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Partnered
Compression-Heat Absorption
Hybrid A/C & Refrigeration



How it works...

Understanding Solar HVAC-R

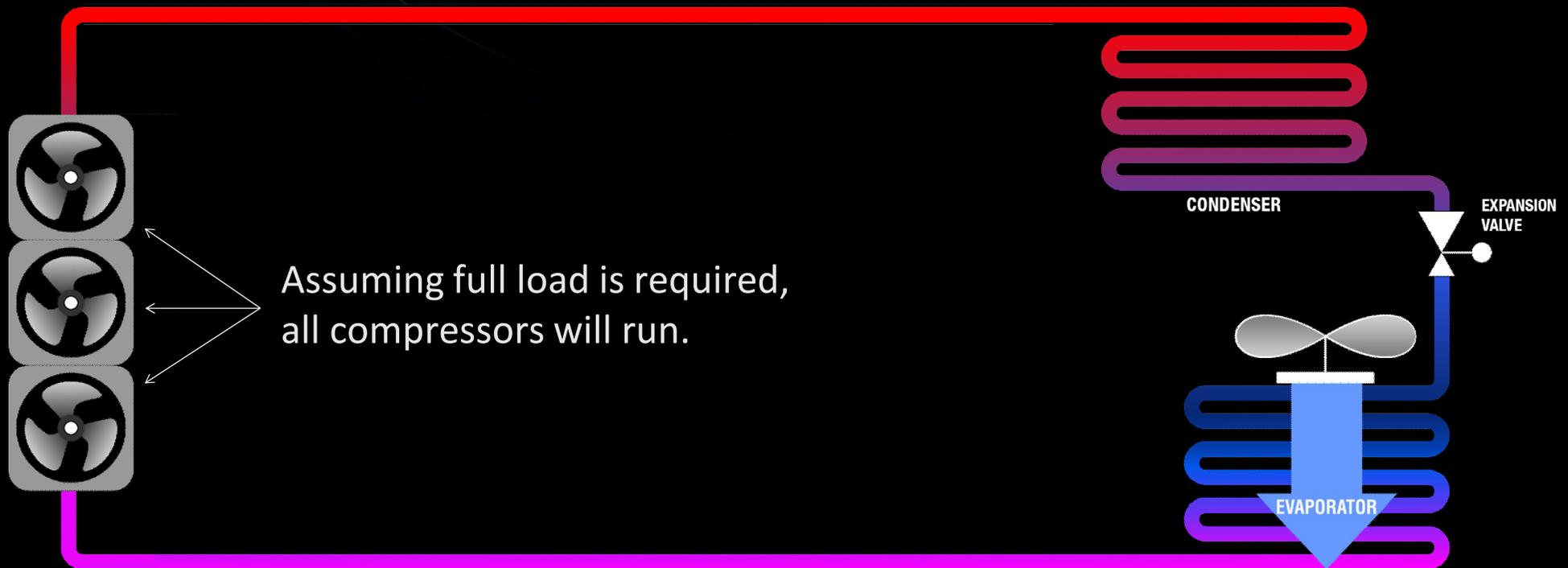
Firstly, it is important to understand the scope of the solar thermal HVAC system.

To achieve the ultimate available efficiencies, ThermX should only ever be installed on systems correctly specified for the cooling or heating load requirements, more importantly only on systems with the ability to **unload**, such as:

- Staged or rack systems
- Screw Type
- Invertor
- VRV/VRF
- Digital Scroll

Important – Although there are clear and significant efficiency benefits offered by partnering the above systems with ThermX, this technology offers very little benefit in regards to stand alone single fixed speed compressor systems.

The below illustrates the normal cooling process. This is what you would expect to see on any standard cooling system. In this example we have a 3-stage system.



Therm



STAGED COMPRESSION



The modification we make is to add an array of solar thermal collectors, on the discharge line of the compressor and prior to the condenser.

This process in turn creates a number of distinct changes in the physics make up of the gaseous refrigerant.

- ✓ A higher value of kinetic energy within the gas molecules
- ✓ Intermolecular forces weaken and the molecules space out.

So now...

