EY loss prevention services for utilities

Integrating machine and human intelligence

Forensic & Integrity Services

EY

Building a better working world

Meter-to-cash loss is a major issue facing utilities worldwide

Power theft around the globe

▸ **India:** More than US$16 billion in power theft every year — more than any other country.[2]

▸ **Canada:** Indoor marijuana farms are the leading cause of electricity theft with growers stealing power to mask operations and increase profits.[3]

▸ **US:** Electricity theft is the third largest type of theft costing an estimated US$6 billion a year.[4]

▸ **Mexico:** Electricity theft cost more than US$3 billion from June 2018 to June 2019.[5]

Utility companies are losing staggering amounts of money in the meter-to-cash process for both electricity and water distribution. The estimated theft, fraud and other non-technical losses total US$96 billion per year globally.[1] This problem is crippling many utility companies, driving up prices for customers who do pay and forcing many governments to provide subsidies. Emerging markets lose a large percentage of output to theft, but North American and European utilities are also impacted. Major types of non-technical losses for power and water utilities include:

▸ **Illegal connections** — customers bypass meters and connect directly to the grid or water supply

▸ **Fraud** — meters are tampered, grids or data are manipulated to reduce registered consumption

▸ **Flaws in processes and IT systems**, including data inconsistency, billing and collection problems and incorrectly applied tariffs

Theft dries up water supplies in many countries:

▸ **Brazil:** Roughly 37% of the water pumped into the supply network is lost due to leaks, faulty meters or theft.[6]

▸ **United Kingdom:** Unauthorized connections to pipes siphoned off more than a quarter of the water treated by Britain's biggest supplier in 2018.[7]

▸ **Spain:** Severe drought is causing more farmers to dig illegal wells for irrigation — it's estimated there are more than a million unauthorized wells.[8]

▸ **Jordan:** Municipal water networks lose about half their water to theft and leaks, exacerbating the country's severe water shortage.[9]

1 *Electricity Theft and Non-Technical Losses: Global Markets, Solutions, and Vendors*, Northeast Group, LLC, May 2017.

2 Anjani Trivedi, "Power Thieves Drain India's Electric-Car Hopes," *Bloomberg website*, www.bloomberg.com/opinion/articles/2019-05-06/india-s-electric-car-goals-undermined-by-power-thieves, accessed 20 May 2020.

3 "Power Theft," *dTechs Electrical Profile Management website*, dtechsepm.com/power-theft/, accessed 20 May 2020.

4 Peter Kelly-Detwiler, "Electricity Theft: A Bigger Issue than You Think," *Forbes website*, www.forbes.com/sites/peterdetwiler/2013/04/23/electricity-theft-a-bigger-issue-than-you-think/#12d5286a5ed7, accessed 20 May 2020.

5 Adam D. Williams, "Mexico Steps Up Push to Reduce Rampant Electricity Theft," *Natural Gas Intel (NGI) website*, www.naturalgasintel.com/articles/119821-mexico-steps-up-push-to-reduce-rampant-electricity-theft, accessed 20 May 2020.

6 "Using AI to trace leaking pipes," *The Economist*, 26 April 2018, www.economist.com/science-and-technology/2018/04/26/using-ai-to-trace-leaking-pipes.

7 Gill Plimmer, "Thames Water deploys detectives to stop water theft," *Financial Times*, 24 January 2018, www.ft.com/content/e8cc9670-00f4-11e8-9650-9c0ad2d7c5b5.

8 "Spain's vast network of illegal wells exposed after death of toddler," 1 February 2019, www.dw.com/en/spains-vast-network-of-illegal-wells-exposed-after-death-of-toddler/a-47311150.
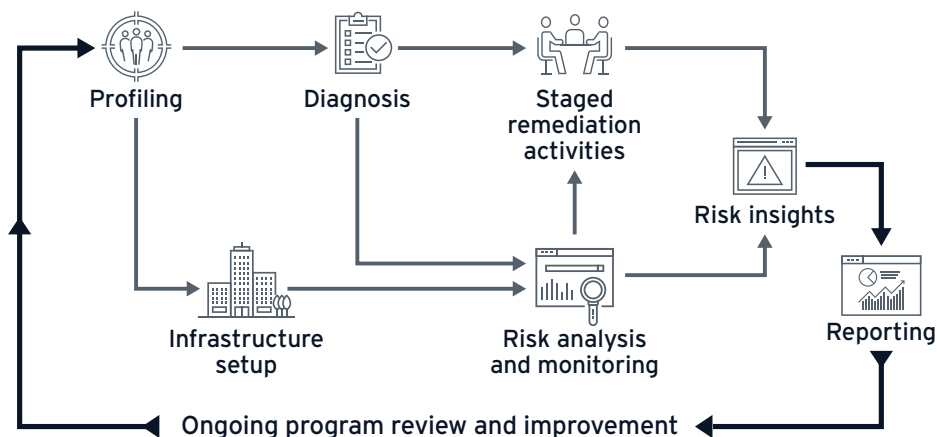
9 Elizabeth Whitman, "A land without water: the scramble to stop Jordan from running dry," *Nature*, 4 September 2019, www.nature.com/articles/d41586-019-02600-w.

