



Graphene Manufacturing Group

**THERMAL-XR ~ ENERGY SAVING PROJECTS
BRISBANE CITY COUNCIL**

www.graphenemg.com

TSX.V: GMG

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THERMAL-XR®

- A unique coating for improving the conductivity of heat exchange surfaces in Heating, Ventilation, Air Conditioning and Refrigeration (HVAC-R)
 - The process also coats and protects heat exchange surfaces against corrosion.
- Energy Savings
 - Emission Reductions
 - Corrosion Protection
 - OPEX not CAPEX
 - Extends equipment life and defers capital investment.

Thermal-XR Measurement & Verification Process



Equipment Inspection

Equipment location and site access is important for our team to understand before providing recommendations on data logging and required duration for the service.



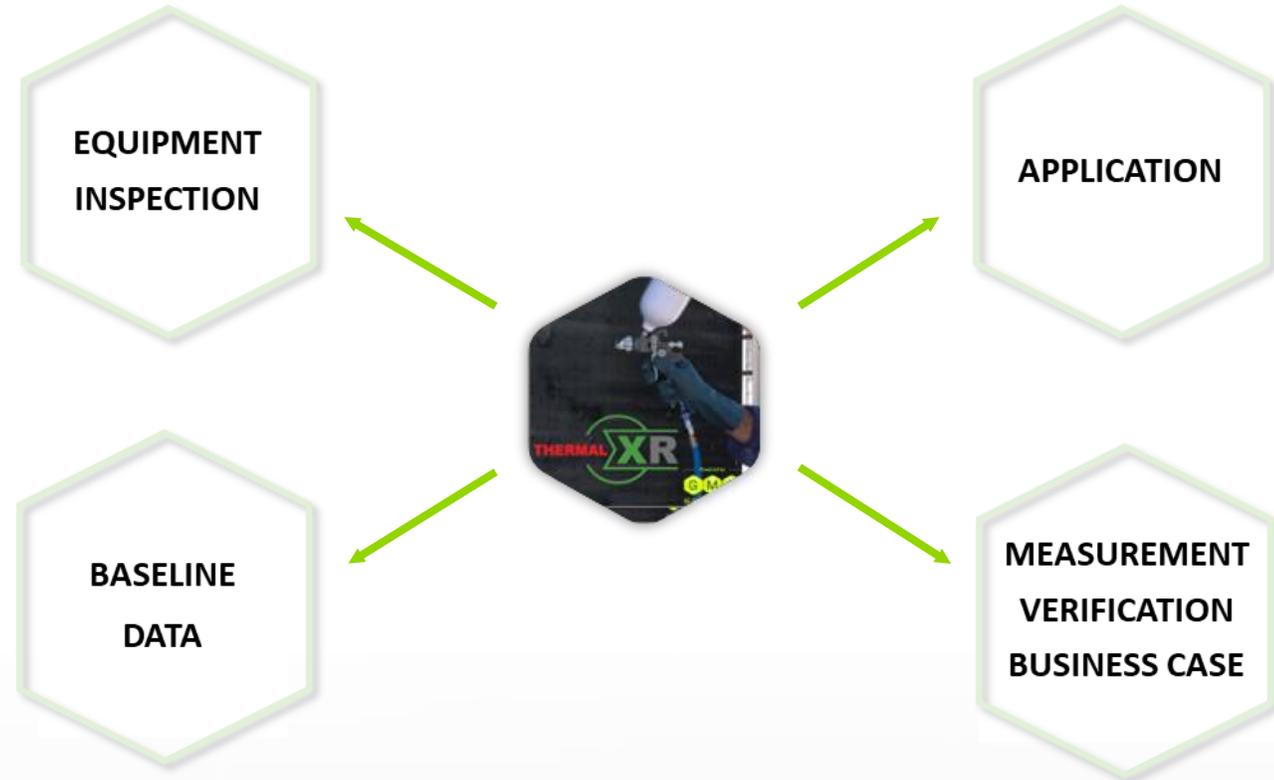
Baseline Data

Monitor and measure electrical consumption of the existing equipment in its current condition. data logging hardware and software will measure minute by minute kWhr output of each piece of equipment.