- ✓ The molecules move with at a greater velocity
- ✓ The molecules are considerably more volatile
- ✓ The Delta T at the condenser stage has increased

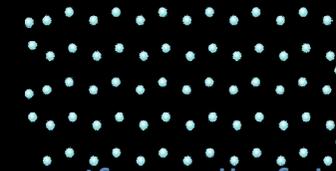
SYSTEM WITH SOLAR COLLECTION



REMOVING THE HEAT

This is the easy part. We now have a vastly increased ΔT , therefore this combined with the increase in kinetic energy and subsequent volatility of the gas molecules, effectively increasing the surface area of the condenser, therefore liquid forming commences further up the condenser.

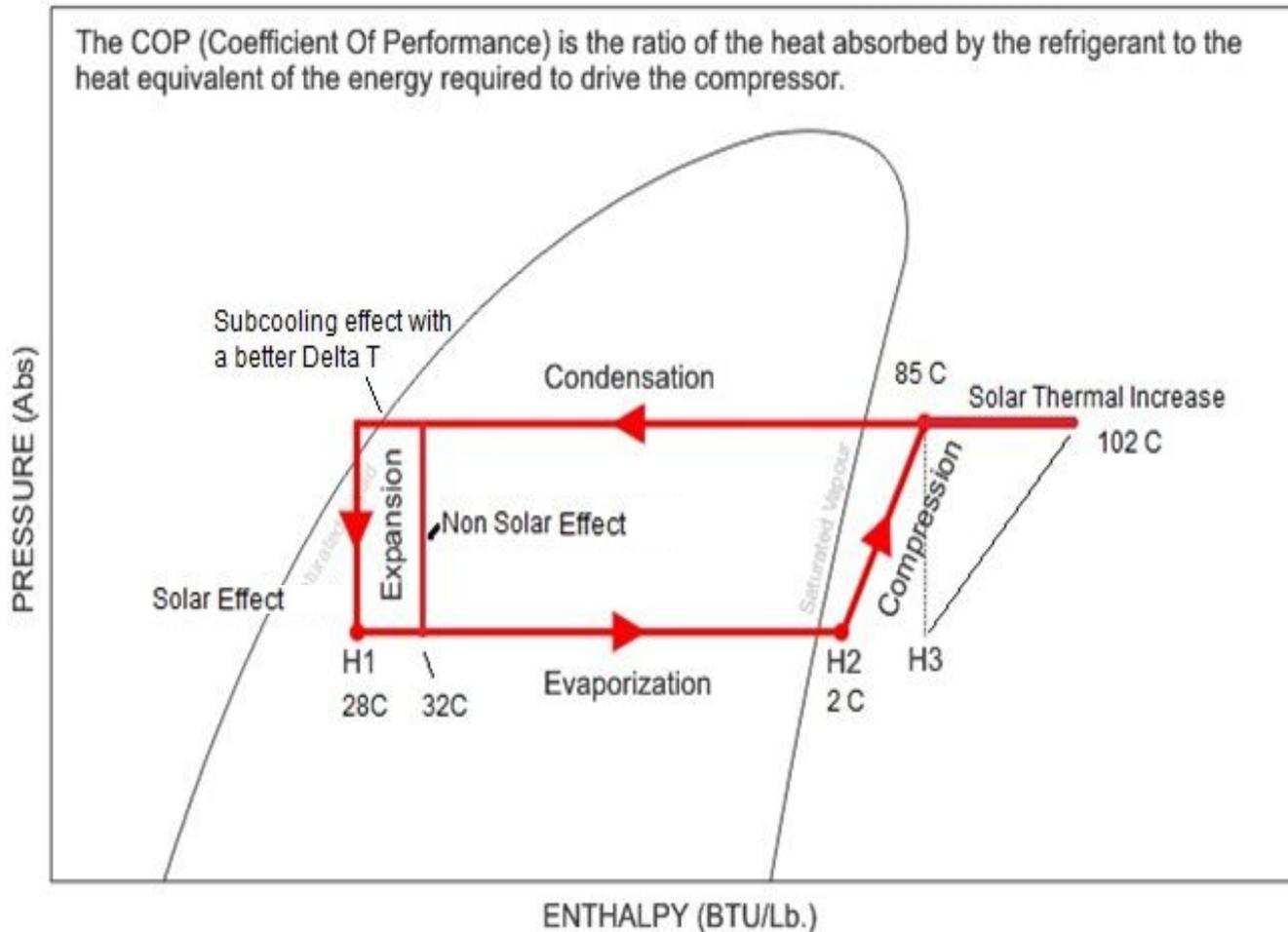
← Due to the increase in molecular velocity and ensuing volume conversion within the condenser, most if not all of the expected compressors begin to shut down as the sun takes over the load requirement →



