

Electricity Theft

Monitoring for Meter Swapping

TRENDALYZE

BUSINESS CASE

The Use of Micro Trend Analytics Against Electricity Theft



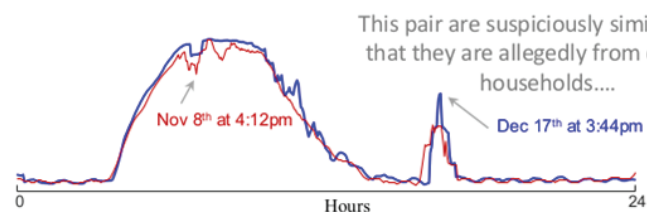
Electricity theft is becoming a global dilemma, costing power companies around the world about \$96 billion a year according to PR Newswire. Not only does this problem cost power companies billions each year, but customers must also deal with higher energy prices to cover the losses caused by energy theft.



Enterprising energy thieves use a variety of methods to steal electricity, including meter swapping. This issue has become more prevalent with the use of wireless meters. For instance, a customer, let's call him customer A, may live next to an older lady, we'll call her customer B. Customer A may have one or two electric cars in his garage, he may also have a large family and likes to keep his home extremely cold during the summer. On the other hand, customer B lives alone and keeps her energy use down to the barest minimum. It's easy to see that customer A's electric bills will be much higher than customer B's. Customer A may decide to cut down his electric bill by swapping meters with customer B. As a result, customer A now pays a much lower energy bill, while his neighbor's electric bill suddenly escalates as she is now paying for customer A's electricity.



The graph on the right side shows a pair of homes with highly similar power usage where the meter swapping is well planned and harder to detect. Customer A has switched electric meters with customer B for a short period of time which makes the spike in electricity consumption of customer B particularly hard to detect and less suspicious.



This is a common problem that's often difficult for power companies to identify. The difficulty arises due to the "bursty" use of electricity. Each home has a unique



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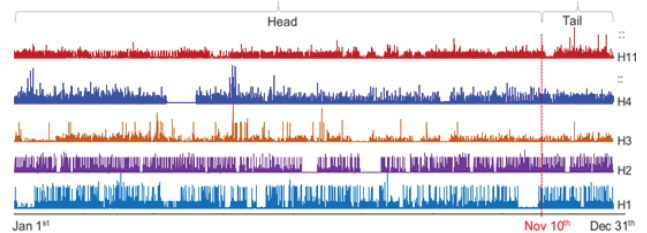
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footprint or shape of its power consumption over time. For example, a customer may use more electricity to cool their house during the summer, while their winter use of power is much less. This is one example of “bursty” use of electricity usage. Billing analysts who are looking just at the average electricity consumption will not be able to detect this crime unless they are able to compare the detailed individual household footprint. But how can they do that for thousands and even millions of households?



The graph on the right side illustrates why it is so difficult to monitor the electricity consumption footprints of individual homes. The individual home's electric usage footprints display common patterns or trends of use over time. Each home's footprint displays a specific pattern; the pattern generally stays stable for each household over time. But look at the graph – can you reliably tell the differences? The footprints are too dense for the human eye to be able to spot changes in usage trends that may signal meter swapping.



The graph below is another example of a home's energy use over time. As you can see, while there is a certain pattern to the use of electricity, the readings are not completely alike even though they are allegedly from the same household. Because the consumption pattern of each household is similar on a period over period basis but not exactly identical meter swapping gets obfuscated in the average electricity consumption. This is why it's difficult for power companies



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to find instances of electricity theft—it's not always obvious to the meter reader or the company's data analysts. Compare this to the first graph, and you'll see why this trend is difficult to spot. How can you tell which is a normal reading for a home or which graph displays an instance of meter swapping?



Micro trend analysis is a new method available to help electric companies spot and take action against power thieves. With Trendalyze electric companies can compare the energy footprints of different households and monitor if the footprints are changing over time. Electric companies can also run comparative analysis on the footprints of different households and quantify the differences in order to detect meter swapping. The individual households' footprints monitoring is completely automated across hundreds of thousands of customers and sends alerts to the billing analysts about suspicious patterns for further investigation. This is how Trendalyze helps electric companies solve the issue of electricity theft.



Trendalyze's platform has been built to operate like Google; rather than searching for words, Trendalyze searches for patterns within time series data from billions of trend lines. The benefits of using the Trendalyze platform include:

- **Improved efficiency & forecasting:** in all power companies and other businesses, at all levels—find problems before they happen.
- **Decrease energy theft:** by quickly spotting electricity theft within time series data for homes or neighborhoods.
- **Monitoring:** get alerts for trend shifts to prevent problems (such as energy theft) as they occur—catching them faster and sooner to cut down on company and customer financial losses due to meter swapping.

Trendalyze makes it easy for anyone to analyze micro trends with our highly interactive visualization and search functions. Use the platform to pinpoint micro trends in time-series data with just a few clicks. Our platform unlocks the value of time series patterns, helping power companies find energy thieves, new revenue streams and increase profitability.



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