Power Sector Data and Frameworks: Thinking ahead for data usage, access, and rights

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Collaborators

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Background

Data is becoming more and more important for all spheres of public and private activity. The power sector is no different, but much of data has been for operational reasons, ranging from billing to power management to operations. With the rise of IT (and eventually, the Internet of Things), data is now an enabler of change, for increased efficiency, choice, and empowerment. This report and the underlying workshop was a by-invitation discussion session with experts in the power and IT sectors on issues of how to think of improving power sector outcomes through data. The initiative is being led by Brookings India with the support of Shakti Sustainable Energy Foundation.

Workshop Participants:

Participants included experts from NSGM, CEA (Central Electricity Authority), Think Tanks and NGOs, DisComs, IT companies, ISGF (India Smart Grid Forum), and others.

Workshop and Report Objective:

Data is a powerful enabler for both operations as well as compliance, future planning, etc. There is now far more data than ever before in the power sector, even before the advent of Smart Meters, which will unleash far more data. Some of the data could be potentially sensitive, not just because of its direct individual nature (e.g., the mobile number of a customer) but also because of the inferences it can provide.

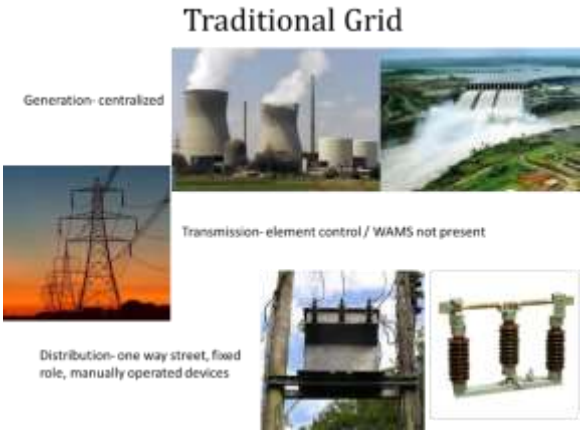
This workshop was a discussion session focused on the following issues:

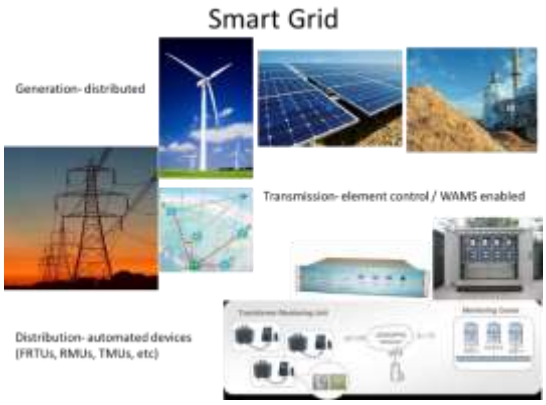
1) How do we think about data in the power sector (especially for DisComs and consumers)?
2) Why isn't data being harnessed more today?

Why we need data (incl. from a kick-off presentation by Sh. Arun Mishra, Director, NSGM-PMU)

Discussion:

- Data is an enabler of improved performance, and is a hallmark of a smarter if not Smart Grid.





- A Smart Grid should be for customers and society and not (just) for the utility. Consumer loads drive the system, and therefore they should also be the beneficiaries.
- There are 99 planned Smart Cities – how many of these are syncing for Smart Power?
- Traditional meter data was for billing and distribution. However now meter data can help with distribution management. Therefore, metering should be thought of not just as a physical device at a location but a logical node in a system.
- While the supply position has improved measurably, with the emerging grid (including high RE), there are many concerns on grid stability. Hence, we need more and better data to keep the grid stable.
- Currently in India power distribution focuses on quantity (providing power to all) before quality of power.
- The current priority for DisComs is billing even when they think of Smart Meters, even though these can do much more.
- For now data is (appears to be) the DisCom's property and consumer can only have access to data based on what the DisCom chooses to share.
- DisComs are struggling with current challenges and worry that overall data can be used against them and thus may not be keen to letting data released to the public. A lot of data is available with DisComs at different levels but they may as well package analysed information in chosen formats that limit their liability.
- While many discussions talk about Big Data, more data, etc., even existing data isn't harnessed well.

Observations on DisComs today – reality and implications

- Even before considering data frameworks and data handling, the first question is what is what is the nature of data available, where and with whom it resides, and in which formats?
- Much of DisCom data is either with their IT service providers (including under R-APDRP/IPDS/etc.) where it is 'secured' by making it proprietary. Of course, data doesn't need to be proprietary to maintain security!
- The existing data handling contracts are *not* geared for sharing of data even with the direct end-consumer (who may claim rights to access "their own data"). To make it shareable to authorised entities (including consumers) adds a cost that is not accounted for many IT projects, which often focused on billing only. This is before considering any commercial implications of the same (sharing data).
- Even simple historical billing data is not easy to share with consumers. Many current bills are local (via spot billing machines or handheld instruments). Meters only store limited (e.g. 45 days) historical data (if the meters are digital – many aren't). Longer-term data has to come from the back end, which raises costs if separately maintained and mailed. Making it accessible online via a portal is cheaper but many consumers aren't online, or comfortable using new websites/apps.
- Understanding timeframes (live, delayed, historical, etc.) and formats for data is important. Making data in .pdf format is not always ideal for analysis/ stakeholders. On the other hand, real-time or raw data may not be required at the consumer end, and can raise possible security (or competitive) risks.
- Utilities need to be sensitised and trained to understand the required metadata and then make it standardised.
- One of the popular schemas (.xml) for sharing consumer data is the "Green Button" standard, developed in the US but now used in numerous countries. It is a consortium-based model, and based on relatively open standards. However, a number of Indian stakeholders have asked that instead of relying on a US-originated standard, why not make an Indian standard? It's not clear this is required or even helpful – any concerns about security, openness, and relevance of Green Button for India are worth examining and resolving quickly

What are the views of the key stakeholders: Is it DisCom versus the consumer?

