRS/RF, etc.)			
Cost of implementation (in ₹)			
Cost borne by DISCOM (in ₹)			
Cost borne by implementation agency (in ₹)			
Cost shared with consumers (in ₹)			
Mechanism of cost sharing with consumers (charged for meter/ cost recovered through tariff, etc) number of years			
Plan for rollout provided? (Y/N)			
Lessons from pilot project:			
Duration of pilot project			
Meters installed			
Technology used			
Payment option in smart meter (prepaid/post-paid)			
Cost incurred (in ₹)			
Benefits incurred for each category (in ₹)			
No. of complains related to metering issues			