← Finally, remember the system has the ability to **unload**, which now results in a reduced energy demand as the pressure increase is released. →

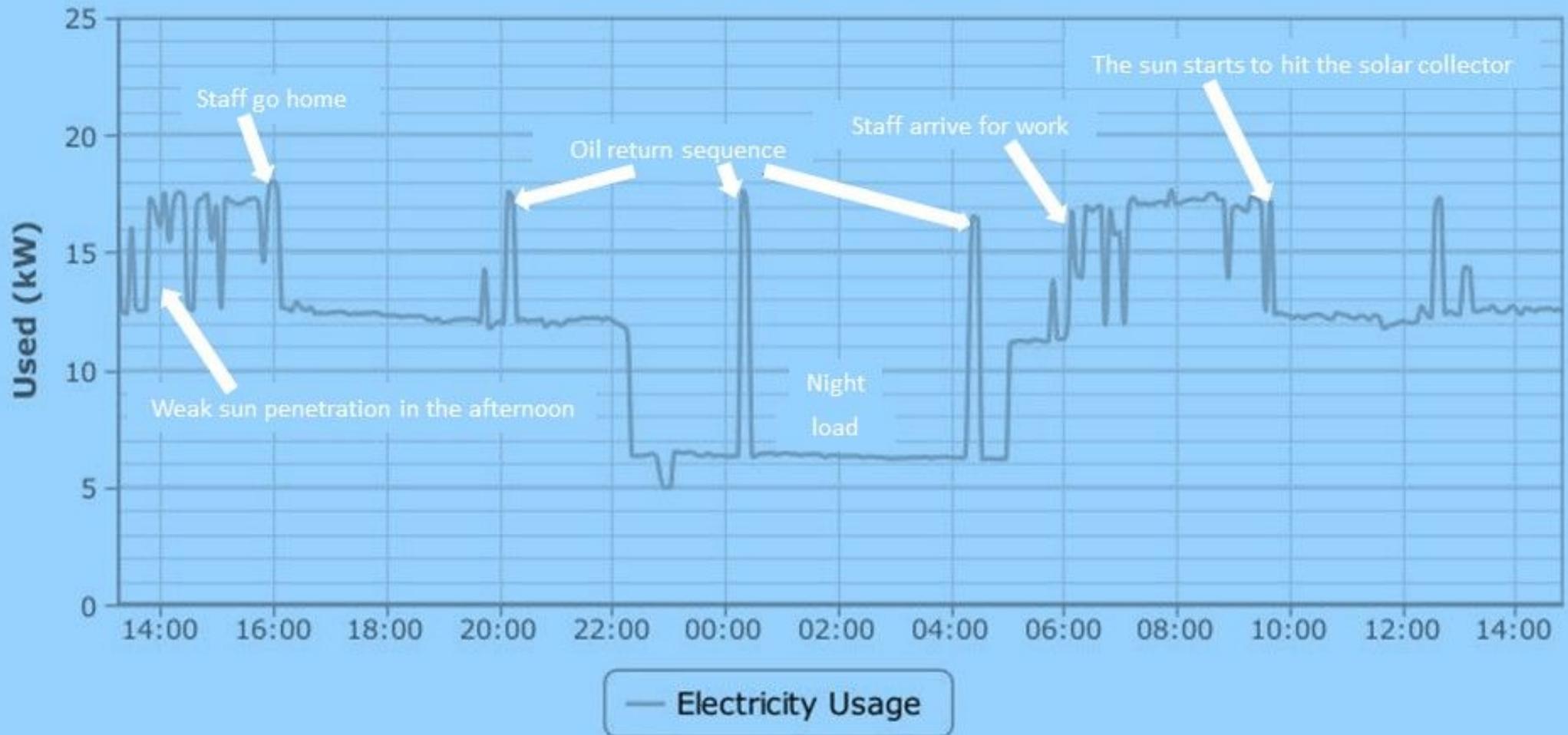
ThermX - What the engineer may expect to see...