- While this isn't an either-or type of situation, understanding who the data belongs to and what it can be used for can help with its proper gathering, storage, access, and utilisation.
- Consumers can benefit knowing about their details of consumption such that they can save energy and money (especially if they are charged for peak demand, time of day, power factor, sanctioned load, etc.)
- Aggregated data is sufficient for most research analyses, e.g., by class of consumer or location (transformer, feeder, etc.).
- The fundamental questions become: what data is available, where, and in what formats? Only then can we determine who can "use" it.
- Key question: Even if there is consensus on the benefits of data, who is set up to actually operationalise better data gathering/sharing?
    - Say we wish to add consumer billing history, like 12 months usage. These data are not available in the meter (which has only 30-45 days data), and thus have to come from the back end. Thus, these cannot be given in a spot bill (via a billing machine).
    - Adding a printout into a mailed bill adds costs - DisComs face strict limits by regulators on increasing consumer costs by even the slightest amount
    - Online access to such historical data is lower marginal costs, but may only be helpful to a subset of consumers.
- How is data available for scholarly research and analysis? What security concerns are genuine, especially after aggregating and anonymising data?
- On the other hand, personal and individual data may be required for very specific savings of energy for individual consumers. What are frameworks for these? Can India consider the "Green Button" standard for this, or maybe develop one of its own?
- Security of data is a key challenge, and a threat for all segments of the power sector (i.e., it's not just data security but broader cybersecurity).
- Regulators have (till date) not been active in discussions on power sector data, even for its gathering/collection/analysis, let alone issues of rights, access, privacy, etc.
- Must all organisations have and display their data privacy policy? Are there norms for the same?
- What is the value if not price of such data?
    - Data has immense value (the five most valuable companies in the world deal with data, viz., Google, Amazon, Facebook, Apple, and Microsoft). How is it to be valued, monetised, and priced (for access)?

  - Even if it belongs a consumer, it takes effort to collect, store, retrieve, etc. the data. How should this be priced? Options range from socialising this (which needs regulatory approval) to charging for this based on a transactional basis. Should charging for access to data be based on marginal costs or "market value"?
- Ownership of data is just one of multiple questions and unknowns. Linked is the issue of liability, even for a custodian of the data (like a DisCom might be).

Discussion brain storming

Participants were asked to list their top few thoughts or reasons *WHY* we don't have more data usage/sharing/harnessing in the power sector (or other key concerns/thoughts), from different perspectives

DisComs	**Consumer**
• Ability to provide data • Lack of automation in metering • Lack of priority • Lack of resources • Understanding of accountability • Limited follow-through in steps required to cut commercial losses • Limited clarity on what can be achieved with granular data • Lack of proper instruction of data collection • DisComs need IT professionals	• Lack of understanding what their data can be used for • Not sure how data will be secured at level they are being stored • Lack of structures and mechanisms to answer their concerns • Poor understanding of consumption and billing • Varying if not contradicting data requirements (in terms of mode, type, level, granularity, etc.)
Policy	**IT Service Providers**
• Is it right to have/use such data? • Priorities may be elsewhere • Lack of structured databases • Costs of electricity service provision relative to tariffs is unviable; no reform is possible without a market-reality driven scenario (which can	• Tech deployed may not be amenable • Could be an opportunity • Short-term focus: their jobs and profit • Least concerned about data quality • Better to keep things closed - cyber security breaches as many

still allow subsidies but perhaps in different manners) • Lack of awareness, potential vs risk	openings/hooks can lead to exploitation from the service point • Lack of robust analytics and data handling programmes • Several IT providers have faced losses and now unwilling to store data without getting a proper profit margin (it wasn't in their mandate/contract)
Regulators	**Third parties**
• No capabilities for data analysis • No provision of use for other purposes • Concerned with data related to tariff filing mainly • Data security / privacy guidelines for consumer and researchers aren't present • Lack of regulatory authority which can look into data framework, privacy • Impact oriented – translates to tariffs; less able to address subtler or nuanced issues • What is revenue (or cost) and how to hand handle a subset of these when things can be linked (e.g., data means hardware, software, telecom, manpower, etc.) • Regulator are the final arbitrators	[no comments listed – suggests this is nascent]
Researchers	**Financial Institutions**
• Want consistency of data	• What is the return on investment?

• Worry about availability of data • Process to acquire data: whom I should approach? • Where do I get genuine data for research? • Confidentiality issues • Data ownership, if I buy or otherwise access can I share it forward? • Unstructured data • Lack of system/process/mandates • Government should stop wasting time and money in publishing same data by different entities	• Where will the cash (up front) come from (which is separate from broader business model issues)

Additional Information:

While privacy and rights are only a subset of the issues relating to power sector data (especially with a consumer and DisCom perspective), these have been gathering interest recently. Digital India is a buzzword, and Nandan Nilekani has talked about Data Democracy, where people should have rights to their own data (this is a broad concept related the "India Stack" and goes well beyond the power sector). Just recently, the Supreme court in a unanimous 9-0 verdict from a constitutional bench, found privacy to be a Fundamental Right as opposed to a derived, implied, or contractual right. What this means (operationally and philosophically) in terms of the power sector or other domains remains to be seen.

Next Steps:

Based on discussions some recommendations were to:

1) Engage more with government DisComs directly, either one-on-one or through the convening via other activities
2) Use the draft questionnaire for focused replies; this workshop was a good start to high-level discussions

3) Engage with Regulators (Say Forum of Regulators) who may have a direct interest and influence in such issues (esp. related to consumers).