Application

The process of applying the THERMAL-XR® System is non-intrusive to business. On average, and depending on size of unit, the full process will usually take between 4 to 8 hours.



Thermal-XR Data Results

~ Adherence to IVMVP Framework

IPMVP FRAMEWORK

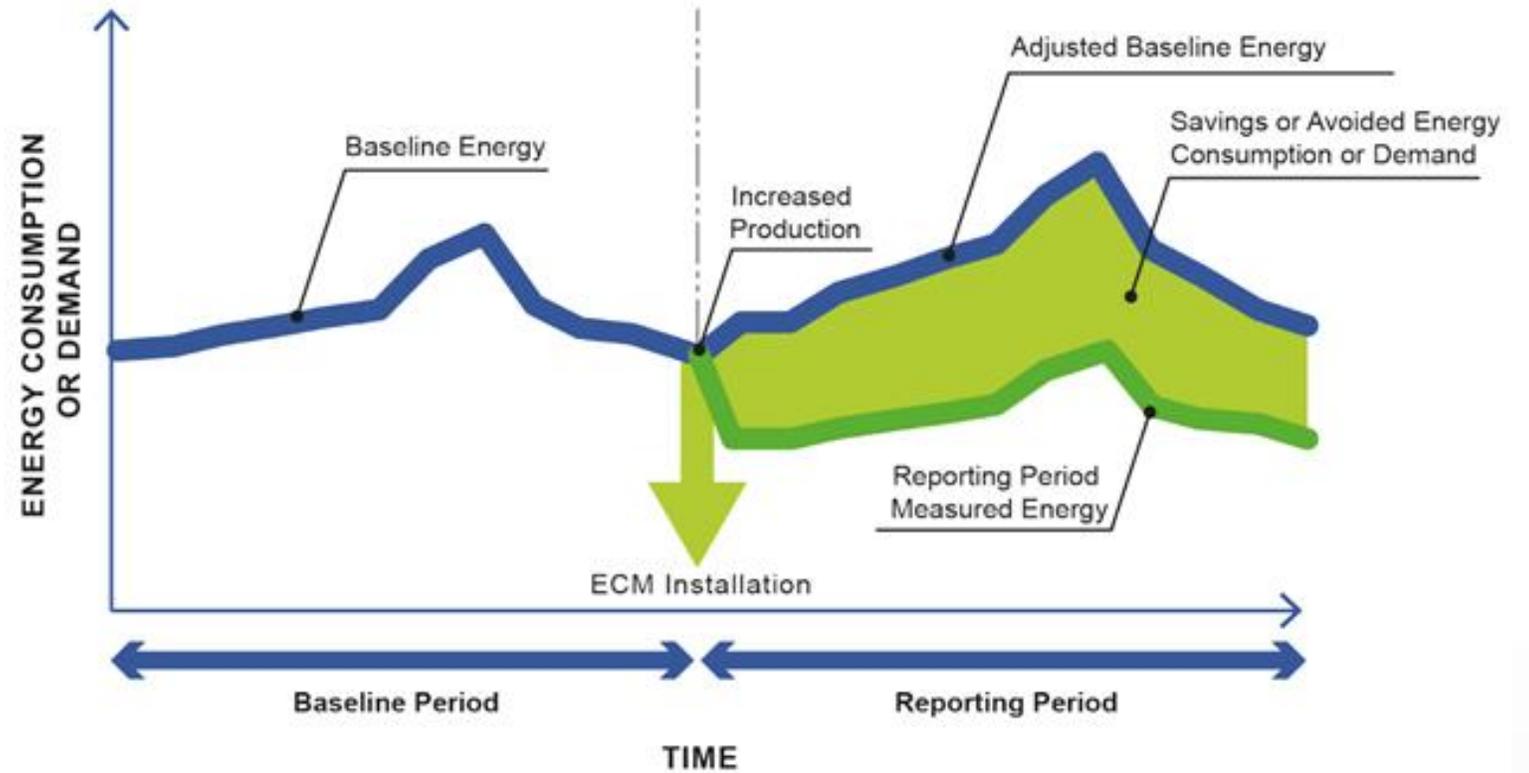
International Performance Measurement and Verification Protocol

Energy, or demand savings cannot be directly measured, because savings represent the absence of energy consumption or demand.

