



**Northern University**

**Coolnomix**

**Trial Data Report**

**Report compiled by Tim Twohig**





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**EMC Renewables** is a trading name of

**Electrical Mechanical & Cooling Ltd**

Room 10 Beaumont House  
74 / 76 Church Road  
Stockton on Tees  
TS18 1TW  
T: 01642 049023  
[www.emcrenewables.co.uk](http://www.emcrenewables.co.uk)  
[enquiries@emcrenewables.co.uk](mailto:enquiries@emcrenewables.co.uk)

## 1. Introduction

As specialists in the field of Critical Power and Cooling, EMC Renewables were invited to conduct a site survey to assess the suitability of Coolnomix being integrated into the existing University's DX cooling systems, and any other potential issues that could improve the efficiency within the rooms.

A Coolnomix unit was fitted to a Mitsubishi PKA.M100KA unit for a trial period and Monitored at the Incoming 3 phase supply in the plantroom.

## 2. Room Overview

The room being surveyed was a Bio-science research room with multiple refrigerators and agitator equipment, it is set out with 1 x 10KW Mitsubishi PKA.M100KA 9KW Cassette cooling unit blowing cold air from the rooms far wall towards the door.

Its set point was 19'c but had been changed to 20'c on our return.

The general opinion of the current room layout and cooling is that it is sufficient for the load currently seen.

## 3. Coolnomix Readings

The unit within the room was set to 19'c and running adequately.

The below readings were taken to ascertain Coolnomix suitability.

Data Hall	Unit 1		Unit 2		Unit 3		Unit 4	
Environment	Min	Avg	Min	Min	Avg	Avg	Min	Avg
Set Point	19.0							
Cooled Room Temp		17.5						
Return Air Temp		20.4						
Cold Air Temp		5.4						
Temp Delta	12.1							

Having a Temperature Delta of >7 gave confidence that a trial unit could be fitted.

## 4. Coolnomix Energy Optimisation Systems

With the unit having some spare capacity suitable for Coolnomix installation the test was set up to operate on Coolnomix for 7 days and in Normal operation for 7 days, clearly the data below shows that good savings can be made.

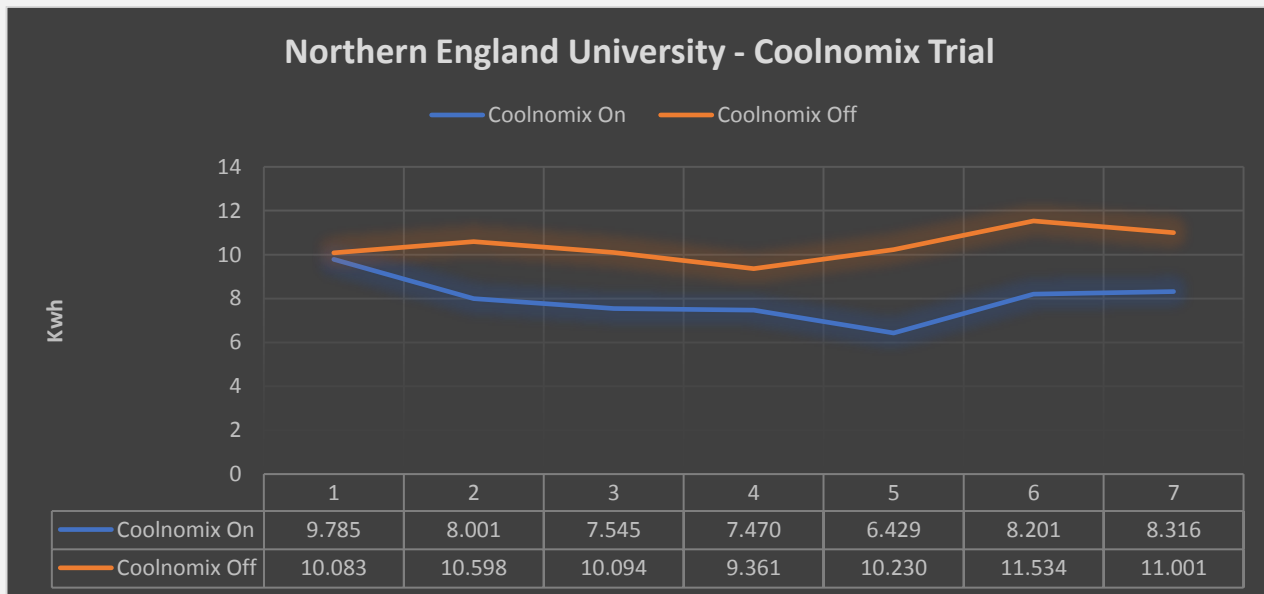
### Calculation results

The KWh usage of one unit can be seen below giving a **23.5%** saving over a 7-day period with Coolnomix attached and tested for 7days on / 7days off scenario.

kWh Usage With Coolnomix		% Energy Saving	kWh Usage Normal Operation	
29/03	9.785		23.5%	10.083
30/03	8.001	10.598		07/04
31/03	7.545	10.094		08/04
01/04	7.470	9.361		09/04
02/04	6.429	10.230		10/04
03/04	8.201	11.534		11/04
04/04	8.316	11.001		12/04
<b>29/03 – 04/04</b>	<b>55.747</b>		<b>72.901</b>	<b>06/04 - 12/04</b>

Highlighted - Using the data measured during the trial the best saving scenario could be shown as 6.429Kwh against an average of 10.230 KWh without Coolnomix.

