Colorado Springs Utilities
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MANAGING ELECTRICITY COST with INTERVAL DATA

ARTICLE

Eliminating waste is part of business. You can see your usage data on the Colorado Springs Utilities customer portal at no charge. The data can be helpful by comparing one day to another, one week to another, this time last year, etc.

Many electric meters post 'interval data' to the customer portal where you can access it. This article explains what interval data is and how you can use it to spot savings opportunities.

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What is interval data and where can I get it?

The term 'interval data' means meter reading intervals less than a day apart. The intervals of time in recorded interval data is sometimes hourly, sometimes 15 minutes, and sometimes 5 minutes, depending on the meter. But *any of the intervals give excellent insight into usage you might not be aware of*. Information is power!

> *What about interval data for my gas and water meters?*
>
> *Daily data is available for all meters. For some gas and water meters, hourly data is available. The limitation of water and gas meter data is partly from how mechanical meters work, and partly from battery limitations of non-electric meters.*

Even the most basic electric meter can display interval data showing kWh – this is actually a perfect fit when the bill is based almost entirely on kWh. Kilowatt-hours, or "kWh" is a unit of electric energy. For small commercial bills, reducing kWh will reduce your bill directly. Watching "kWh" use is like watching dollar bills on a cash register. In rough numbers, about every ten of them is a dollar, give or take. But try to remember that electricity use is a tool for business and industry. Energy is a good thing, just not something to waste. So, you will see some examples of electricity use when the business is closed for the night or used erratically causing demand charges

to swell….at this point the electricity use is a cost without an associated benefit. Sometimes savings comes from how much is used, and sometimes savings comes from when and at what rate it is used.

Interval data gives you new information that you can use to control your electricity cost. Savings begins with questions and interval data helps get those questions out in the open - questions that never got asked before having interval data:

"Hey, what is that usage I'm seeing in the middle of the night?"

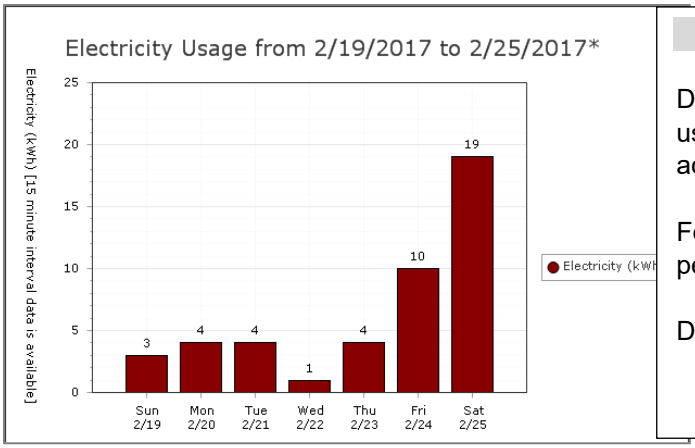
"I thought that was supposed to be off on the weekends!"

"Why doesn't usage go down when we go home?" Etc.

When studying interval data, questions pop up about 'what is that' which is exactly why we suggest you look at this data. The utility does not offer the service to find for you where your electricity is going after it goes through the meter, but with a little scouting you can probably figure it out on your own. For example, you may be able to turn something off for an hour and see the results on the data portal the next day. If you use interval data to find 'ghost loads' you can learn a lot and control a portion of your bill. What you're looking for are things that are using electricity needlessly, like lights, HVAC, space heaters, computers, etc. It all adds up.

Safety note: Of course, some things need to be left on for safety or security or to protect something from freezing, keep food cold, maintain computer data, etc…..so don't turn off critical things.

And please, always be careful with electricity and don't open up electrical panels or get near wiring unless you are a qualified electrician. Just don't. Don't do anything you are not comfortable doing or turn things off without knowing what they are for. Stick to basics and stay safe.



Daily Data

Daily data creates information (or at least raises useful questions) by correlating usage with weekly activity schedules and business days of the week.

For example, if closed on a weekend and usage persists, maybe the thermostat has gone bonkers.

Daily data can spot a water leak while on vacation.