Instead, savings are determined by comparing measured consumption or demand **before** and **after** implementation of a program, making suitable adjustments for changes in conditions.

The comparison of before and after energy consumption or demand uses the following general M&V equation:

$$\text{Savings} = (\text{Baseline Period Energy} - \text{Reporting Period Energy}) \pm \text{Adjustments}$$

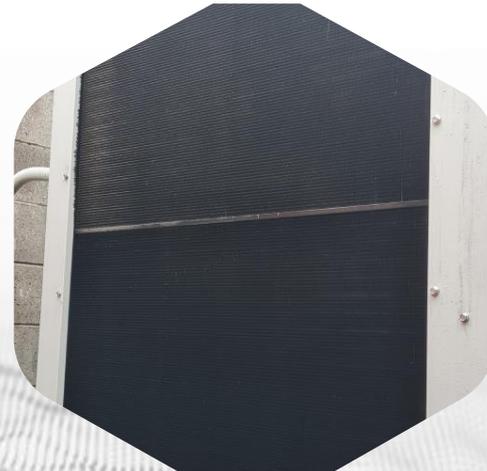
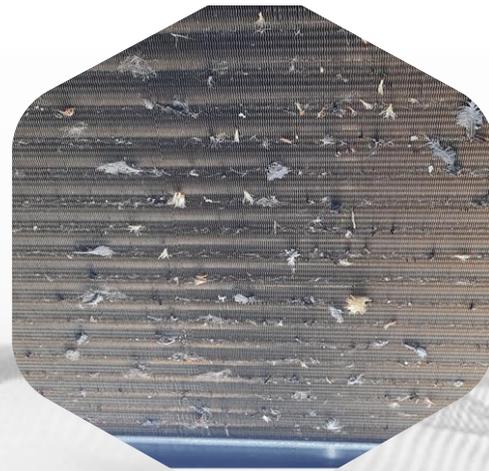




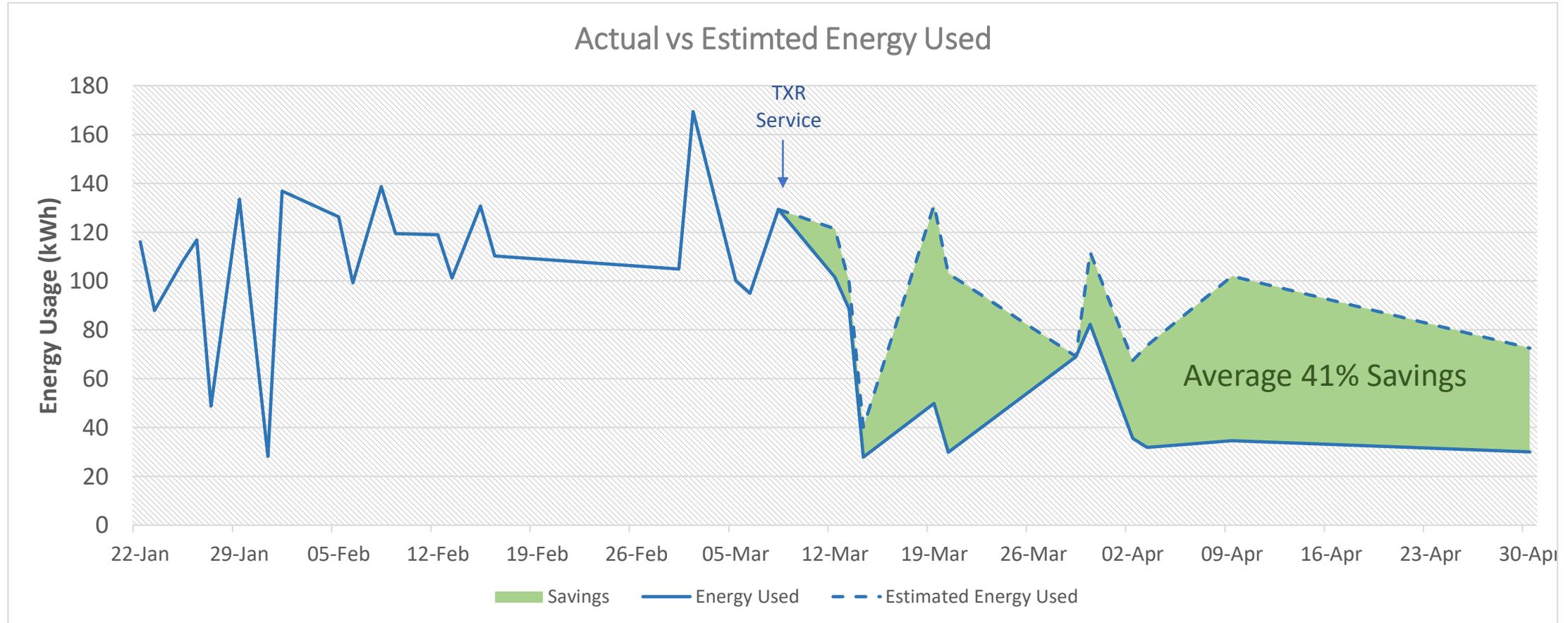
THERMAL-XR® Energy Saving Projects Brisbane City Council