This demonstrates higher energy savings (**37.15%**) are achievable during the right conditions. However, should also note during this period outside air temperatures were not aligned.



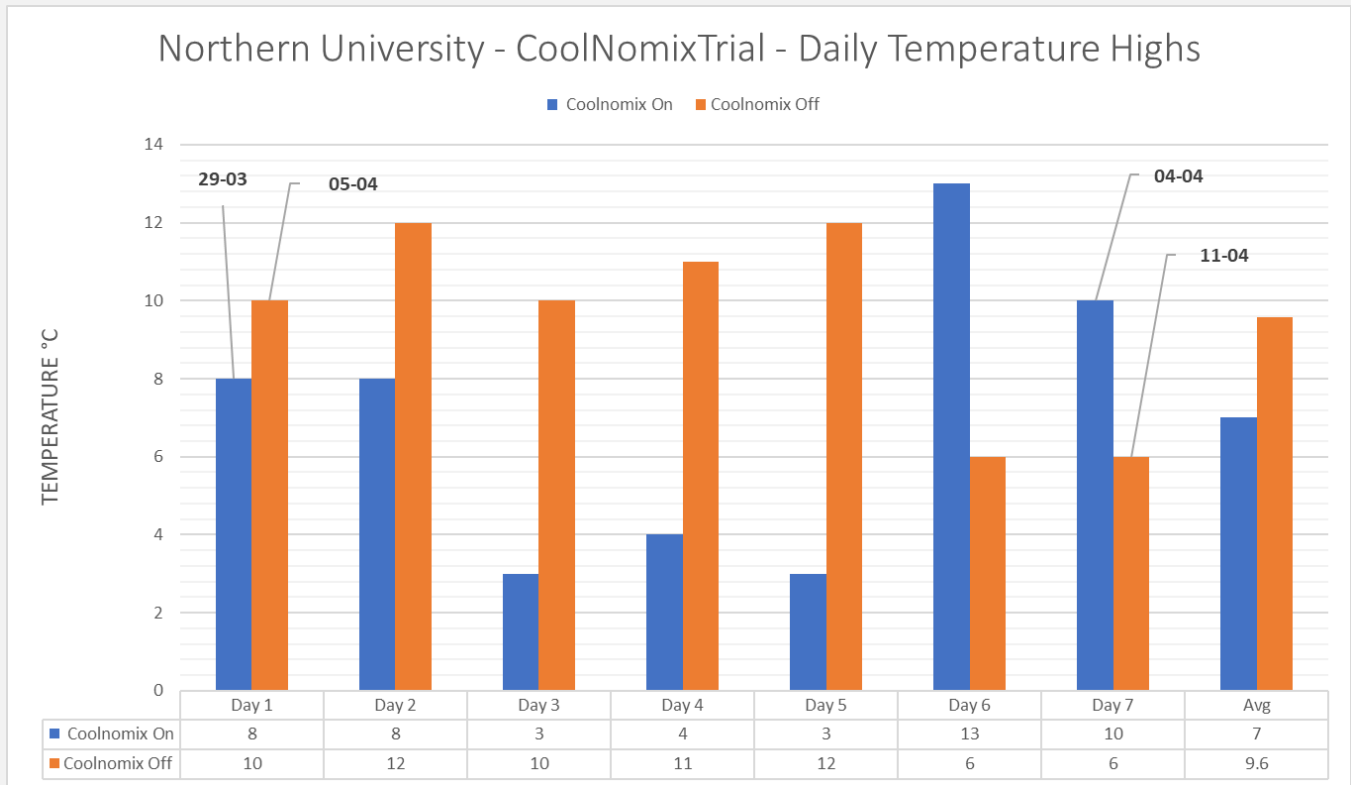
The average trend data showed an Energy saving of **24%** over the 16-day monitoring period.

During the trial no allowances were made for degree days or temperature differentials. However, for reference, below are the daily maximum temperatures reached during the Coolnomix Trial On/off periods.

What can be noted is, the temperature during the off period were slightly higher producing a 2.4-degree average for the week. Which would make a marginal difference in savings (best estimate is around -2%, to savings). Which would reduce savings figure to **21.5%**.

However, what can also be seen is, as the daily highs during the full trial were very low, the A/C system was only ever working at around **10% capacity**.

As outside air temperatures increase during the summer season we would expect the Coolnomix kWh savings to significantly increase during this period.



To summarise, due to the short period of the trial and low outside air temperatures, it's not possible to extrapolate & calculate an exact figure for kWh which would be saved over the course of the year.

However, EMC Renewables are confident and can demonstrate that with a percentage saving of 21.5% the Coolnomix would have a **return of investment of 12 months or under**, when run for the full course of a year.

## 5. Recommendations

Following on from the successful trial of one Coolnomix unit, the next step would be to install the solution permanently and depending on budget the quickest return on investment would involve identifying the larger AC units from the asset list and installing the Coolnomix accordingly.

Although, based on the approximate number of suitable units at the University of 300 and savings of over 20% utilising the Coolnomix unit, the energy consumed by the site cooling could see a reduction of over 900,000 kWh annually.

For further information and to discuss how we can help your business, please find our contact details at [www.emcrenewables.co.uk](http://www.emcrenewables.co.uk)