Energy Accounting and Health Monitoring

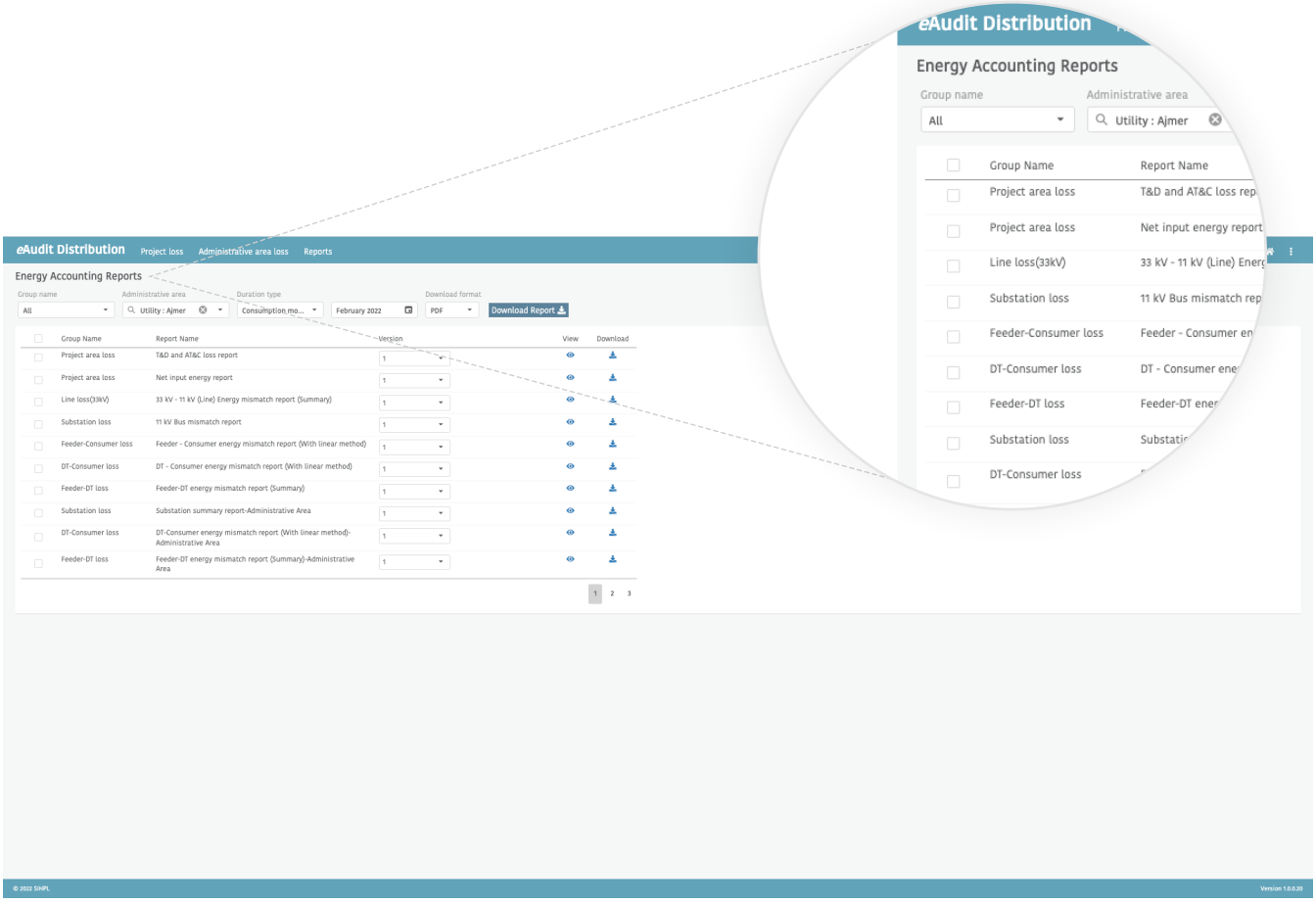
Energy accounting and network health monitoring

Providing last-mile connectivity to end users is crucial to the economic viability of the power sector.
Over the last two decades, however, AT&C losses have become one of the biggest financial concerns for distribution utilities.

