

How demand billing works

Why one reading can dominate your electricity bill

A plain-English guide for South African commercial, industrial and multi-tenant customers.

Published by Panda Power. No jargon, no sales pitch - you can use every step of this yourself.

The short version

Most people read their electricity bill as though it were a water bill: you use a certain amount,

you pay for what you used. For a commercial or industrial supply, that is only half the story.

A large part of your bill - often the largest part - has nothing to do with how much electricity

you used. It is charged on the single highest moment of demand in the month. One busy half-hour

can set a charge you then pay for the whole month, even if the rest of the month was quiet.

That single number is where most billing errors hide, because almost nobody checks it.

Your bill has two very different halves

Look at any commercial electricity invoice and you will find two families of charge.

	Energy charge	Demand charge
Measured in	kWh (kilowatt-hours)	kVA (kilovolt-amperes)

What it answers	How much did you use?	How hard did you pull, at your worst moment?
Billed on	Total consumption for the period	The single highest reading in the month
Typical rate	Rands per kWh	Rands per kVA per month
Reduced by	Using less electricity	Flattening your peaks

The energy charge behaves the way people expect. The demand charge does not. You can cut your

consumption significantly and barely move your demand charge, because demand is not about the

total at all - it is about the peak.

What "maximum demand" actually means

Your meter does not just count units. It also records how much power you were drawing, averaged

over short blocks of time - typically a rolling 15-minute or 30-minute window, depending on your

tariff. Your tariff document will state which; it matters, so it is worth knowing.

At the end of the month, the utility looks back at every one of those blocks and takes the highest

one. That is your maximum demand for the month, and that single figure is what you are billed on.

Three consequences follow, and they surprise most people:

- A brief coincidence costs for a month. If your compressors, ovens, pumps and air-conditioning

all happen to run together for twenty minutes on one morning, that twenty minutes can set the

demand charge for the entire month.

- Being efficient the rest of the month does not help that charge. The other 1

400 half-hours are irrelevant to it.

- Staggering loads is worth real money. Two large loads that never start together can produce a materially lower bill than the same two loads run carelessly - with no reduction in what you actually produce.
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Why kVA, and not kW

Demand is usually billed in kVA rather than kW. The difference is power factor.

- kW is the power doing useful work.
- kVA is the power the network actually has to deliver to you.
- Power factor is the ratio between them.

Motors, transformers and older fluorescent lighting draw current that does no useful work but must

still be carried by the network. If your power factor is poor, your kVA is higher than your kW -

and since you are billed on kVA, you pay for that difference every month.

A site with a power factor of 0.75 is being billed for roughly a third more demand than a site

doing identical work at a power factor of 0.98. Power factor correction is often one of the fastest

paybacks available on a commercial supply, precisely because it attacks a charge you are paying

whether you notice it or not.

What it costs - a worked example

Real City Power Industrial LV demand rates seen on invoices between 2022 and 2025 ranged from about

R257.62 to R318.31 per kVA per month.

Take a site on a 150 A three-phase supply. That breaker physically limits the site to roughly

100 kVA. At a demand rate of R276.90 per kVA:

Monthly peak demand	Demand charge per month	Per year
70 kVA	R19 383	R232 596
50 kVA	R13 845	R166 140
36.6 kVA (actual measured)	R10 135	R121 614

The gap between the first and last row is about R9 248 every month - roughly R111 000 a year -

and not one kilowatt-hour of consumption has changed. That is the entire point of this guide: the

demand figure is worth as much attention as the units you use, and often more.

Five things that commonly go wrong

This is where an audit earns its keep. In our experience these are the recurring faults.

1. Your demand was never actually measured

If the meter cannot be read, or the demand register is not working, the utility may estimate. In the

City of Johannesburg tariff structure, clause 4.1.3.2 addresses this directly for industrial tariffs:

where the maximum demand for the month has not been measured, a maximum of 70 kVA may be used.

That matters enormously. If your real peak is 36 kVA and you are being charged on an assumed 70 kVA,

you are paying roughly double - indefinitely, and quietly.

