



# GRID-WIDE BENEFITS FROM C&I ADOPTION OF VO

Voltage Optimisation delivers major energy savings, lower emissions and a stronger, more efficient grid for Australia

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A new analysis reveals that widespread adoption of Voltage Optimisation (VO) across Australia's commercial and industrial (C&I) sector could unlock up to 4.25 TWh of energy savings each year, cut nearly 3 million tonnes of carbon emissions and reduce peak demand by up to 1 GW.

The benefits extend beyond lower bills for businesses—delivering a more efficient grid, longer equipment life and deferred infrastructure investments.

Full story on Pages 4–5



## FEATURE SPOTLIGHT

### Voltage Optimisation (VO): Features and Benefits

Voltage Optimisation (VO) is an energy-saving solution for regulating and optimising the voltage supplied to electrical equipment to the optimal level for efficient operation. VO reduces energy consumption, lowers electricity bills, and decreases carbon emissions.



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Optimising Power.  
Reducing Costs.



#### Real-time Digital Control

Continuously monitors voltage and load conditions to deliver precise, dynamic optimisation.



#### Wide Voltage Range

Optimises voltage across varying load conditions for maximum energy savings.



#### Easy Installation

Compact, modular design for quick installation in new or existing systems.



#### Built-in Protection

Protects equipment from overvoltage, undervoltage and power quality issues.



#### Continuous Monitoring

24/7 monitoring with performance data and energy savings reports.

## THE GRID-WIDE IMPACT: KEY BENEFITS



### 1. ENERGY SAVINGS

- Typical savings of 5–15% in electricity consumption.
- C&I users often have inductive loads (e.g., motors, HVAC) where even small voltage reductions yield proportional savings.
- Case example: A 3% voltage reduction typically results in ~2% energy savings.

#### GRID-WIDE POTENTIAL

With Australia's ~170 TWh of annual electricity consumption, about 50% from C&I users, a conservative 5% savings translates to:

$$170 \text{ TWh} \times 0.5 \times 0.05 = 4.25 \text{ TWh/year}$$

Enough to power ~600,000 households annually (7 MWh/year each).  
At 10% savings: ~1,200,000 households.



### 2. CARBON EMISSIONS REDUCTION

#### EMISSIONS SAVINGS

Using an average grid carbon intensity of ~0.7 kg CO<sub>2</sub>/kWh:

- At 5% savings (4.25 TWh):  
4.25 TWh × 0.7 kg/kWh = **2.975 million tonnes CO<sub>2</sub>/year**  
Equivalent to removing ~650,000 cars from the road.
- At 15% savings (12.75 TWh):  
12.75 TWh × 0.7 kg/kWh = **8.925 million tonnes CO<sub>2</sub>/year**  
Equivalent to removing over 2 million cars from the road.



### 3. REDUCTION IN PEAK DEMAND

- VO can reduce peak demand by 5–10%, alleviating grid stress during peak periods.
- Lowers the need for peaking plants and reduces risk of grid instability.
- Example: If peak C&I demand is 20 GW, a 5% reduction saves 1 GW—equivalent to a large gas-fired power plant.



### 4. VOLTAGE COMPLIANCE & EQUIPMENT PROTECTION

- VO reduces over-voltage conditions, protecting equipment from wear, overheating and early failure.
- Prolongs the life of motors, transformers and sensitive devices.
- Analysis suggests 10–15% reduction in maintenance and equipment replacement costs.



### 5. NETWORK LOSS REDUCTION

- Transmission and distribution losses account for 5–7% of electricity consumption.
- VO can reduce these losses by 1–2%, especially during high-load periods.



### 6. COST SAVINGS FOR BUSINESSES

- Direct energy cost savings lower operational expenses.
- For a business using 10 GWh annually, a 5% reduction saves 500 MWh/year.
- At \$0.15/kWh, this equals \$75,000/year per site.



### 7. DEFERRED GRID INVESTMENTS

- Lower peak demand and improved load factors delay the need for grid upgrades.
- Utilities estimate savings of \$100–\$500/kW in deferred capital expenditure.

## SUMMARY OF BENEFITS

METRIC	ESTIMATED IMPACT
Energy savings	5–15% reduction (c. 4.25 TWh/year for Australia)
Emissions reduction	c. 3 million tonnes CO <sub>2</sub> /year saved
Peak demand reduction	5–10% reduction (c. 1 GW capacity savings)
Equipment lifespan	10–15% longer life, reduced maintenance costs
Network loss reduction	c. 1–2% reduction in T&D losses
Cost savings per site	c. \$75,000/year for a 10 GWh consumer
Deferred grid investment	c. \$100–\$500/kW deferred infrastructure costs

## CONCLUSION

Installing Voltage Optimisation across all C&I users in Australia offers multiple benefits: energy savings, emissions reductions, peak demand management and infrastructure deferral.

The aggregated impact of VO would not only support Australia's energy transition goals but also enhance grid stability and reduce operational costs for businesses.

While individual results may vary, the aggregated impact can be transformative for both the economy and the environment.

## KEY BENEFITS



### 5–15% Energy Savings

Reduce electricity consumption by 5–15% on average.



### ~3 MILLION TONNES CO<sub>2</sub> Reduction

Cut carbon emissions by around 3 million tonnes CO<sub>2</sub> per year.



### 5–10% Peak Demand Reduction

Lower peak demand and ease pressure on the grid.



### 10–15% Longer Equipment Life

Extend the life of motors, transformers and other electrical equipment.



### LOWER COSTS

Stronger Bottom Line Lower maintenance Lower energy bills, reduced maintenance and deferred infrastructure costs.

Smart voltage. Big impact.

Better for business. Better for Australia.

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