'Multipliers'

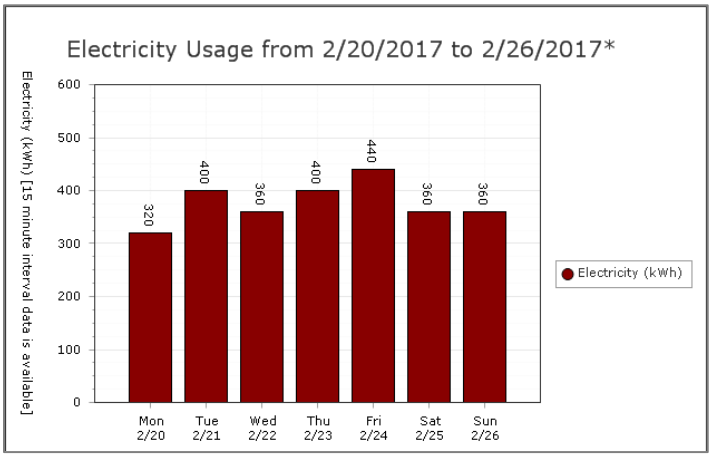
Meters all have a 'multiplier' that records usage as

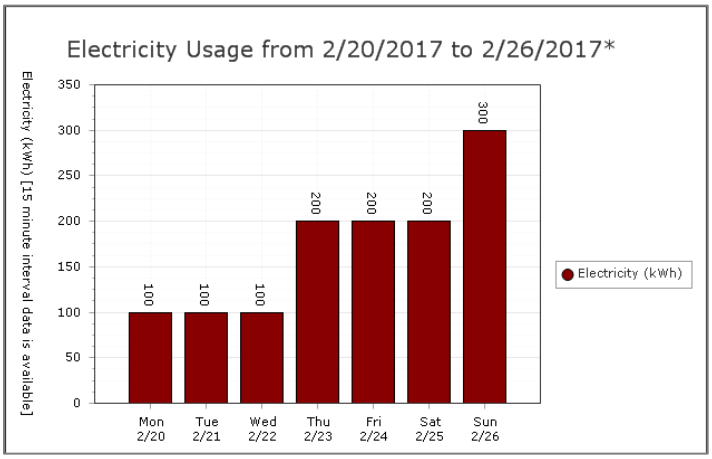
kWh x 1 or
kWh x 10 or
kWh x 100, etc.

Most of the small commercial meters will have a multiplier of "1".

But

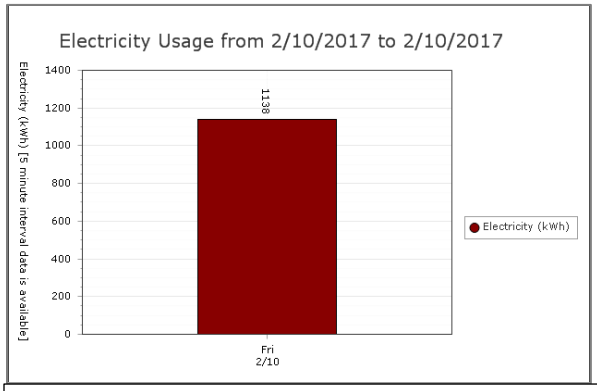
If your meter has a multiplier that is not 1, the daily data will lose some of the 'smoothness' as shown. The upper chart shows a meter with (x10) multiplier; the bottom chart is (x100).

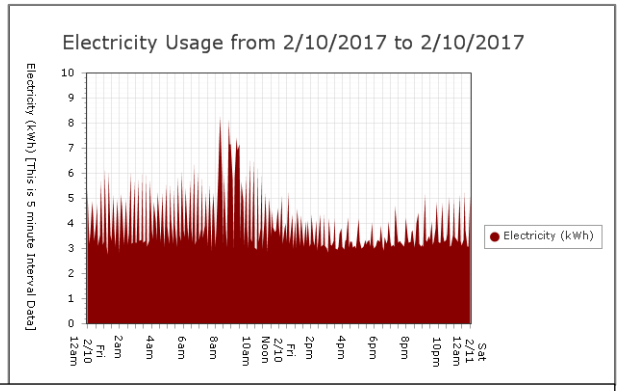




The Case for Interval Data: More data, more uses

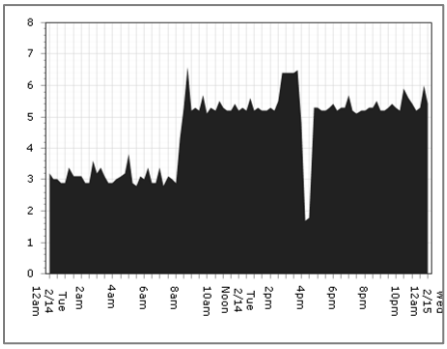
Interval data is your friend for seeing usage associated with times of day, equipment operation, and business hours.