EY approach to loss prevention

Consultative and collaborative

Capitalizing on decades of fraud detection and risk monitoring experience, EY teams work with businesses to develop an effective loss prevention program. The consultative EY approach focuses on prevention, detection and mitigation measures from business, operations and technology perspectives. The broad range of EY services comprises profiling fraud and loss schemes; using artificial intelligence (AI) and analytics technologies for process and control evaluation; implementing workflows and escalation procedures, developing risk monitoring control measures, loss calculation, return on investment tracking and reporting and remediation procedures. Using insights generated from risk analysis, EY teams can help you develop field inspection programs that are seamlessly integrated with existing service management systems. This allows you to work in a familiar environment without the need of extensive training.

Chart 1. EY loss prevention prescriptive methodology

Enhanced by data and analytics

Using interactive surveys or in-person workshops, EY professionals kick off each project by working with business stakeholders to evaluate existing processes and controls, as well as loss risks during the meter-to-cash process. The resulting risk profile is used to build a business case and serves as the basis for loss diagnosis.

Using data from various systems (e.g., billing), EY teams help determine companies' root causes for various loss categories (e.g., process errors, data manipulation) and quantify risks using AI

and other advanced analytics technologies. In parallel, a data- and analytics-based infrastructure is built for ongoing risk analysis and monitoring.

Remediation efforts typically are carried out in a staged approach designed to provide early return on investment. At the end of each stage, remediation results are assessed and used to plan for the next stage. Finally, insights gained from risk analysis and remediation efforts are combined into one comprehensive report and fed into an ongoing program review and improvement process.

The use of analytics is expanded to provide estimations, by location or customer segment, for the total losses caused by fraud, defective meters and water losses. The loss quantification function also can be used to calculate losses from accounting issues, such as poor data quality, incorrectly applied tariffs, inaccurate estimations and missed invoices.

Technology that supports EY services

Powered by virtual analytics infrastructure (EY Virtual), EY loss prevention services for utilities can be deployed on premises or via cloud, has the scalability to be implemented in multiple locations and the ability to integrate with a multitude of systems, e.g., billing systems, enterprise resource planning (ERP) systems, service management or meter management systems.
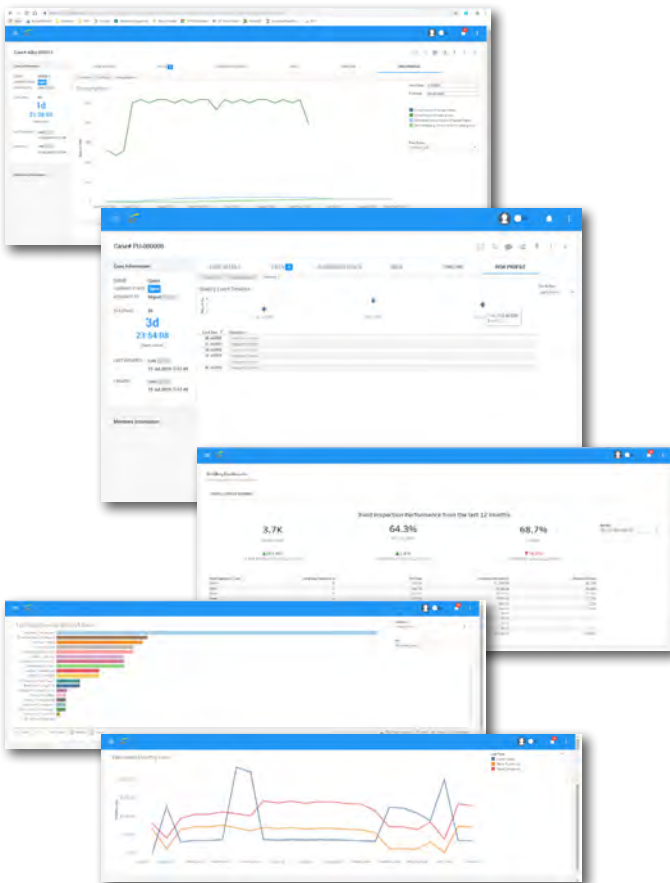
Access to data anywhere and at anytime