PROJECT: Carina Library
EQUIPMENT: 53.2kW R410a Temperzone
Model OPA 55RKTBG01-P
Results: 41% Energy Saving
6.5 tonne of Co2 reduction



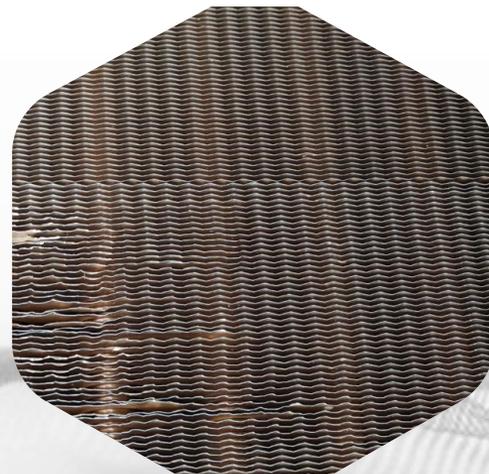
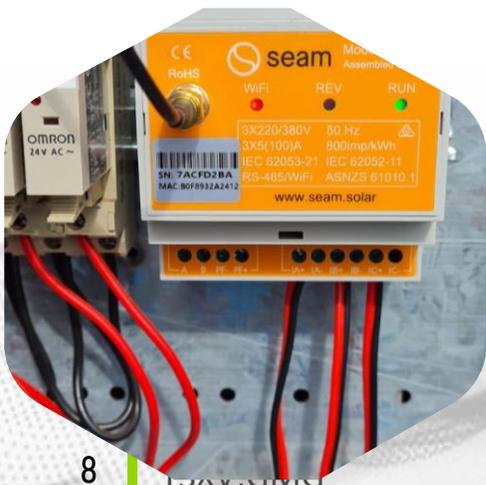
Findings – Carina Library