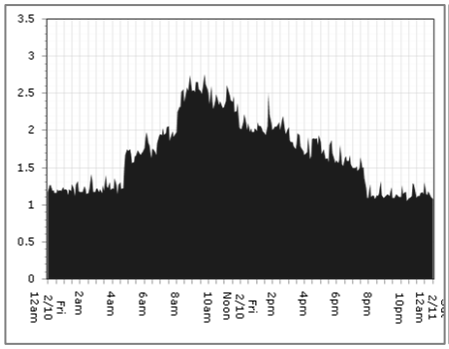


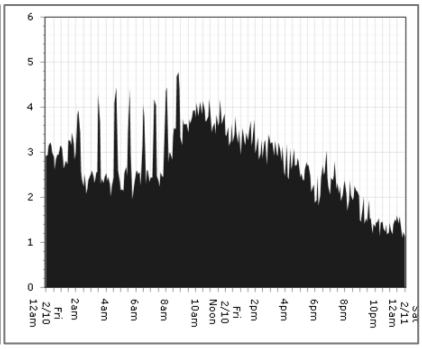


Same day….Interval data on the right. Now data is hourly or even more frequent

Using interval data to help control your electric bill







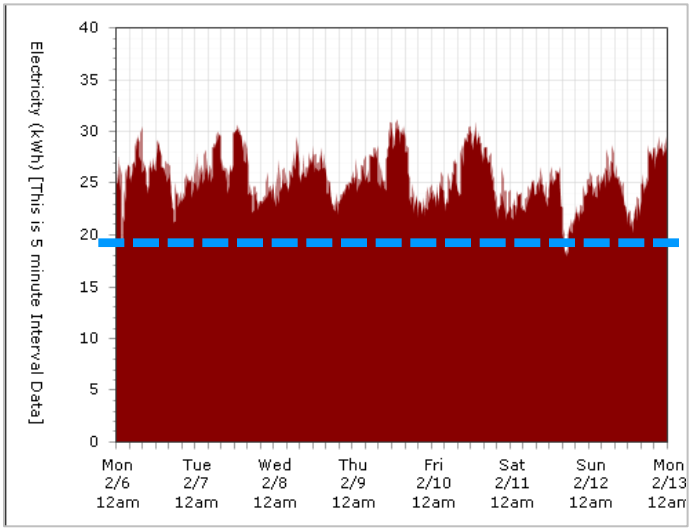
Patterns, Patterns

The visual presentment of raw data helps a lot, especially when combined with knowledge of building schedules and activities – that is where you come in.

High usage on a Saturday…problem? If conducting business on Saturday, maybe normal, but if closed on that day, it begs a question that sounds like ‘I don’t need to be paying for that’.

Example cases

In each case, savings begins with phrases like ‘what’s that??’ and ‘that doesn’t make sense’.



