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TUTUM ENERGY

coolnomix

Reducing energy consumption and carbon emissions

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Energy Management

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coolnomix

Stay cool, save money and reduce your business' carbon emissions

We can deliver up to 40% electricity savings without getting hot

We help businesses to make big energy and carbon savings without changing cooling needs so that your building users are kept comfortable, equipment stays cool and your produce remains chilled.

COOLNOMIX is a UK designed technology that is maintenance free and can be easily installed by our qualified engineers with no disruption to your operation. You can expect up to 40% energy saving on your air-conditioning and up to 30% on your refrigeration without your cooling output being affected.

TUTUM ENERGY

Reduce the energy consumption of your air-conditioning and refrigeration without affecting the output you need

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Applications

Air-Conditioning
- Commercial split type air-conditioners e.g. wall-mounted and cassette based
- Package based and double expansion DX units up to the largest sizes
- Ducted air-conditioners with AHUs
- Inverter based VRV and VRF air-conditioners

Refrigeration
- Industrial refrigerators used in the manufacturing sector e.g. food processing and pharmaceuticals
- Walk-in refrigerators used in the food and beverage sector
- Retail sector refrigerators e.g. vegetable and dairy display units, cold drink cabinets, wine warehousing refrigeration

Cooling
- Data Centres
- Comms Rooms
- Server Rooms

World beating energy and carbon savings

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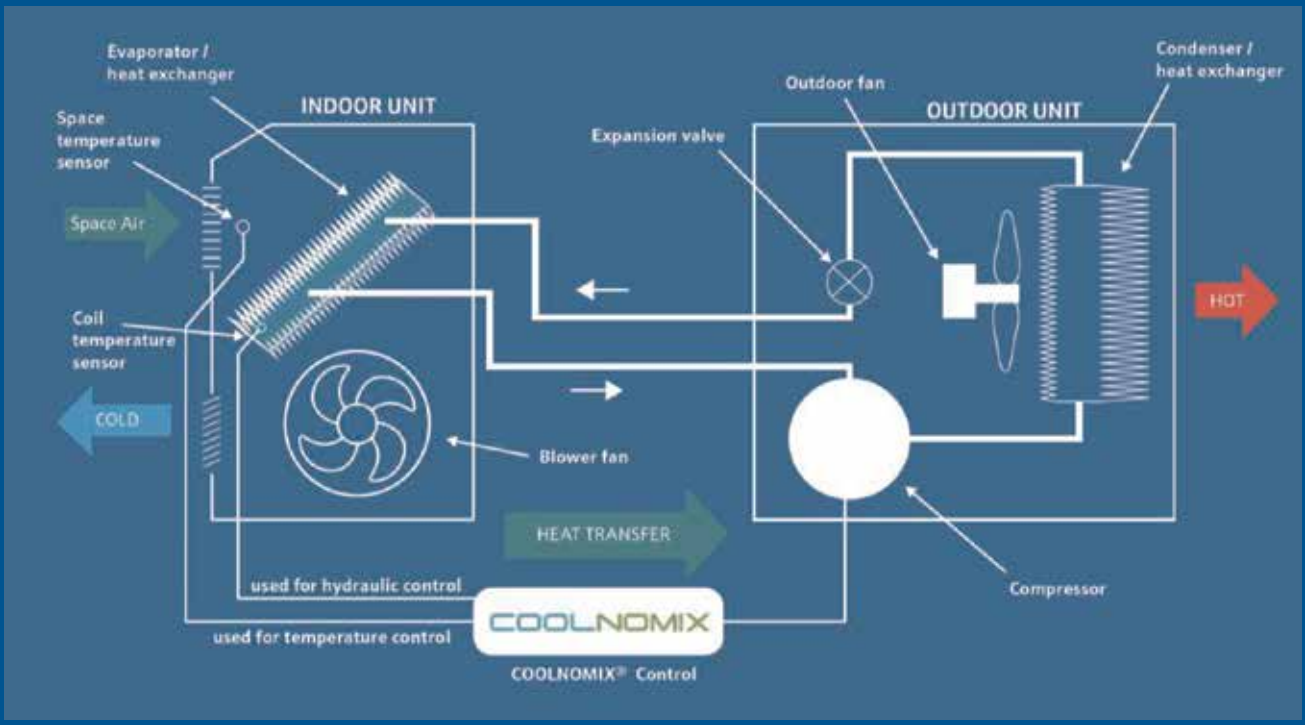
In most air-conditioning applications, a lot of energy is wasted because the unit's compressor (the main running cost component) runs much longer than is needed. Using our patented process called Optimised Refrigerant Supply® (ORS®) the advanced COOLNOMIX® control device reduces the run-time of the cooling system compressor, therefore, reducing electricity consumption even in the most demanding high and humid environments.