EY teams regard broad and sufficient data as the key to safeguard against theft and fraud. EY technology is specifically designed to ingest and analyze relevant data sources, structured and unstructured, to help companies gain a consolidated view of their risk environment instead of resorting to sampling. While sampling may be helpful to assess the scale of the problem, it may not identify specific instances of theft. Typical sources included in the data ingestion process are master data, billing data, readings and consumption, invoices, service orders, and field inspection results.

The EY data-centric approach does not view a certain level of data quality as a prerequisite for a loss prevention project. Instead, data quality is viewed as a potential cause of loss that needs to be addressed in the same way as other losses.

Interactive and integrated case management capabilities

Through EY Virtual's built-in interactive case management tool, investigators have access to a full view of anti-fraud and loss prevention schemes, which helps them to manage alerts and drill into specific risk areas in real time. Users also have the ability to automate certain escalation procedures using workflow tools. The case manager can integrate a wide range of data sources so that relevant information needed for investigation is readily available at one central location.

Visual executive dashboard and robust reporting

The EY executive dashboard helps operational leaders and loss prevention teams to monitor the performance of multiple locations in one consolidated view in real time. The reports can be customized using easy-to-use configuration function to show key performance indicators such as hit rate per inspection, fraud identified, and losses recovered. Besides risk insights, business owners can also gain additional operational measurements such as revenue performance and sales projections.
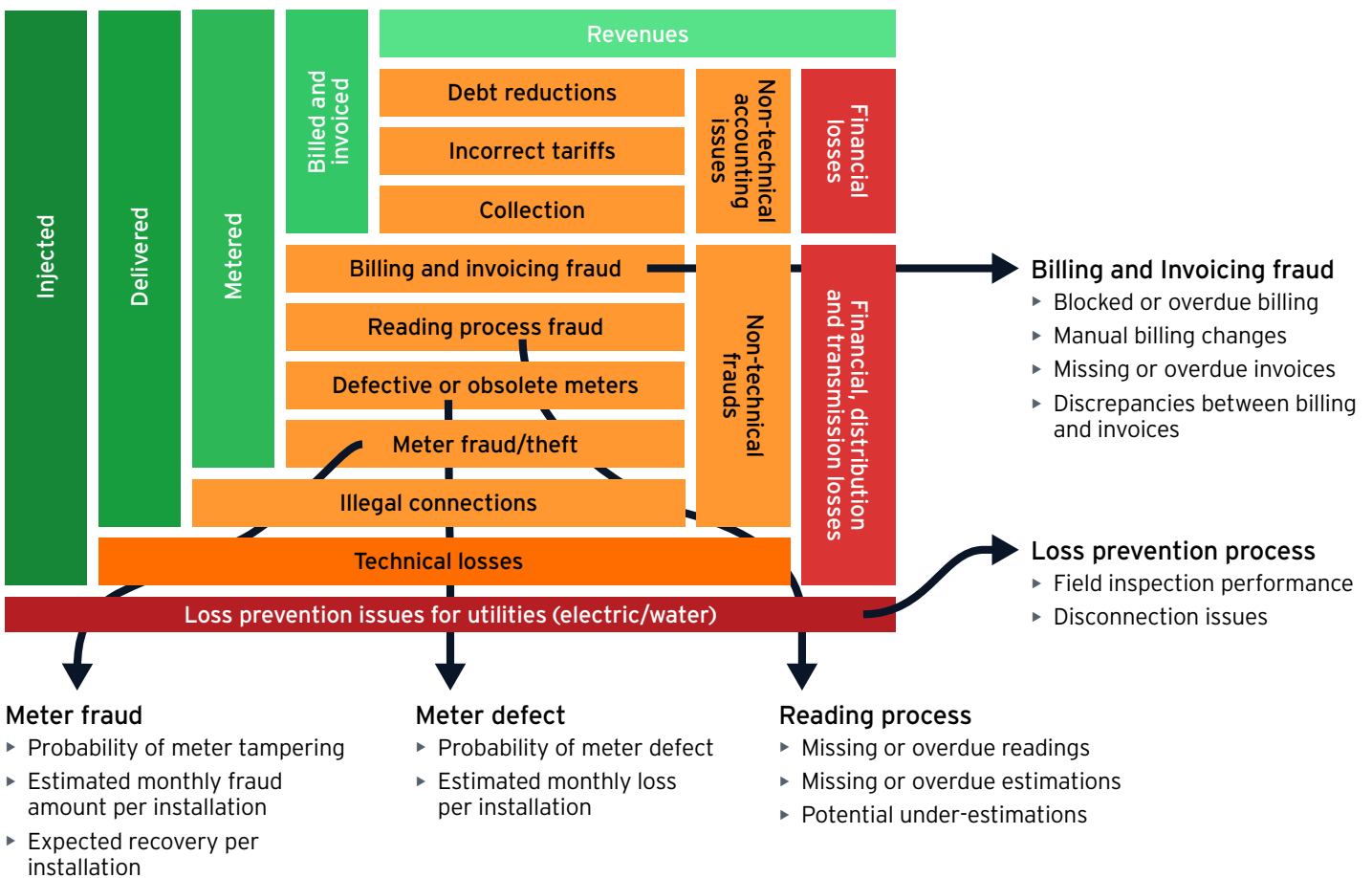
Loss detection enhanced by advanced AI technologies on a continual basis