Example 1
Clues from Interval Data

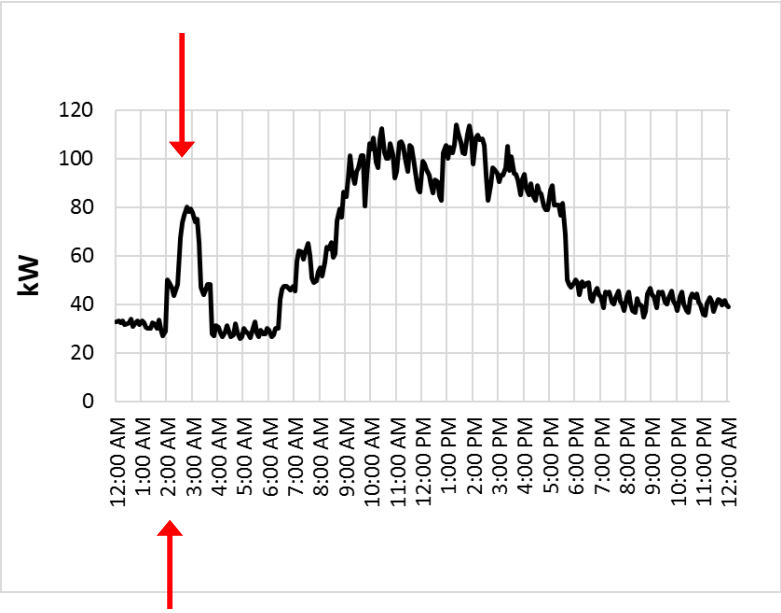
Ghost load (base load that never goes away).
What could it be?

Hard to say ‘what’ it is, but we can estimate its size. This particular meter is reading kWh and indicates “20”.

kWh=kW*hours.
This is a 5 minute interval which is 5 / 60= about 0.08 hours.

…and so… the ghost load kW =
=20kWh / 0.08 hours = 250 kW

Next step: identify what runs all the time in the building, and if it needs to be. 1 kW is roughly 1.2 Hp, so if there is ‘one’ motor as the culprit it would be about 200 Hp (big motor). More likely a variety of things. Data center, underground parking lights. Full time process ovens. Probably not 200 space heaters.

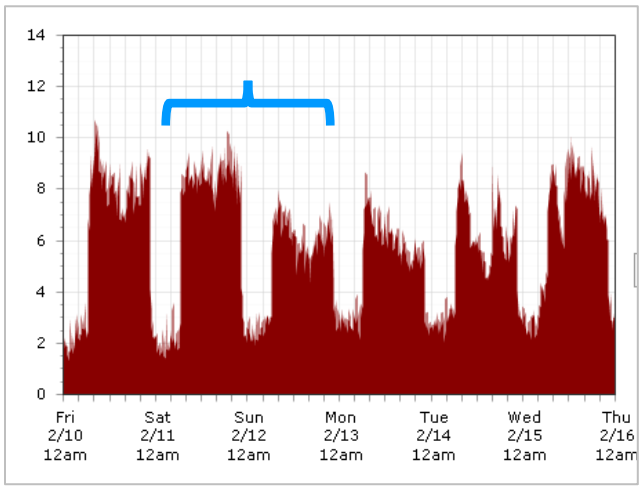


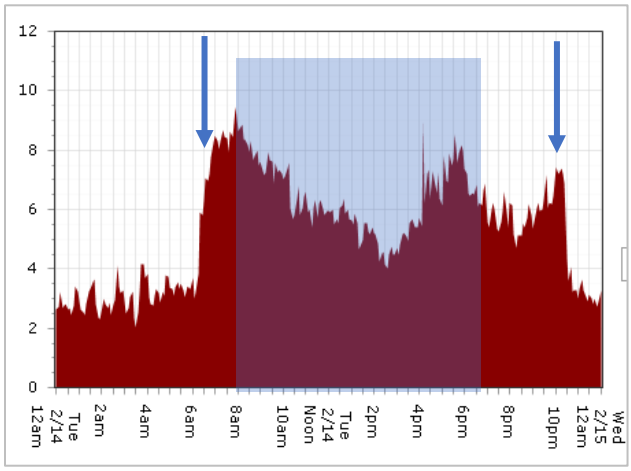
Example 2
Clues from Interval Data

Mystery start/stop load
What could it be?

Not setting a peak but using energy…for something. If useful, fine.

Otherwise might be worth the time to track it down and adjust something so it runs when it does something useful.