A good understanding of the calculated loss figure, full knowledge of the high-loss contributors, and a plan for addressing these issues are all essential before taking action. This is where energy accounting services can benefit a distribution utility.

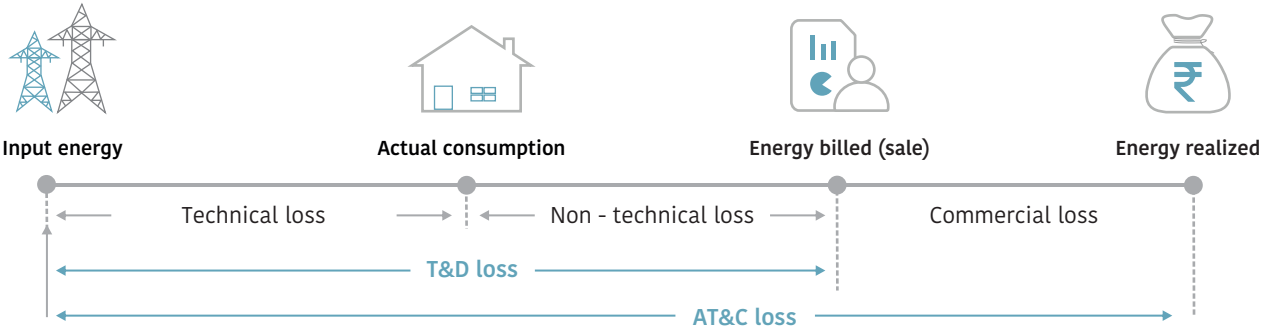
Economic growth has increased per capita power consumption, putting an additional load on the power distribution network. Also, the fiscal crisis faced by the power distribution sector has made large-scale investment for network monitoring or augmentation impossible. This leads to failure in the distribution network, compromising supply reliability and leaving the consumers dissatisfied. A healthy network asset means more supply reliability.

Hence a distribution utility needs to maintain healthy network assets. To resolve this issue, it is essential to identify vulnerable assets (feeder and DT) and address them as quickly as possible.



Challenges

- Absence of a solid IT infrastructure, systematic mechanism or process that
    - Identify and account overall losses
    - Monitor losses downstream of DT
    - Monitor and track loss control activities and their impacts
- Change in the network connectivity due to maintenance and augmentation activity
    - Various commercial adjustments in billing data
    - Advanced or delayed payment by the consumers
    - Unaccounted energy consumption at the field
- Limited workforce for maintenance and system handling
- Inadequate data analytics tools and systems for monitoring asset health
- Dissatisfaction and unrest among consumers due to frequent asset failures and power interruptions
- Non-availability / delayed availability of system meter readings from remote locations



Our solution

The energy accounting service has the correct blend of intelligence and precision. It ensures accurate and reliable loss calculation. The process is so transparent that the outcome at every step is visible and auditable. Once utilities have confidence in the final result, they can take corrective measures to reduce losses.

