

## ARTICLE: COCKTAIL PARTIES AND UTILITY CONSUMPTION DATA



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# Cocktail Parties and Utility Consumption Data

Discussing utility consumption data at your next cocktail party may not earn you the "life of the party" award, but then again, that depends on who you hang out with. If your friends get excited about applying new perspectives to old ideas, they'll love it if you share some of the new technologies that are being adapted to utility consumption data in the multifamily arena.

## Turning Data Into Actionable Information

Imagine for a moment that you have the capability to review the electric, gas, or water consumption data for your multitenant property and analyze it to determine:

- Undetected maintenance issues like leaks and malfunctioning heating systems
- Problems with metering equipment
- Which readings are accurate and which need further review
- How your property compares from a utility consumption standpoint, to similarly configured properties
- Which residents use the most energy and why.

Wouldn't you be able to save a lot of money and have more confidence that your residents were receiving accurate bills? Wouldn't it reduce resident complaints?

There is a wealth of actionable information that can be mined from monthly utility data if you know how and where to look. The better you are at mining this information, the more efficient your monthly billing program will be and the fewer problems you'll have to deal with.

Software applications that conduct sophisticated data mining and statistical analysis are commonplace in many other industries such as manufacturing, high-technology, and biotechnology. In the utility billing industry, however, these tools are rarely used. One of the reasons is that many companies use older, legacy software systems to collect and process consumption data. These systems don't support rules-driven statistical analysis that can be automated.

## Manual Review Processes Lead To Costly Errors

Many billing companies leave the task of reviewing billing data to analysts. Analysts pore over reams and reams of printed consumption data reports trying to identify problems, anomalies, and patterns that require further review. The trouble with this approach is that not only is it mind-numbing, it's time intensive, and prone to error.

Analysts either miss important information or are forced to review information that is not problematic, spending valuable time in the process. Some companies simply assume the data is correct, bill residents, and handle problems via the customer support function. Disgruntled residents are considered a natural part of the monthly billing equation.

Many experienced owners and property managers have come to see inaccurate utility bills as the norm. This shouldn't be the case. Statistical data analysis increases the accuracy of utility consumption data,

and substantially improves the overall billing process. Since fixing errors is always more expensive than preventing them, these technologies can actually reduce operating costs.

## A Simple Example

Consider a 200 unit apartment complex that is individually submetered for water. Each month, an analyst reviews consumption data prior to calculating and sending resident bills. In general, most analysts don't have historical data that is readily accessible that they can compare to.

Unit 101 uses 1875 gallons of water in May. Should the resident be billed? Well that depends. The first thing you'd like to know is whether or not this is a normal read. To answer that, you'd start by looking at the last 12 months consumption data to determine if the value falls in the range of "reasonable." If average consumption for this person is 1400 gallons of water, you'd probably flag this data because it's more than 30% higher than the average.

Next, you'd look at the maximum value over a longer period of time--e.g. two years--to see if this reading is truly high, or if it's in line with previous readings. You'd notice that two years ago in May, this same unit used 2050 gallons of water. A review of the notes would show that this resident has a small studio apartment, but she grows an extensive patio garden that requires frequent watering. She usually gets it going in May.

## Applying Business Rules To Test Utility Data

By performing statistical analysis on consumption data, you can be more certain that the data is accurate and that billing should proceed. With a manual review process, however, you have to invest time to look at the data closely. Even though the manual process may arrive at the same conclusion, it requires much greater effort.

Now consider that many billing companies are processing large volumes of data and applying multiple rules to determine if usage data is correct or not. Without the benefit of analytical software tools, this is a slow, labor-intensive, and error prone process at its best. Moreover, there's a limit to the number of complexes an individual analyst can realistically manage.

## Using Technology To Optimize Billing Operations

Software tools are much better at managing large volumes of data, analyzing that data, and calculating results. They operate quickly, the amount of data they can process is virtually unlimited, and they function with a high degree of accuracy. They effectively extend the processing capabilities of analysts and improve operational efficiency.