At the core of an EY offering is a library of proprietary, sector-specific, loss prevention algorithms using historical incidents. EY teams work with clients to develop custom algorithms for non-technical losses based on their unique business model and risk profile. Each algorithm is translated into machine learning scoring models that generate risks indicators to show issues such as potential theft, meter defect, illegal connections and overdue or missed readings. The models also estimate monetary damages and the probability of recovery. The results are used to determine appropriate remediation efforts. Remediation activities are monitored to gain further insights that are used to retrain machine learning algorithms, leading to continual improvement in detecting and preventing nontechnical losses.

Chart 2. Sample risk assessment

Meter fraud
▸ Probability of meter tampering
▸ Estimated monthly fraud amount per installation
▸ Expected recovery per installation

Meter defect
▸ Probability of meter defect
▸ Estimated monthly loss per installation

Reading process
▸ Missing or overdue readings
▸ Missing or overdue estimations
▸ Potential under-estimations

Billing and Invoicing fraud
▸ Blocked or overdue billing
▸ Manual billing changes
▸ Missing or overdue invoices
▸ Discrepancies between billing and invoices

Loss prevention process
▸ Field inspection performance
▸ Disconnection issues

Multiple deployment options

Through managed services or preferred provider arrangements, EY teams forge long-term relationships with organizations that enable them to gain deep knowledge of their risks and potential for recovery. Effective loss prevention programs with remediation measures are developed that leverage both advanced technologies and nontechnical approaches.

1 EY cloud

Source data is hosted on our secure EY network with single and multiuser cloud options. Scalability is offered and 24 x 7 availability via an EY technology infrastructure used across the globe.

2 Enterprise deployment

All data traffic is maintained within the client network, without any outside access.

3 Client cloud

EY teams integrate with many of the most common and popular cloud technologies.

EY teams in action

Helping an electricity company develop a loss prevention program

Working with a Latin American electric utility, EY professionals performed an in-depth loss analysis of their meter-to-cash process through interviews, as well as advanced data analyses, to identify and quantify risks and losses. Besides identifying issues with meter fraud, readings and estimations, a rising trend in fraud risks was observed when the company began outsourcing its meter readings. The team also discovered that the utility's tip hotline was not anonymous, which greatly hampered its effectiveness. Further analysis revealed that the contract with the outsourcing company had no provisions regarding ethical behavior or background checks for meter readers. As a result, the company engaged in a renegotiation to improve employee vetting and to include key performance indicators about fraud.

Assisting a water utility reduce nontechnical loss and improve its field inspection programs

A water utility in Central America engaged EY teams to help implement a data analytics program with the objective to reduce non-technical losses and increase the effectiveness of its field inspection programs. The company lacked a machine-readable repository of past cases of meter fraud. As a result, we performed text analyses on service orders to create training data, which we then used to develop fraud detection algorithms using machine learning technologies. The risk insights generated helped the company to more effectively identify and remove illegal connections and ultimately saw significant loss recoveries.

Global presence

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- Dallas
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- Los Angeles
- Mexico City
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- San Antonio
- San Francisco
- San Jose
- Santiago
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- Secaucus
- Toronto
- Washington, DC

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- Melbourne
- Perth
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- Shanghai
- Singapore
- Sydney
- Taipei
- Tokyo

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Legend:

- Jurisdictions with EY presence
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- Advanced security centers
- Forensic data centers
- Managed Document Review centers

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