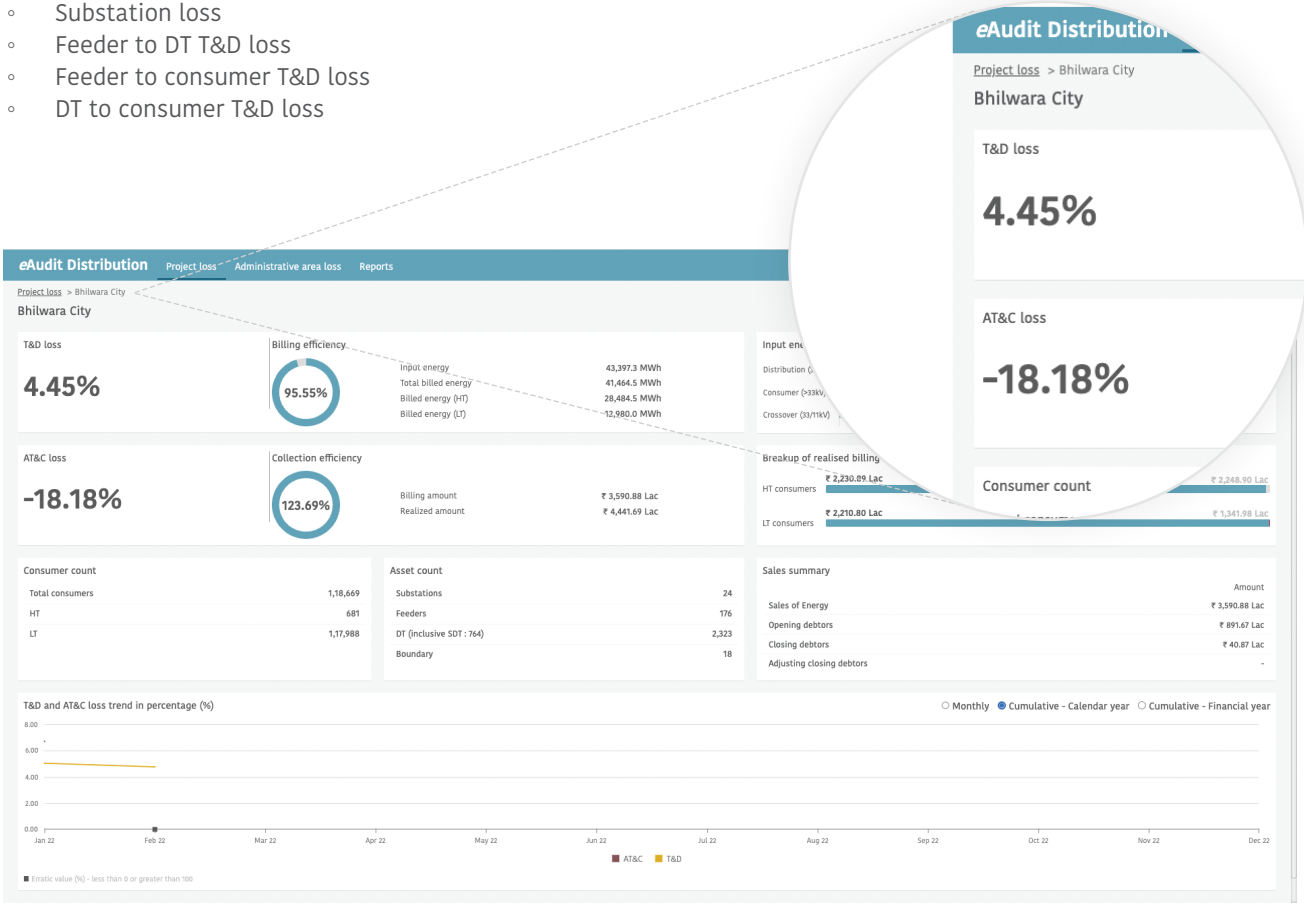
Furthermore, the final loss calculation includes a recommendation for reducing losses.

As part of our service, the customers get -

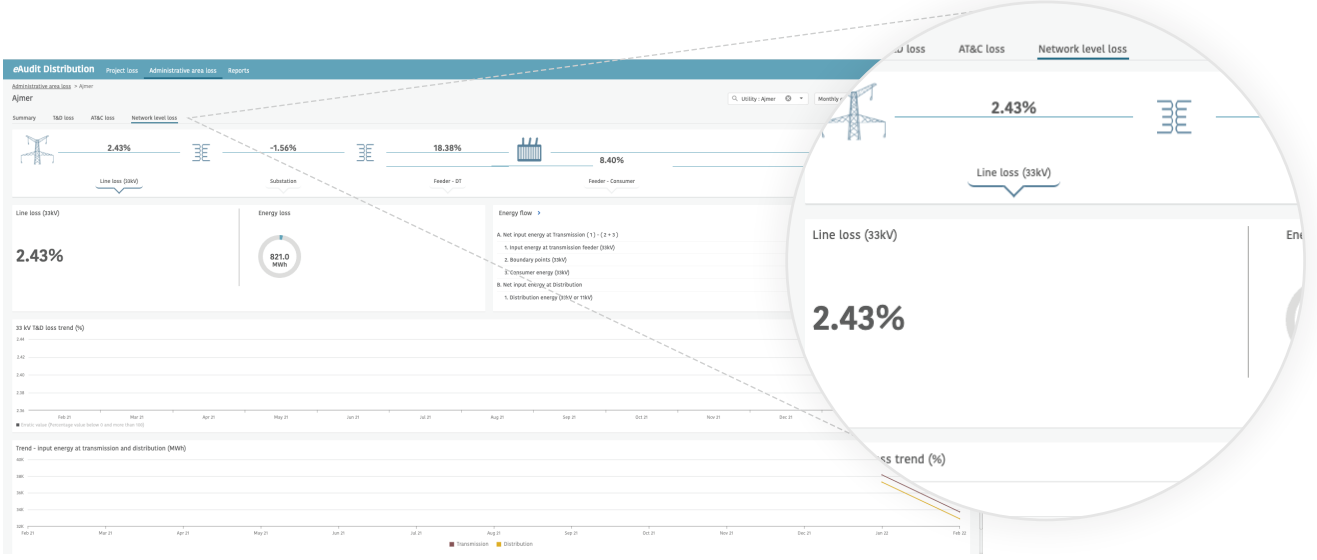
- Network-wise and geographical area-wise T&D loss reports and dashboards to identify the high loss segment or area for further actions of loss reduction.