## A Second Example

The McBride's live in a two bedroom apartment and for the past three years have used an average of 2500 gallons of water every month. One month, their usage spikes to 5600 gallons. You run an analysis and see that this value exceeds the average by more than 30% and there is no historical high value that's even close.

What information does this data tell you? One possibility is that the McBride's allowed their son's family of four to move in. Even though they pay for the excess water usage, the increased occupancy may violate the lease agreement. Another option is that they have an undetected leak within the unit--e.g., a running toilet or leaky faucet.

This case actually revealed a different situation. While there were no broken toilets or leaky pipes inside the unit, there was a leak between the interior and exterior walls of the apartment near a water spigot. Because consumption could be measured directly and the analysis was timely, the maintenance team was notified and an otherwise costly problem, for the resident and the property owner, was averted.

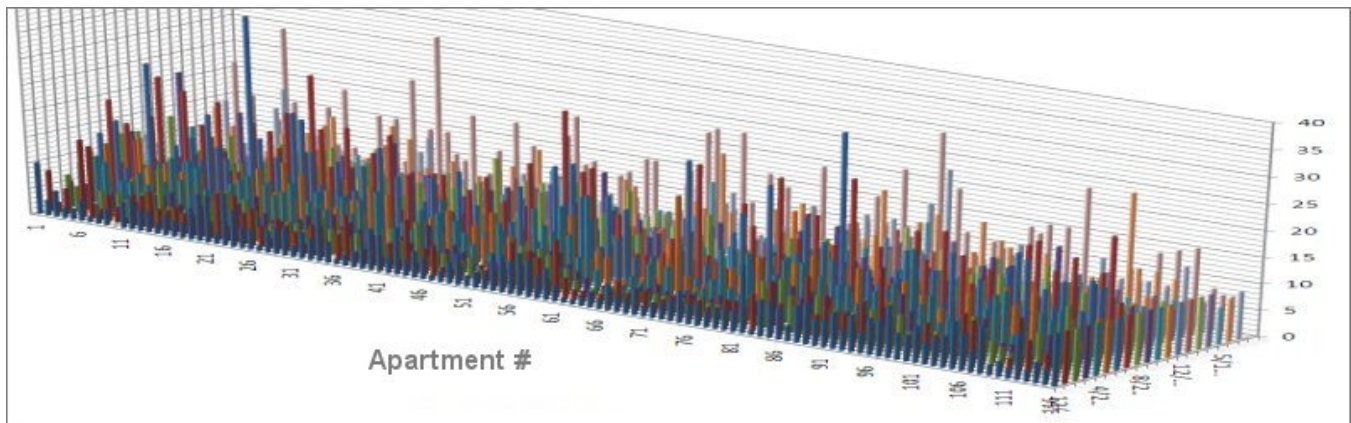
### Pattern Recognition Is The Secret Sauce

The above examples are very straightforward and handled routinely by most billing companies. This next case is much more exciting and illustrative of the power of statistical analysis.

