## The Journey To Energy Efficient Temperature Controlled Storage

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In business to secure a better future

#### About Us

- Founded in 1970
- UK's largest independent industrial refrigeration engineering company
- >300 employees
- £50M turnover
- Pioneers in innovative natural refrigeration and heating technology
- Total solutions provider
- UK-wide coverage (and beyond)
- ISO 9001:2015 & 45001 certified



















"We are in business to secure a better future by using the best people, systems and technology to deliver quality temperature solutions"



#### Environmental:

- Need to achieve carbon emission reductions
- Focus on net zero and sustainability
- Energy intensive industry

### Financial

- Increasing in energy prices (pre-COVID)
- Energy next highest cost after labour and transport







#### Asking The Energy Questions

- What is my annual energy bill?
- How does this compare to best practice (and competition)?
- What are my main energy consumers?
- How will increasing energy prices affect profitability?
- What steps can I take to reduce energy consumption







#### Refrigeration:

- How do I know my refrigeration system is optimised?
- What is the size of saving on offer?
- What is the cost to improve?
- Should I modify or replace?

#### **Total Cost of Ownership**



■ installation costs ■ maintenance ■ energy



#### THE ROAD TO ENERGY EFFICIENT TEMPERATURE CONTROLLED STORAGE



### Planning

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- > Minimise heat load in store
- > Site location and layout
- > Product throughput and temperatures
- > Ambient design temperature



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#### The Cost Of Air Ingress





### 1m<sup>3</sup>/s air ingress =

## £13,000/yr Chill £20,000/yr Frozen





- > Minimise heat ingress
- > Building fabric and door configuration
- > Jointing and vapour seals
- > Roof panels

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# Refrigeration System Design

- Select a robust solution which is optimised for your site
- > System sizing and functionality
- > Refrigerant choice and defrost methodology
- > Performance enhancing technologies and efficient controls



![](_page_10_Picture_7.jpeg)

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#### Equipment Selection, Operation & Control

Three Steps to optimum energy efficiency:

- 1. Efficient equipment
- 2. Efficient operation
- 3. Efficient control

![](_page_11_Figure_5.jpeg)

![](_page_11_Picture_6.jpeg)

### Maintenance

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- > Ensure system longevity and avoid breakdowns
- > Proactive maintenance regime
- > Robust response plan
- > Knowledgeable and capable service partner

![](_page_12_Figure_6.jpeg)

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![](_page_12_Picture_7.jpeg)

## System Analysis and Monitoring

- > Monitor operation and identify continuous improvement opportunities
- > Assessment of system performance and power consumption
- > Benchmarking
- > Reporting and system feedback

![](_page_13_Figure_6.jpeg)

![](_page_13_Picture_7.jpeg)

### Specific Energy Consumption Benchmarking

#### USER INPUTS (complete yellow cells)

![](_page_14_Picture_2.jpeg)

Company:	Test Company
Site:	London
Installation Year:	2000
Application:	Cold
Store volume (m³):	100000
Energy consumption (kWh/year):	3,050,000
Electricity cost (£/kWh):	0.13
% of stated consumption relating to refrigeration	80%

![](_page_14_Picture_4.jpeg)

![](_page_14_Picture_5.jpeg)

![](_page_14_Picture_6.jpeg)

![](_page_14_Picture_8.jpeg)

### Specific Energy Consumption Benchmarking

![](_page_15_Figure_1.jpeg)

![](_page_15_Picture_2.jpeg)

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### **Energy Performance Calculator**

![](_page_16_Figure_2.jpeg)

![](_page_16_Picture_3.jpeg)

## System and Controls Optimisation

- > Optimise ongoing performance as your site evolves
- > Setpoint adjustment
- > Compressor sequencing and control
- > Address underperforming equipment

![](_page_17_Picture_6.jpeg)

![](_page_17_Picture_7.jpeg)

### System And Controls Optimisation

- 1. Operating in line with design
- 2. Identification of underperforming equipment
- 3. Set point adjustment
- 4. Improvements to control
- 5. Energy analysis vs ambient/previous
- 6. Justification for CAPEX spend
- 7. Load profile generation

![](_page_18_Figure_8.jpeg)

![](_page_18_Figure_9.jpeg)

![](_page_18_Picture_10.jpeg)

#### SUMMARY

Implement an Continuous Reduced Engage with an optimisation Benchmark downtime and Assess energy expert Opportunities your store reduction increased and profitability improvement programme

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![](_page_19_Picture_3.jpeg)

![](_page_19_Picture_4.jpeg)

![](_page_19_Picture_5.jpeg)

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#### THE ROAD TO ENERGY EFFICIENT TEMPERATURE CONTROLLED STORAGE

#### **Questions?**

![](_page_20_Figure_2.jpeg)