  The reports give insights about

  - 33kV line loss
  - Substation loss
  - Feeder to DT T&D loss
  - Feeder to consumer T&D loss
  - DT to consumer T&D loss

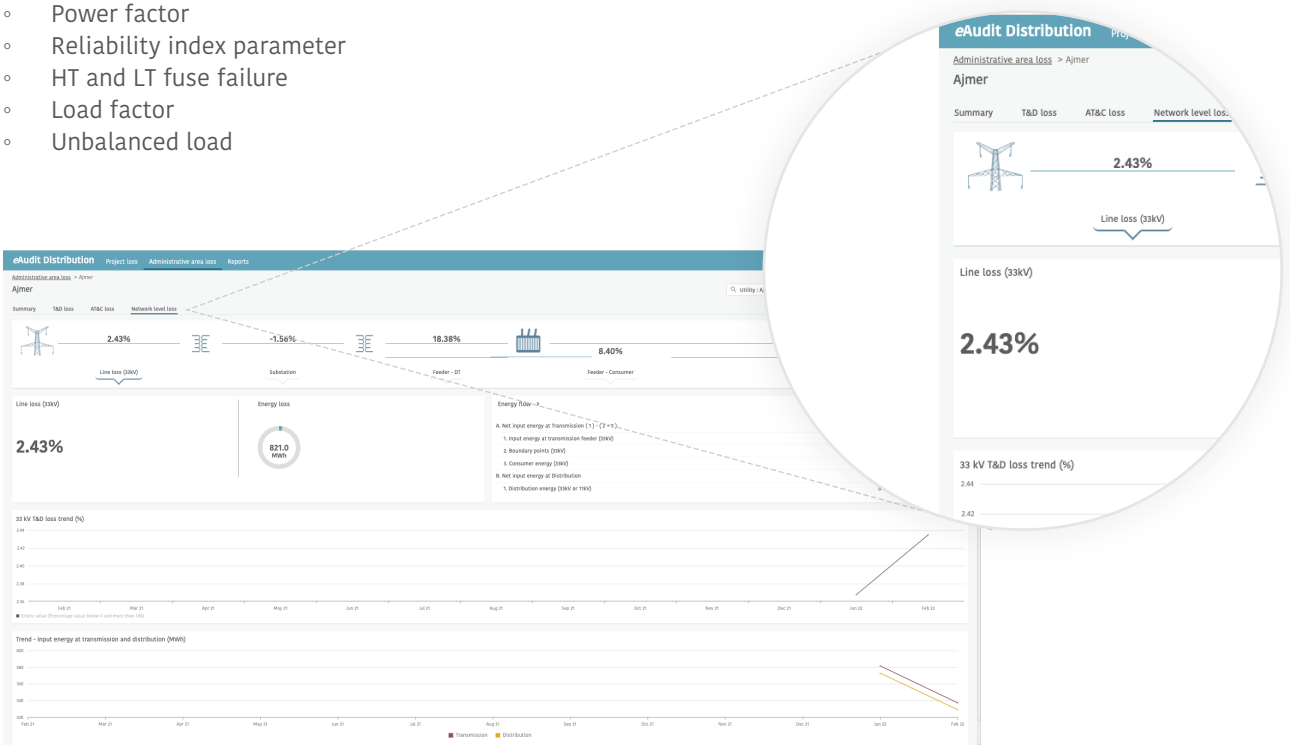


- Network and geographical area-wise AT&C loss, billing efficiency, collection efficiency reports and dashboards to identify the high revenue leakage segment or area