The COOLNOMIX® ORS® technology uses two temperature sensors in an algorithmic energy transfer control arrangement to monitor the thermodynamic (room or space temperature) and the hydraulic (refrigerant supply) performance of the connected air-conditioning or refrigeration system.

In practice, this algorithmic energy transfer approach first uses the room or space temperature sensor to ensure that a required setpoint has been achieved. Subsequently, this temperature sensor ensures that the space is maintained within +/-0.5°C of the required setpoint. Meanwhile, a second temperature sensor connected to the indoor evaporator coil is used to identify when the compressor has done its useful hydraulic work in producing a sufficient supply of high-pressure liquid refrigerant. Using the built-in algorithmic energy transfer control, the COOLNOMIX® ORS® advanced system then starts and stops the compressor at appropriate times to optimise running costs.

COOLNOMIX operation parameters

- Does not affect the air-conditioning unit as it is installed inline with the thermostat and provides more accurate temperature control.
- Responds dynamically to any change in heat load optimisation of the running time of the compressor to minimise energy consumption
- Outstanding energy savings, even on the largest and most modern inverter-based cooling technologies
- A rapid return on investment, paybacks are typically within 18-24 months
- Reduced carbon emissions



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TUTUM ENERGY

Coolnomix Trial Report

North Tees and Hartlepool NHS Foundation Trust (UK)

Report compiled by Shaun Nugent Director Emissis Date: March 14th 2022

Coolnomix Trial Report North Tees and Hartlepool NHS Foundation Trust (UK)

NHS
North Tees and Hartlepool
NHS Foundation Trust

ABOUT

The University Hospital of Hartlepool is a general hospital in Hartlepool, England. It provides healthcare to people living in southeast Durham. The University Hospital of North Tees is a general hospital in Stockton-on-Tees. They are managed by the North Tees and Hartlepool NHS Foundation Trust.

ANNUAL SAVINGS

8103 kWh representing a reduction of 33% per year in energy consumption

4051kg or 4.051 tonnes

Saving of £2,025.75

PAYBACK

14-15 months

coolnomix

OVERVIEW

Reduce the energy consumption of your air-conditioning and refrigeration without affecting the output you need. Our technology is maintenance free and can be easily installed by our qualified engineers with no disruption to your operation.

Emissis and North Tees and Hartlepool carried out a 28 day trial on 4 air conditioning units at North Tees Hospital.

We keep your people, equipment and produce cool, and your energy budget from overheating.

TRIAL

Coolnomix units were installed and connected to 4 air conditioning units at North Tees Hospital. To measure the energy used (kWh consumption) by each AC unit, Emissis installed 4 intelligent smart meters with remote monitoring connected to each AC units external condenser.

The units were installed and activated on Thursday February 8th 2022 and were set to run in weekly cycles with Coolnomix OFF - Coolnomix ON - Coolnomix OFF - Coolnomix ON mode for 4 weeks or 28 days in total. The pilot ran from 8.02.2022 until 10.03.2022.

During the pilot the metered half hourly and 4 hourly data has been downloaded and analysed. This data is available to the engineering team at North Tees.

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RESULTS

DAILY

Coolnomix active (ON) reduced daily energy consumption by 33% reducing kWh consumption across the 4 pilot AC units by 22.2 kWh per day.

This saving is based on average daily consumption of electricity with Coolnomix ON and Coolnomix OFF over the 28 day period of the trial.

