



## **ENERGY FINANCE FOR A NEW ERA**

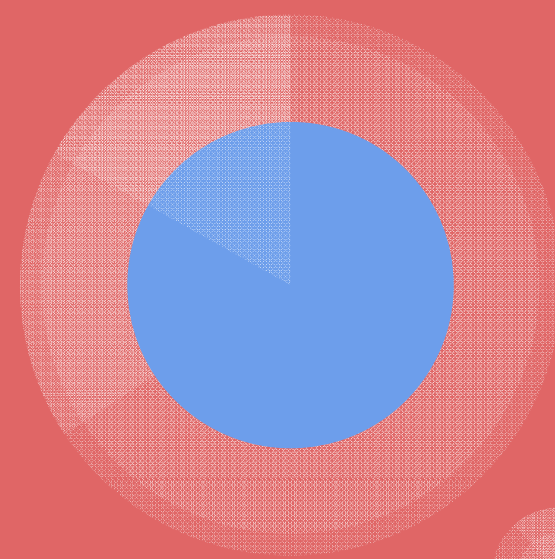
12 APRIL 2018

# Building Energy Optimisation

Tony O'Keeffe

**RemoteHVAC**

Creating High Performance Buildings



# Overview

**Building Energy Optimisation -**  
Finding Market Fit

**Energy Performance Contracts -**  
Benefits and Market Barriers

**Innovation - Building Performance**  
Monitoring software

**Deep Building Retrofit - Health,**  
Wellness & Energy Efficiency

---

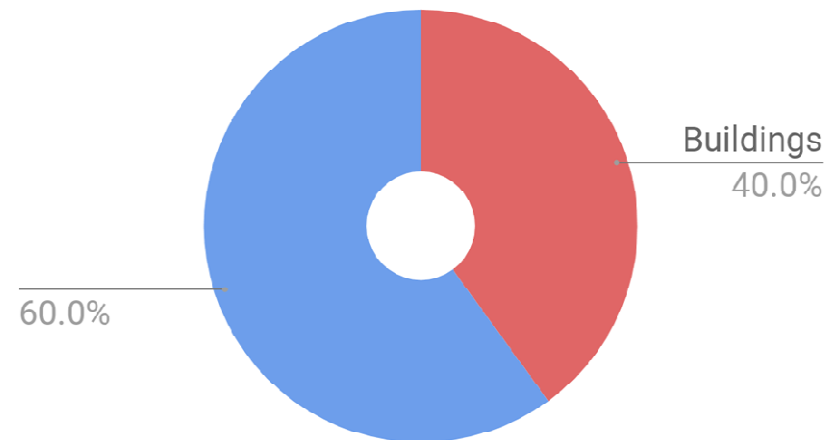


# Building Energy Optimisation

## The Requirement

- Buildings account for **40% of Final Energy Consumption**\*
- **50%** of which is used for heating/cooling, ventilation and air-conditioning (HVAC)

Final Energy Consumption



\*Source: National Energy Efficiency Action Plan, 2014





# Building Energy Optimisation

## The Opportunity

In general, commercial buildings perform far below their intended operating performance and efficiency level\*

\*Source: International Energy Agency, 2006



# Building Energy Optimisation

## A difficult sell....

- Estimated Energy Savings
- Existing BMS equipment is used to fine tune building operation for energy efficiency
- Energy savings will become evident after works are completed

## Delivering the Service...

- Highly valuable expertise and experience used to identify energy opportunities and deliver a suitable solution
- Compensated for the full value delivered to client
- Very difficult to prove benefits and justify the cost.



# Energy Performance Contract



# Energy Performance Contracting

## Brown Thomas Cork

- All Project Cost covered by ESCO - Sirius Building Energy Solutions
- No financial risk to client
- Earnings based on 50/50 split of energy savings
- 3 year contract - Opportunity to benefit over longer term when project is successful



# Market Barriers

## Client Concerns

- Building comfort is reduced
- Comfort sacrificed for Energy savings
- Potential impact to business or staff
- Loss of control

## ESCO Risks

- No control over building operation
  - 24 hour operation
  - Inefficient set-points
- No control over maintenance of plant
- Inherit systematic design issues



# Market Barriers

## We stopped...

- Despite three very successful EPCs, we stopped pursuing EPCs
- The risks were too high
- The level of return did not match the upfront investment in time and resources

## However...

- Buildings are still poorly commissioned and operated
- Energy saving opportunities still exist

The image features a solid red background. In the center, the text "Innovative Software Solution" is written in a bold, white, sans-serif font. On the left side, there are three vertical bars of varying heights, each with a white grid pattern. On the right side, there are four vertical bars of increasing height, also with a white grid pattern.

# **Innovative Software Solution**



# Building Performance Monitoring

## A Wealth of Data...

- Building Control Systems contain a wealth of valuable data
- The BMS is often mistrusted and underutilised
- **BMS, Energy** and **Weather Data** are used to establish how efficiently and effectively the building is operating.