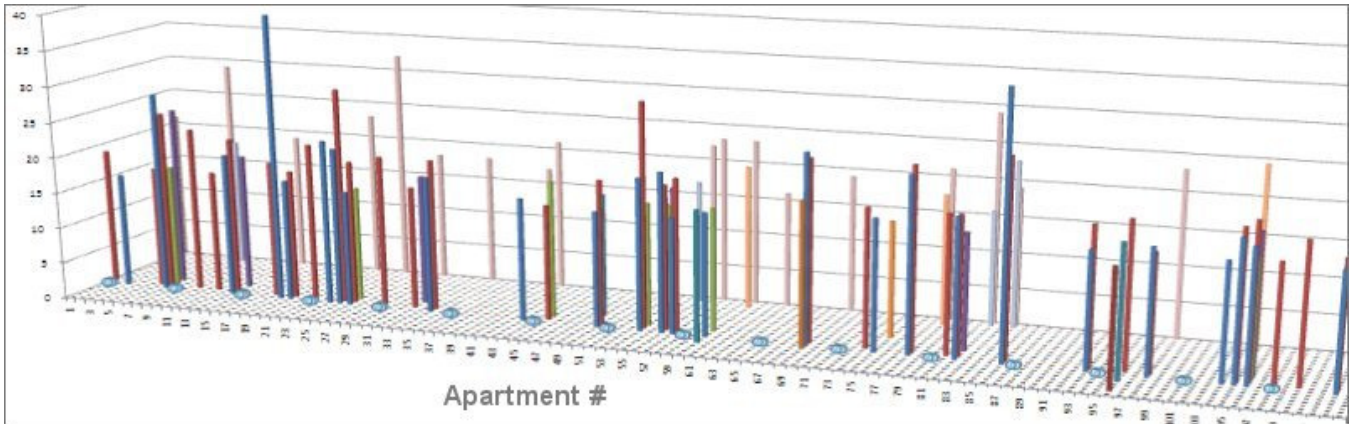
Take a look at the following data table. It shows water consumption data for a 116 unit complex that has been recorded for 19 months. It has been cropped to fit this page but includes another 111 units and 5 more months of data. If you had to review this data, which readings/units have potential problems? Should you look at the 28s, the 19s or the 0s?

	12/27/2007	1/28/2008	2/27/2008	3/25/2008	4/27/2008	5/28/2008	6/30/2008	7/30/2008	8/29/2008	9/30/2008	10/30/2008	12/1/2008	12/30/2008	1/30/2009
1	10	8	0	5	8	10	13	19	12	12	5	2	3	2
2	3	2	7	2	2	2	4	7	3	3	2	5	4	4
3	5	5	5	5	10	12	16	15	13	12	10	6	4	6
4	2	0	0	1	9	0	7	12	6	7	6	3	3	2
5	2	15	2	1	3	1	2	1	2	1	2	1	2	1
6	4	14	5	4	6	6	3	17	8	9	6	5	4	5
7	1	2	1	1	6	14	28	25	17	25	14	6	1	1
8	2	5	5	4	8	9	9	9	5	5	6	5	4	5
9	3	3	4	3	6	4	9	10	7	9	4	3	2	3
10	0	1	2	2	3	10	13	23	11	10	8	4	3	4
11	5	6	6	5	7	8	10	11	7	7	5	6	5	5
12	6	6	6	5	12	9	15	17	11	11	7	8	8	8
13	4	7	11	6	8	7	11	15	8	9	9	10	8	8
14	4	4	4	4	12	9	20	22	15	19	5	7	4	3
15	2	4	3	2	11	5	14	9	10	11	3	0	0	1