Example 3
Clues from Interval Data

Day/night difference is strong – most things are being turned off. Good

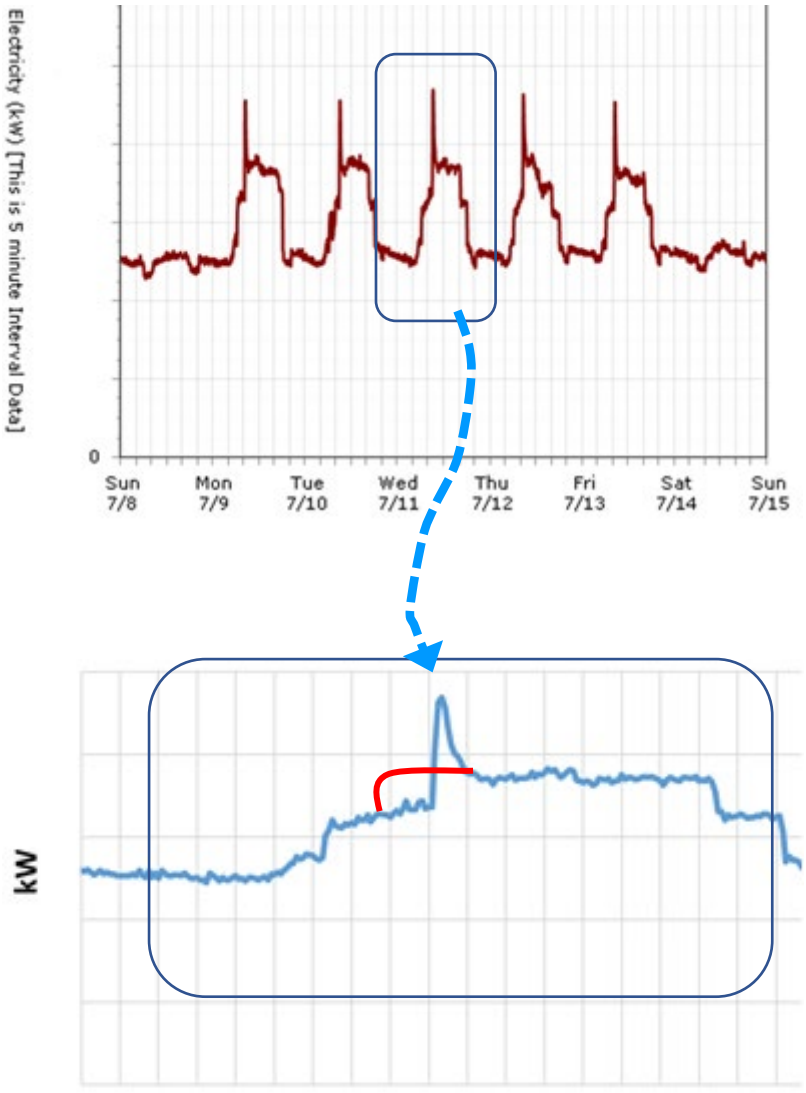
Weekend electric use is not turning down…it's actually a bit higher. Odd, since the facility is closed on weekends.

Let's drill down and look at a single day of the week (bottom chart)

This is a weekday. Store hours are 8a-530p. The abrupt changes are probably the programmable thermostat. 'Occupied' starts about 6am and ends about 11pm.

11pm? Is that what is intended if the facility closes at 6pm? Hmmm Maybe somebody worked late that day. If it is doing this every night, maybe the control schedule needs adjusting.

Actual weekday business hours are shown. It does take an hour or so to warm up a cold building, so starting an hour before employees arrive seems normal. But weekends and late evenings as a habit do not make sense.



Example 4
Clues from Interval Data

Large short-term loads

This is about demand, not energy. See those 'spikes'? Those are short term loads when the building first starts. This is common for buildings that are closed at night and have 'morning warm up' or 'morning cool down'.

Without some supervising controls to prevent it, this can happen. The large heater or cooler unit, unbridled, goes to max capacity for 15 minutes or an hour to 'pick up the load'. It settles down after that, but by then the month's demand charge has already been set.

Chart below illustrates a generic solution: Hold back on the reins (called load limiting), start early, be patient. Same work spread out over time saves you money.

A 50 kW reduction to a monthly on-peak demand is worth about $1000 off the bill.

Side note since the comment comes up so often:

Motor inrush current has only a trivial effect on the demand charge and this example is not about motor inrush current.

The demand charge value of 'kW' is based on the highest three sequential 5-minute average demands…basically a 900 second average. Motor inrush is a few seconds (minor effect against 900) but all of it counts when a large load is present for >15 minutes.