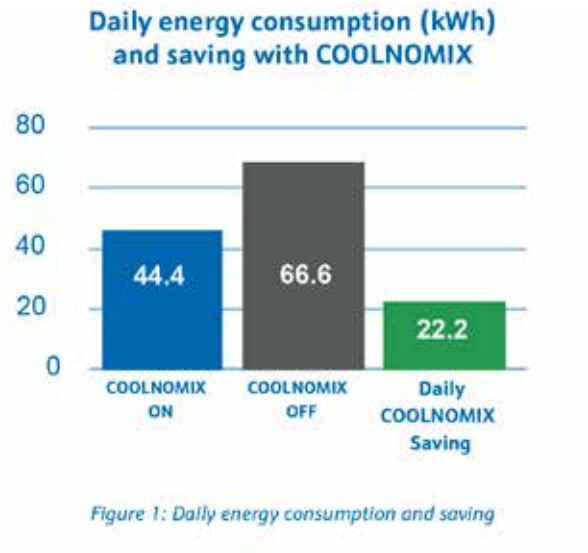

Figure 1: Daily energy consumption and saving

CONSUMPTION BY AC UNIT PER DAY (KWH)

	Coolnomix ON	Coolnomix OFF	Saving	%
Mattress Room 1	13.1	15.6	2.5	16%
Mattress Room C	9.1	18.8	9.7	52%
Wash Room	14.9	23.1	8.2	36%
EDU Dirty Side	7.3	9.1	1.8	20%
Total	44.4	66.6	22.2	33%

ANNUAL ENERGY REDUCTION & SAVINGS FORECAST (4 AC UNITS)

	Energy (kWh)	Financial(£)	CO2 (kg)
Daily	22.2	5.55	11.1
Weekly	155.4	38.88	77.7
Monthly	675	168.75	337.5
Annually	8103	2,025.78	4,051.50

CONCLUSIONS

The trial accurately confirms energy savings for kWh and CO2 reductions across the 4 units.

The financial savings have been based on a trial site electricity supply cost of 0.25p per kWh.

With average electricity prices set to rise beyond 0.30p per kWh over the next few months and with further inflation forecast over the coming years the savings model and Coolnomix payback period will only improve.

It is estimated that the savings model will also improve dramatically over the warmer summer months as the outside temperature increases making the AC unit work harder. All AC units are designed to work to a maximum outside temperature of around 32 degree C and will hold the room at, for example, 22 degrees ensuring that until the outside temperature is reached there is residual energy within the AC unit that Coolnomix will make savings on. In this way, we usually expect to generate additional savings (further 5 - 10%) in these warmer months.

For the purpose of this trial we have based the following energy reduction and savings estimates on the Feb/March trial and NOT factored in the inevitable additional savings that will be generated over warmer months.

Spread over an estimated AC estate at North Tees consisting of 100 suitable units the annual benefits of installing Coolnomix, based on the trial results will be as follows:-

ENERGY REDUCTION & SAVINGS FORECAST (BASED ON 100 COOLNOMIX UNITS)

Year 1
- kWh (based on 5.5 kWh per day) = 202,575 kWh per year - CO2 saving = 101,287 kg or 101 tonnes
- Financial = £50,643
- Rapid return on investment of under 16 months.

5 years
- Kwh = 1 million plus kWh hours saved - CO2 = 500 tonnes plus saved
- Financial = £250,000 + saved

10 years
- kWh = 2 million plus kWh saved - CO2 = 1000 plus saved
- Financial = £500,000 + saved

Coolnomix is compliant with TM44 part L2 (UK) building regulations.

Coolnomix helps business' who use AC or refrigeration to meet their carbon baseline targets.

Coolnomix does NOT increase the amount of fluorinated greenhouse gases in a cooling system.

Internet of Things (IoT)

The COOLNOMIX IoT is powered by Emmisis providing customers a user-interface that can be accessed via an Android smart phone app or over the internet. Users can access power consumption and savings data (kWh/ CO_2e). The interactive graphs show Coolnomix data from the installation date to granular data i.e. performance today.

Testimonials

"I am very happy with the substantial energy savings that your system has provided on our air conditioning and I am keen to keep working with you on installing more units.
Tariq, Director, SUBWAY"

"I am very impressed with the Coolnomix device, in particular with its proven performance to deliver energy and cost savings continuously for our clients. Coolnomix has surpassed my expectations and we are actively endorsing it to our entire client base."
Alex, Global Energy Manager, Sodexo

We deliver a powerful suite of solutions that reduce your carbon emissions, save you money with lower energy bills and generate revenue from being a more flexible energy user with the help of today's leading technology.

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Qualitas Veritas
ISO 9001:2015