2. The demand figure is impossible for your supply

Your demand can never exceed what your main breaker physically allows. A 150 A three-phase supply

cannot deliver more than about 100 kVA, so a demand charge based on 184 kVA or 231 kVA on that

supply is not a high reading - it is a wrong one. This is the single easiest error to spot, and one

of the most common.

3. The same month is charged more than once

Demand is charged once per month, on that month's peak. When a utility re-bills a long period - for

example, replacing a run of estimated readings with one corrected invoice - demand charges for

months that were already charged can reappear on the new invoice. Unless somebody counts them, you

pay twice for the same month.

4. Suspiciously round, repeating numbers

Measured demand varies. Real peaks look like 47.3 kVA, then 52.8, then 44.1. If your invoices show

80 kVA, then 80 kVA, then 80 kVA, then 70 kVA, month after month, those are very unlikely to be

measured values. Identical, round figures repeating across consecutive months is a strong signal

that nothing is actually being measured at your site.

5. Ratchets and notified demand

Some tariffs include a ratchet: your demand charge for the year is based on the highest peak in the

preceding twelve months, not this month's. Others bill on an agreed "notified" demand whether you

reach it or not. Both are legitimate - but only if the tariff you are on actually

says so, and only

if the figure being applied is the right one. Check your tariff document.

How to check your own bill in ten minutes

You do not need special software to do a first pass.

→ Find the demand line. Look for a charge measured in kVA, usually described as demand, maximum

demand, or a kVA charge. Note the kVA figure and the rate.

→ Count them. How many demand charges appear on this invoice? For a single month there should be

one. If there are several, find out which months they belong to.

→ Sanity-check against your breaker. Find your main breaker rating. Amps multiplied by 400 V

multiplied by 1.73, divided by 1 000, gives your approximate kVA ceiling. Your billed demand

cannot legitimately exceed it.

→ Look for repetition. Line up the demand figures from the last twelve invoices. Are they varying

like measured data, or repeating round numbers?

→ Check "estimated" versus "actual". Your invoice will usually say which. A long run of estimates

followed by a large corrective invoice is exactly where duplicate demand charges appear.

If steps 2, 3 or 4 look wrong, the amounts involved are usually significant enough to be worth

pursuing properly.

A real case

A multi-tenant commercial property in Johannesburg asked us to review its

municipal electricity

account. We analysed 45 consecutive invoices covering nearly four years.

- The account had been billed 125 demand charges where 45 - one per month - were due.
- The demand figures used bore no relationship to the site. Several exceeded what the site's main breaker could physically deliver.
- Independent logging measured the site's true peak demand at 36.6 kVA, roughly half the 70 kVA ceiling the tariff allows where demand is not measured.
- The over-charge identified came to at least R2.7 million.

None of this was visible from any single invoice. It only appeared once every invoice was put in one

table and the demand charges were counted.

Details have been anonymised. Figures are the over-charge our analysis identified.

What to do if your bill looks wrong

Do not simply stop paying - that usually creates a bigger problem than the one you started with.

The route that works is evidence.

- Gather your invoices. As many consecutive months as you can find; more is better, because the pattern is the proof.
- Establish what your demand actually is. Either from a working meter or by logging the supply independently for a representative period.
- Reconcile the two. Line up what you were billed against what you actually used and drew.
- Submit a documented dispute. Quantified, referenced to the tariff, and

traceable to source
invoices. A documented claim gets dealt with; a phone call does not.

About Panda Power

We are an independent electricity billing and metering analysis practice in Johannesburg. We audit

municipal and Eskom invoices, install revenue-grade check meters, and log and analyse power at

commercial and industrial sites.

We do not sell electricity, solar systems or equipment of any kind. We have nothing to gain from

your answer being one thing rather than another, which is the entire reason our numbers are worth

something. Analysis is compiled by a registered Professional Engineer.

Send us one recent electricity bill and we will tell you, free, whether it is worth looking further.

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This guide is general information about how demand billing works. It is not advice on your specific

account, and tariff structures differ between municipalities and change annually. Always check the

tariff schedule that applies to your own supply. Rates quoted are examples drawn from City Power

Industrial LV invoices for 2022 to 2025 and are used for illustration only.