

No Power 1

Short on power to your site? Need to provide a substation? Consider GAS COOLING.

On a recent KAE project, gas powered air conditioning was considered to solve a power supply shortfall.

Utilisation of Gas powered air conditioning to part of the site reduced the power requirements to the site avoiding the need to provide a substation. The site's maximum demand was reduced from > 400 amps to < 385 amps.

Exceeding 400 Amps resulted in the need to provide an underground substation as part of the development. This cost being approximately \$300,000. In addition a significant Architectural impost occurred.

Taking the substation costs into account, an instant capital saving occurred along with CO₂ emission reductions.

Gas cooling units have a lower Coefficient Of Performance (COP) as compared to the project selected water cooled units (2.3 vs 1.01). This results in the gas units costing more to run and the initial capital cost savings being dissipated Over approximately 12 years.

Project Summary

Adoption of gas air conditioning removed the need to install a substation, resulting in an initial overall capital saving of circa \$97,200. The overall cost to run the air conditioning systems increased by circa \$7,938 per year. CO₂ emissions reduced by circa 4,202 kg CO₂ per year.

Rules of Thumb

- Gas COP: 1.01
- Small scale AC COP: 2.3
- Gas AC cost vs Electricity AC cost: 3.2:1
- Gas Cost: 5.3 c/kWh *
- Electricity Cost: 12 c/kWh *
- CO₂ generated, Natural Gas: 0.257 Kg CO₂/kWh.
- CO₂ generated, Electricity from the grid: 1.068 Kg CO₂/kWh.
- Gas vs Electricity CO₂ reduction: 4:1

(* price variations can be significant)

When to use gas AC	Issues to Consider
<ul style="list-style-type: none">• Power supply issues	<ul style="list-style-type: none">• Gas supply required
<ul style="list-style-type: none">• Sub station avoidance	<ul style="list-style-type: none">• External location/well ventilated area
<ul style="list-style-type: none">• CO₂ emission reduction	<ul style="list-style-type: none">• Higher operating costs

Gas cooling units

Compressors within the outdoor unit providing the cooling are driven via a gas engine (instead of electric motor). A gas supply is required to each outdoor unit and refrigeration pipe work is required between indoor and outdoor units.

Each area of the development requiring air conditioning was provided with an indoor unit and associated outdoor gas unit (similar to traditional split air conditioning system).