- Trend analysis of T&D and AT&C loss for a network and geographical area to identify the seasonal load and loss behavior

- Network-based asset health monitoring information
    - Maximum demand, current, and voltage
    - Power factor
    - Reliability index parameter
    - HT and LT fuse failure
    - Load factor
    - Unbalanced load

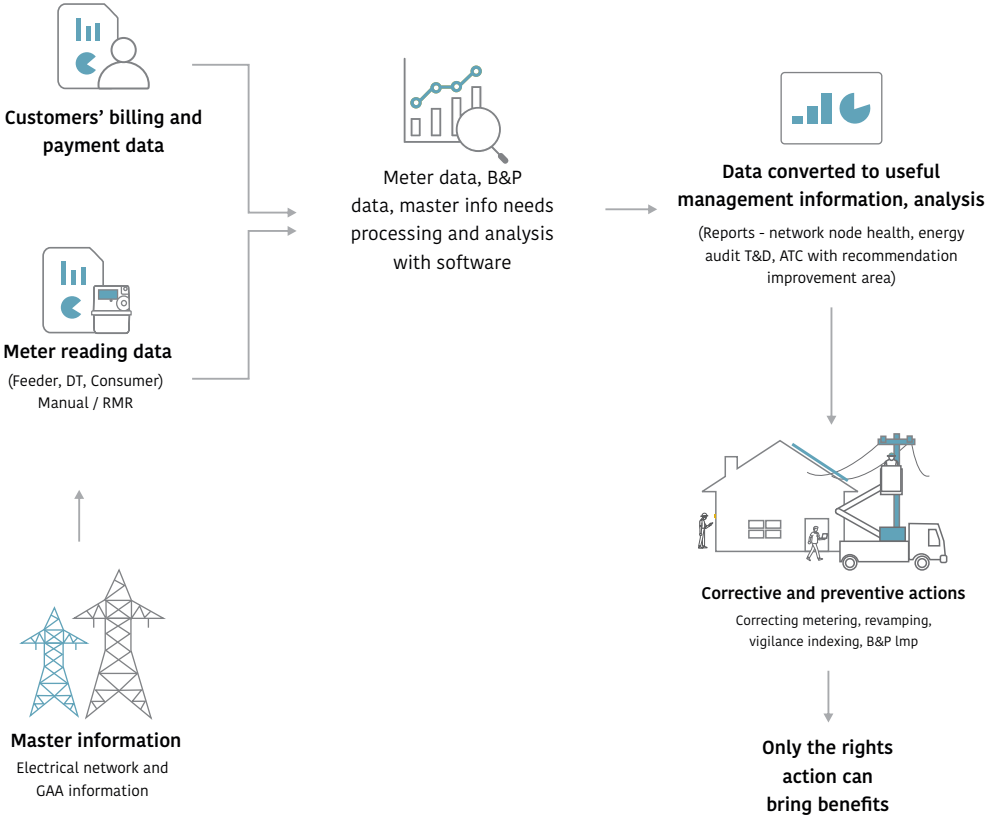


- Recommendations/alerts/actionable information on
    - Substation
        - Better and poor performing substation information based on T&D loss
        - Comparative substation analysis based on current loss
    - Feeder
        - Maximum voltage drop information to improve supply quality
        - High outage or interruption information for maintenance
        - Poor power factor information for capacitor enhancement planning

- Distribution transformer
  - Overloading and under loading information for augmentation
  - High outage or interruption information for maintenance
  - Phase-wise unbalancing information for load balancing

Process

This process is drafted considering our experience and utility practices in energy accounting service.



