ALCAP GROUP

ALCAP EDUCATIONAL DOCUMENT | ENERGY COST

Maximum Demand and Load Profiles

Why timing matters, how peaks form, and how interval data reveals cost and capacity opportunities

Monthly energy totals hide the shape of electrical use. A load profile shows when demand rises, how long it stays high, and which operations combine to create the peak that affects capacity and some tariff charges.

WHAT YOU WILL LEARN

- The difference between energy consumption and maximum demand
- How coincident loads create a site peak
- What notified or contracted demand represents
- How to use interval data to reduce peaks without harming production

PRACTICAL. INDEPENDENT. DECISION-FOCUSED.
Written for South African commercial and industrial energy users. Prepared July 2026 | Version 1.0

01 | THE ESSENTIALS

Build the right mental model

Maximum demand is generally the highest average demand measured over the tariff's specified interval and chargeable periods. The exact unit, interval, time window, and look-back rule must be confirmed from the current tariff.

Load profile

A time series of power or apparent power. It reveals base load, start-up peaks, shifts, shutdown behaviour, cycling, and the relationship between production and energy use.

Coincidence

The site peak depends on which loads operate at the same time. Two processes can each be efficient yet create a costly peak when their start-up or high-load stages overlap.

Reserved capacity

Notified or contracted maximum demand reserves network capacity under defined rules. Exceeding it can trigger charges or require an application, while oversizing it may also carry cost.

ENERGY AND DEMAND ANSWER DIFFERENT QUESTIONS

A 100 kW load operated for 1 hour uses 100 kWh. Ten 10 kW loads spread across ten separate hours also use 100 kWh, but their site peak may be only 10 kW. Same energy; very different load shape.

A QUICK REFERENCE

Profile feature	Likely cause	Potential response
High flat base load	24/7 services or leakage	Shutdown and control review
Short recurring spikes	Starting or batch overlap	Sequence or soft start
Peak after outage	Simultaneous restart	Staged recovery
Seasonal plateau	Heating/cooling/process	Efficiency and scheduling

02 | PUT IT TO WORK

Turn understanding into action

Analyse at least one full operating cycle and enough history to capture seasonal and production variation. A peak-management change must be safe, repeatable, and compatible with quality and throughput.

1. **Confirm the tariff rule**
   Record the demand unit, averaging interval, chargeable periods, seasons, ratchets, and NMD rules.
2. **Acquire interval data**
   Use utility or site meters with validated timestamps and sufficient resolution.
3. **Find the peak windows**
   Rank the highest intervals and inspect the surrounding hours, not only the single maximum.
4. **Assign loads and causes**
   Overlay production, BMS/SCADA, weather, shift, and equipment status information.
5. **Test controlled changes**
   Stagger, sequence, curtail, store, or optimise; then confirm the new profile and production result.

ILLUSTRATIVE EXAMPLE: STAGGERED START

Three 75 kW loads start together, creating a brief overlap near 225 kW. Starting them several minutes apart may reduce the averaged demand peak if the process permits. The actual result depends on start duration, demand interval, and other site loads.

A GOOD DECISION LOOKS LIKE

- Peak events are explained using operational evidence, not guessed from bills.
- Actions target the chargeable interval rather than a momentary meter spike.
- NMD decisions consider growth, redundancy, tariff rules, and network process time.

03 | CHECKLIST AND NEXT STEPS

Use this before you proceed

[ ]	Record the tariff's demand interval, unit, and chargeable periods.
[ ]	Validate meter timestamps, time zone, gaps, and multipliers.
[ ]	Rank at least the top 20 demand intervals each month.
[ ]	Map peak windows to equipment and production events.
[ ]	Quantify operational constraints before changing schedules.
[ ]	Verify savings from post-change interval data and bills.

RED FLAGS

- Using monthly kWh to infer maximum demand
- Optimising a non-chargeable peak
- Ignoring demand look-back or NMD rules
- Reducing peaks in a way that increases downtime or safety risk

PLAIN-LANGUAGE GLOSSARY

Base load	Lowest recurring demand when primary activity is minimal.
Coincident peak	Demand created by loads operating at the same time.
Demand interval	Time window over which demand is averaged for billing or analysis.
Load factor	Average load relative to peak load over a period.
NMD	Contracted or notified maximum demand under the supplier's rules.

SOURCES AND FURTHER READING

- Eskom - Notified Maximum Demand
- Eskom - Electricity Pricing Definitions
- U.S. DOE - Evaluating utility rate options

IMPORTANT NOTE

This document is for general education only. It is not a substitute for a site assessment, electrical design, tariff review, safety study, or professional advice. Use the latest applicable standards, utility rules, municipal requirements, and manufacturer instructions. Work on electrical systems must be performed by suitably qualified and authorised persons.

Learn more at **alcap.co.za** or contact **admin@alcap.co.za**.