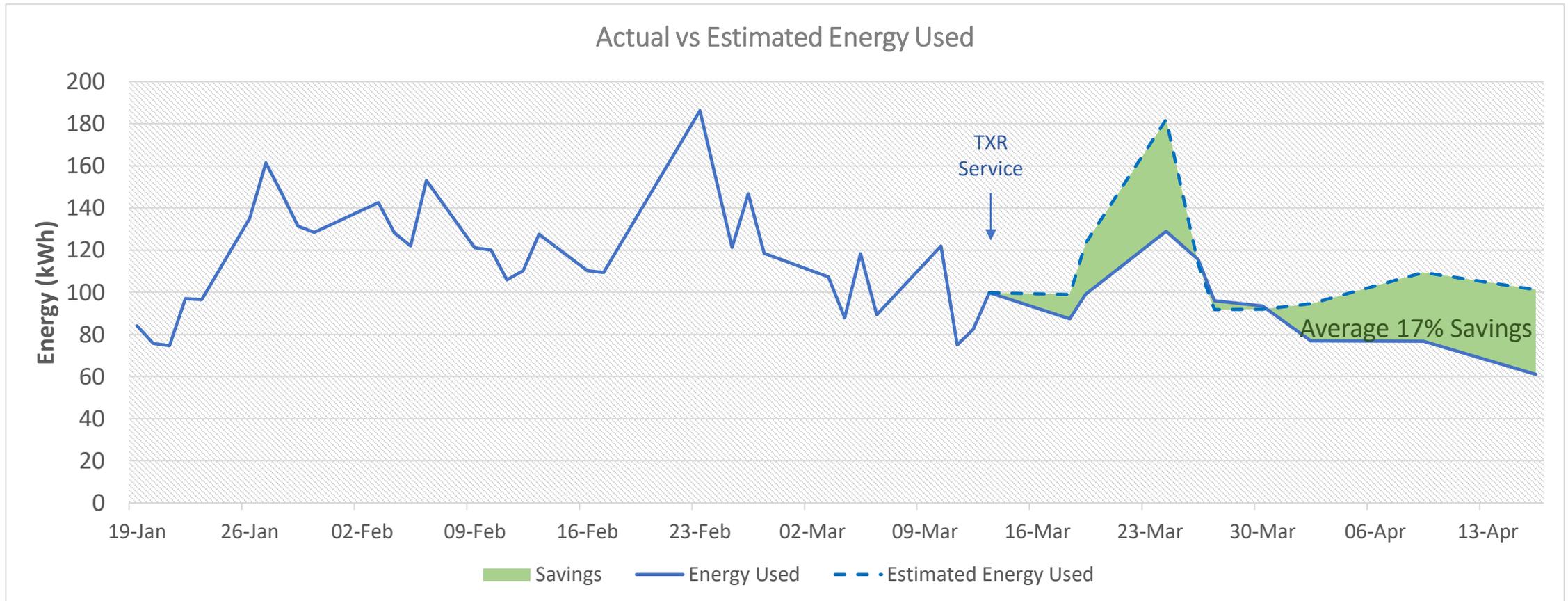
THERMAL-XR[®] Energy Saving PoC Projects Brisbane City Council



PROJECT: Grange Library
EQUIPMENT: 80kW R410a Temperzone
Model OPA 855RKTBG-P
RESULTS: 17% Energy Savings
3.99 tonne Co2 reduction



Findings - Grange



SNAP 24 HOUR GYMS THERMAL XR SUCCESS CASES



Snap Gym Location	Size of Air Conditioner	Actual Calculated Savings %	Estimated Annual Emissions Savings (Co2 tonne p.a)	Estimated Annual Energy Savings (\$ pa)
South Brisbane	5 x 16 kW	54%	8.8	\$8.3 k
Gold Coast	1 x 85 kw	22%	14.5	\$4.8 k
East Brisbane	1 x 55 kw	14%	7.8	\$8.8 k

How does Thermal-XR work?



THERMAL-XR®

- Very thin coating ~ 8-10 micron
 - Adding >6,000m² micro surface area for every litre
 - Graphene within coating is drawing both thermal & radiant heat from coil and environment.
 - Air-cooled system removes the heat very fast assisted by graphene physics
 - Allows coils to operate cooler and more efficient
 - Reduces compressor run-time.
 - Refrigerant operates under less hydraulic pressure.
-
- Energy reduction for same space cooling outcome = less energy cost & less emissions.

B7RLE Bus with x1000 redesigned condenser coil

	Fuel Used First hour (Litres)	Fuel Used Second hour (Litres)	Total Fuel Used (Litres)
Bus 2239 Original Specification	6.68 litres	6.01 litres	12.70 litres
Bus 2239 with Thermal-XR	6.47 litres	5.88 litres	12.36 litres
Improvement	0.21 litres less	0.13 litres less	0.34 litres less
Improvement (%)	3.10%	2.20%	2.70%

	Pull Down Test 45°C to 22°C (minutes)	Fuel Used (Litres)
Baseline Trial	24 minutes	12.70 litres
THERMAL-XR coated Trial	18 minutes	12.36 litres
Improvement	6 minutes less	0.34 litres less
Improvement (%)	25%	2.70%



Graphene Manufacturing Group

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