Note: This process may vary from project to project

Deliverables and capabilities

Deliverables

- Interactive dashboard with trend analysis depicting T&D and AT&C loss at different levels (monthly), and asset health parameters (daily/ weekly/monthly)
- 33kV line-level loss and substation mismatch on the dashboard (daily/weekly/monthly)
- Mobile application for selective dashboard representation
- Energy accounting report (T&D and AT&C) at a different level at a different frequency (monthly/quarterly) with actionable information
    - Reports
        - Substation mismatch report
        - Line loss report
        - Asset health monitoring report
        - Reliability index (SAIFI, SAIDI, CAIFI, CAIDI) based report

Features / Capabilities

- In-house infrastructure and cloud infrastructure are supported by multiple meters
- Web-based platform (internet platform)
- Meter data priorities-wise configuration
- Third-party integration through the template

Benefits

Benefits

- Reduction in losses
- Precise loss figures without human intervention
- Revenue leakage identification using reports and dashboards
- Efficient billing and collection
- Identification of improvement opportunities through comparative performance analysis
- Forecasting based on load patterning
- Accurate metering
- Up-to-date network master data
- Identification of unaccounted energy and network tagging gaps
- Asset health monitoring status
- Information to plan for asset improvement or removal
- Identification of
    - Improvement opportunities through comparative performance analysis
    - Unaccounted energy
    - Network tagging gaps
    - Poor supply availability area

Additional services

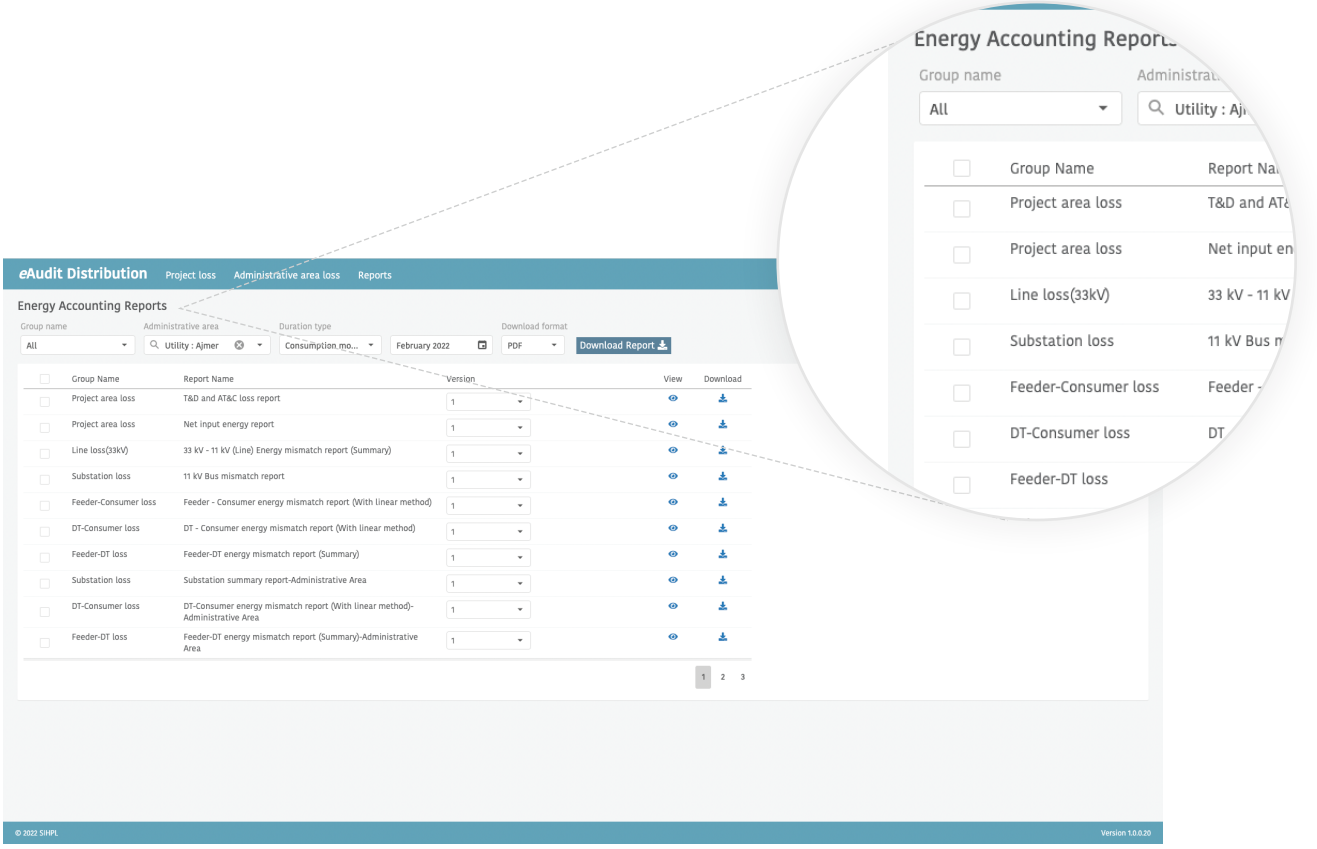
Investing in these services paves the way for energy accounting services to reap their benefits.
As additional services, these are not covered by the loss accounting service scope.