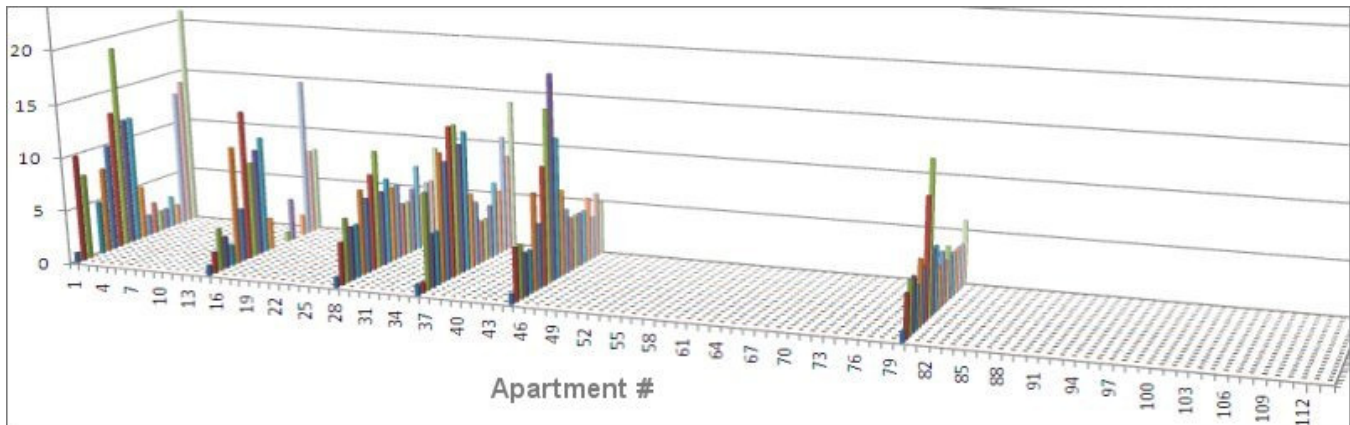
The data for this complex is plotted in the graph below. The height of each bar corresponds to the number of gallons of water used. The months are displayed from the front to the back. The apartment units are displayed from left to right. You might agree that even though this graph is an improvement over the data table, it's confusing to identify problems, even for an experienced analyst.



Take a look at the next graph below. Because most of the consumption data is acceptable, we can remove them from the graph. It doesn't warrant further review by an analyst and can be billed. But we can go even further.



The graph below displays data that has been analyzed more extensively to show properties that require further review. Now an analyst only has to inspect six properties.



Statistical analysis enables a company to take large volumes of data, filter that data according to various business rules, and identify potential issues. The tools that perform this kind of analysis are very fast, very accurate, and very repeatable. Moreover, they can evolve and improve over time as new rules are identified and added to the knowledge base.

### The Benefits of Comparative Data Analysis

With utility consumption data, it's not always enough to know how one resident compares to another resident in a single complex or in multiple complexes. It's also beneficial to know how complexes of equal size compare with each other. Wouldn't you like to know if your apartment complex uses 20% more electricity than other similarly-sized complexes? You'd probably want to know why.

## What Does Google Have To Do With Utility Billing Anyway?

In regards to utility billing, Google doesn't do much. In terms of data analysis, they are experts. Google is a \$145B company that specializes in search technology and Internet advertising. They recently launched an experimental project called Google PowerMeter. Essentially, they integrate their Web platform with smart utility meters to show residents, in real-time, how much energy they are using throughout the day. Their premise is that by giving people information about how they are using utilities (in this case electricity), you can help them make smarter decisions and use energy more wisely.

They are also aware of the benefits of comparative data analysis. Google notes on their PowerMeter website that another purpose of this technology is to "strike up a little friendly competition to see how your energy consumption compares to your friends and neighbors."

Comparing utility billing data in a multifamily complex could also be used for "energy savings contests." An owner might offer a prize to the resident who can reduce his/her gas costs by the largest percentage in a month. Or the property manager might offer an award to all residents who can reduce electric usage by 10% in a month. Comparative data gives owners, managers, and residents more insight into how they are consuming energy so that they can make improvements.

## Conclusion

Using statistical analysis technologies to mine utility usage data can offer valuable rewards. More accurate resident billing, improved ability to detect maintenance issues, and more satisfied residents are a few. These technologies also can save time, money, and preserve our nation's precious resources.

You've probably heard the Peter Drucker saying, "What gets measured, gets managed." Well that's especially true in the world of utility consumption data. To effectively manage data, you have to extract useful information and then take action!

## About American Conservation & Billing Solutions, Inc. (AmCoBi)

AmCoBi offers utility billing, submetering, and conservation consulting services to the multifamily conventional and affordable housing marketplaces. AmCoBi's **UtilityHawk Technology™** provides a means to analyze utility consumption data for the purpose of improving utility bill accuracy and extracting actionable business information.

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