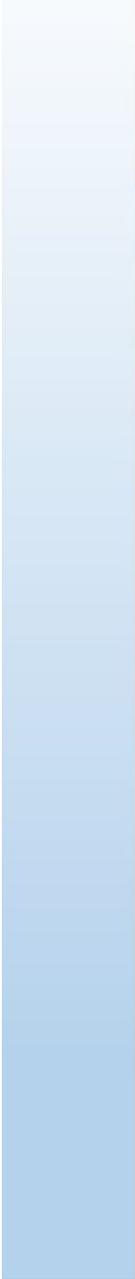
Although it is impossible to show all of the efficiency benefits of the solar supported Variable Refrigerant Flow system (i.e. velocity, volatility and mass flow), below is an illustration of what can be drawn onto the enthalpy diagram.



An average day in the life of a **ThermX** system...

Electricity Used (kW)

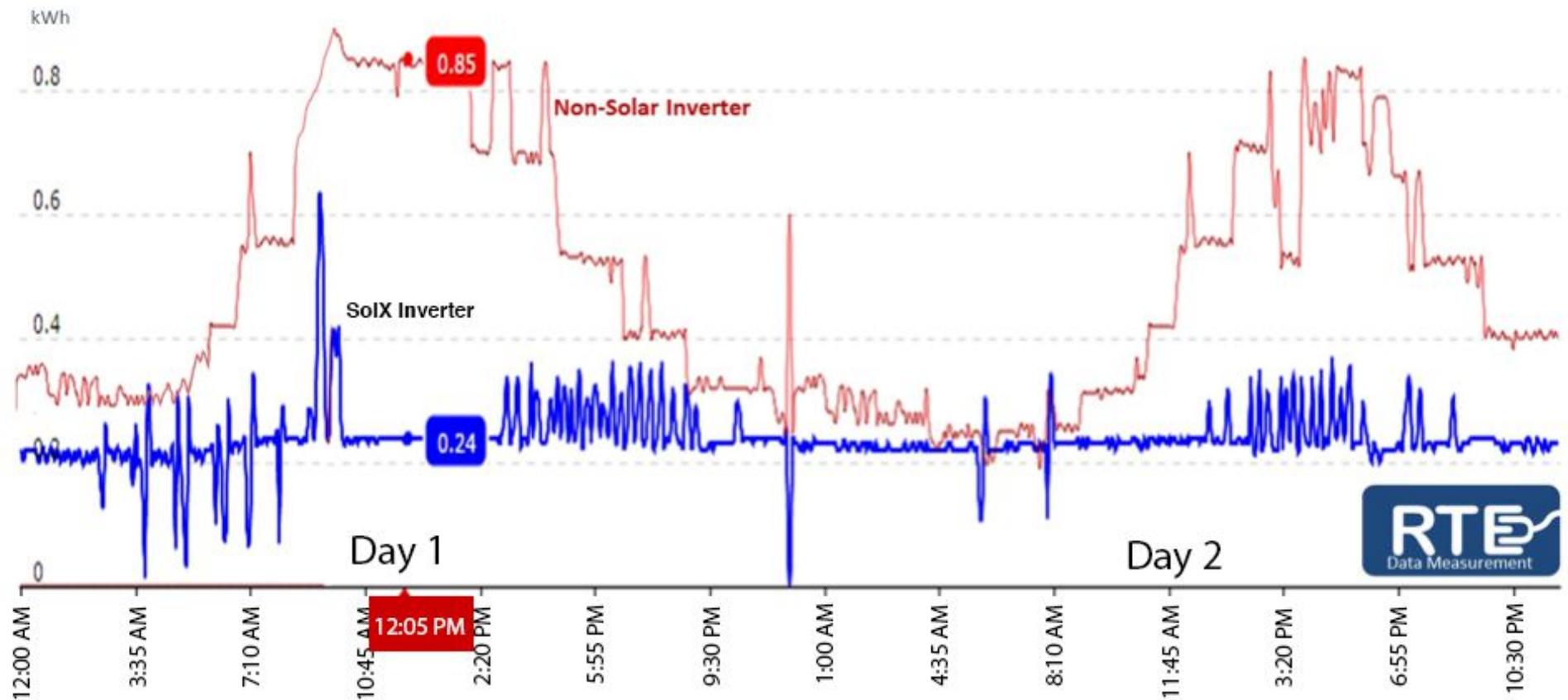




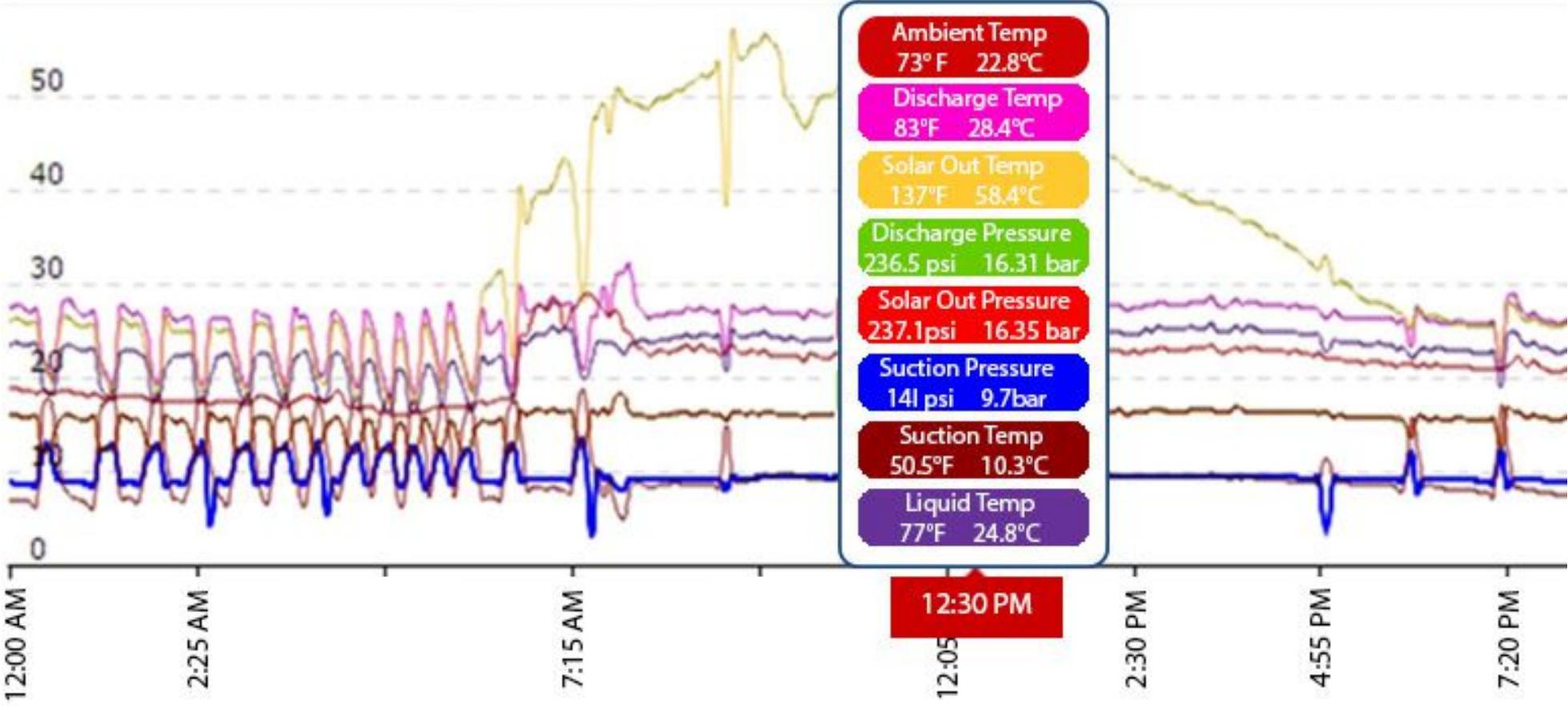
Example Official Testing Data

The below demonstrates the energy usage on a ThermX DC Inverter system, in comparison to an A+ rated DC Inverter system

A clear illustration of **'the hotter it gets, the better it works'** – as importantly the increased energy consumption of the comparative system under the same circumstances



The below illustrates the temperatures and pressures around the system when partnered with ThermX



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