- Consumer indexing
- Asset mapping
- Remote meter reading
- AMC services for metering equipment and modem
- Updating energy nodes' connectivity information regularly
    - Feeder – DT
    - Feeder – consumer
    - DT – consumer

Health monitoring

Asset health monitoring is essential to observe various parameters of an asset and develop actionable recommendations for concerning areas in the distribution network. Our service provides the correct data at the right time, preventing asset failure and facilitating plans for future network expansion. It also identifies vulnerable asset that requires immediate attention.
As a part of the solution, asset health monitoring reports offer following parameters

- DT reports
    - Peak loading condition of the DT for the period with its occurrence time
    - Loading condition (overloading and underloading)
    - Relative unbalance among phases of DT and the highest phase current
    - Performance parameters like load factor, power factor
    - Interruption details in numbers and duration, and total data availability duration
    - Reliability indices like CAIFI and CAIDI (reference consumer data should be available)
    - DT consumption
    - Phase-wise voltage and current
    - Maximum neutral current with date and time
    - Graphical reports showing profiles and duration curves for exceptional cases showing current unbalance voltage profile and duration
    - Area wise separate exceptional reports (OL, UL and UB) for immediate action
- Feeder reports
    - Feeder energy consumption
    - Highest and lowest power factor
    - Reliability indices like SAIFI and SAIDI
    - Peak and base demand with date and time
    - Load factor interruption details in numbers and duration, and total data availability duration


eAudit Distribution
Project loss
Administrative area loss
Reports
Energy Accounting Reports
Group name
All
Administrative area
Utility : Ajmer
Duration type
Consumption mo...
February 2022
Download format
PDF
Download Report
Group Name
Report Name
Version
View
Download
Project area loss
T&D and AT&C loss report
Project area loss
Net input energy report
Line loss(33kV)
33 kV - 11 kV (Line) Energy mismatch report (Summary)
Substation loss
11 kV Bus mismatch report
Feeder-Consumer loss
Feeder - Consumer energy mismatch report (With linear method)
DT-Consumer loss
DT - Consumer energy mismatch report (With linear method)
Feeder-DT loss
Feeder-DT energy mismatch report (Summary)
Substation loss
Substation summary report-Administrative Area
DT-Consumer loss
DT-Consumer energy mismatch report (With linear method)-Administrative Area
Feeder-DT loss
Feeder-DT energy mismatch report (Summary)-Administrative Area
1
2
3
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Version 1.0.0.20
Energy Accounting Report
Group name
All
Utility : Aj
Group Name
Project area loss
Project area loss
Line loss(33kV)
Substation loss
Feeder-Consumer loss
DT-Consumer loss
Feeder-DT loss

Who we are

Secure is a multi-national corporation committed to providing revenue management, power quality and energy efficiency to its customers and communities, enabling them to save money, reduce energy consumption and facilitate comfortable living. Since delivering India's first commercially viable energy meter in 1987, we have come a long way - employing 6500 people worldwide, with offices in Australia, Bangladesh, India, Italy, Malaysia, Singapore, Sweden, Switzerland, UAE, and the United Kingdom. Our products are deployed in more than 60 countries with the highest data security and customer service standards.