# Building Performance Monitoring

## Benefits for EPCs...

- Building Performance can be **quickly** and **accurately** measured prior to contract and investment
- Existing system **faults** and energy savings **opportunities** can be identified
- The benefit of capital investment/upgrades can be more accurately **estimated** and **measured**
- Ongoing building monitoring ensures **return on investment**



## Collaboration for EPCs

Energy Supply  
Company

Deep pockets

Large Client Base

Horizon 2020 Targets

**sirus**  
Building Energy Solutions

HVAC and BMS  
Expertise

Project Delivery

Established & Reliable

Remote**HVAC**

Building Data Analysis

Fault Detection

Ongoing Building  
Efficiency



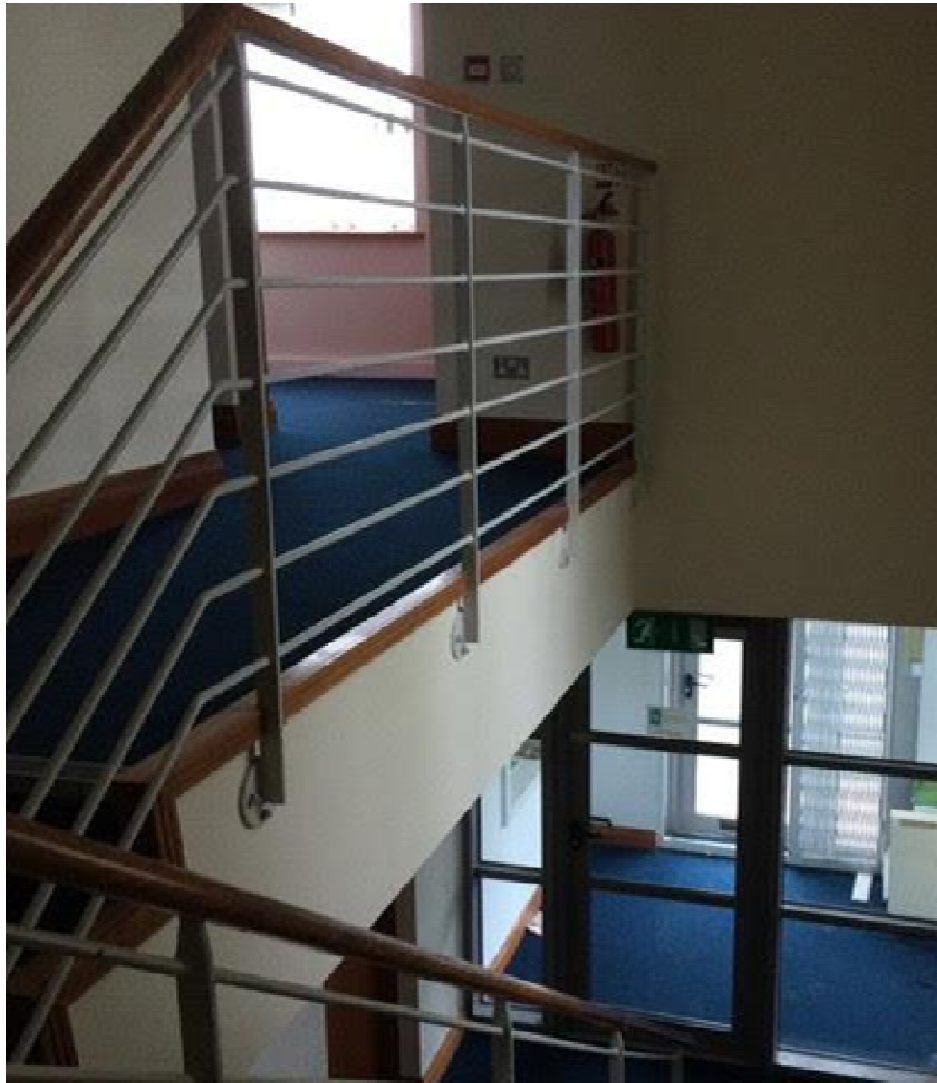
# **Deep Retrofit-The Well Building**



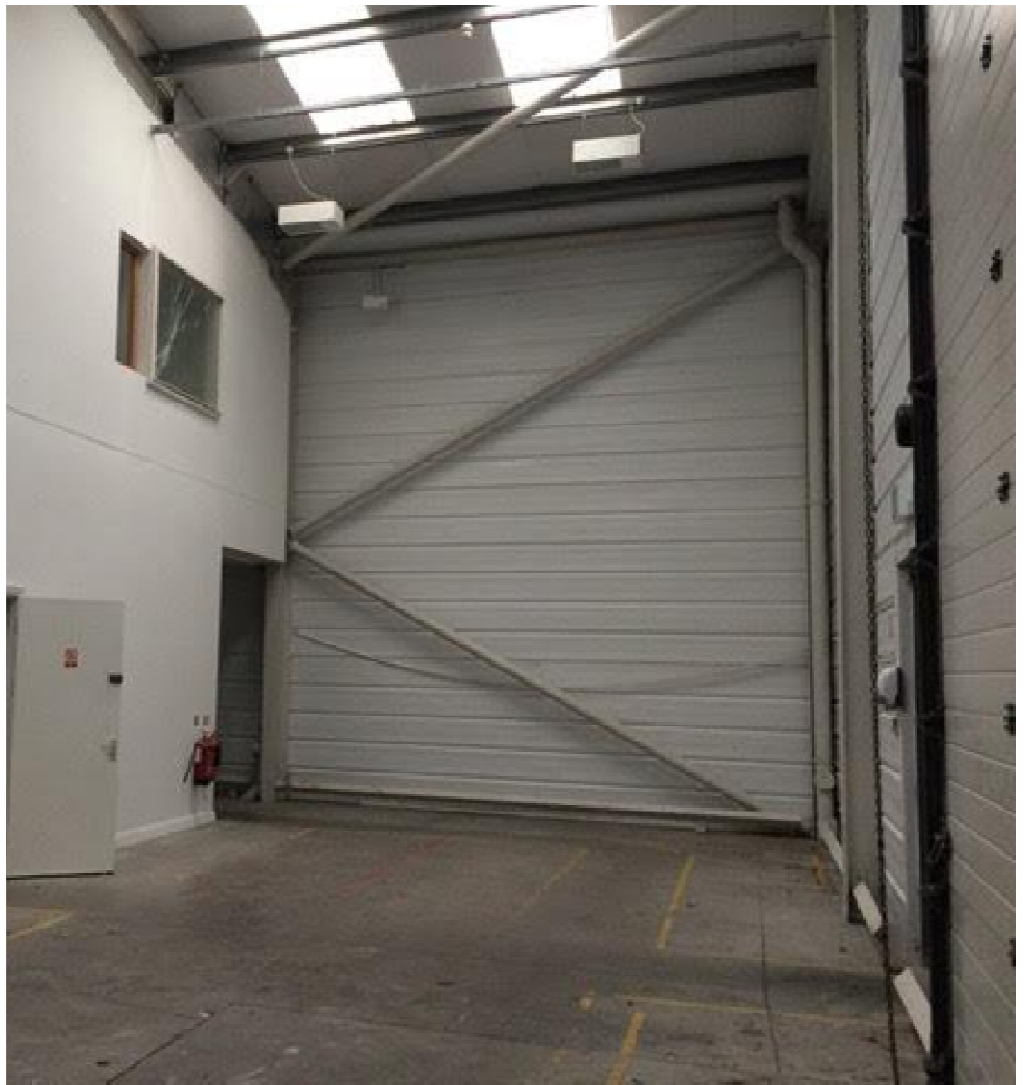
# The Well Building

The starting point...

A typical 1990's warehouse and office unit in CityWest,  
Dublin









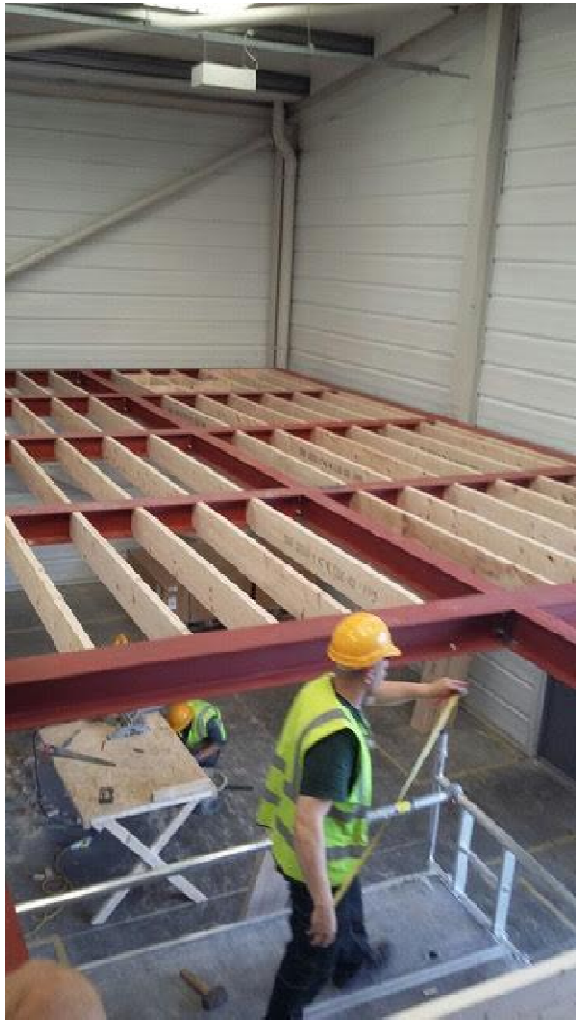
# **The Well Building**

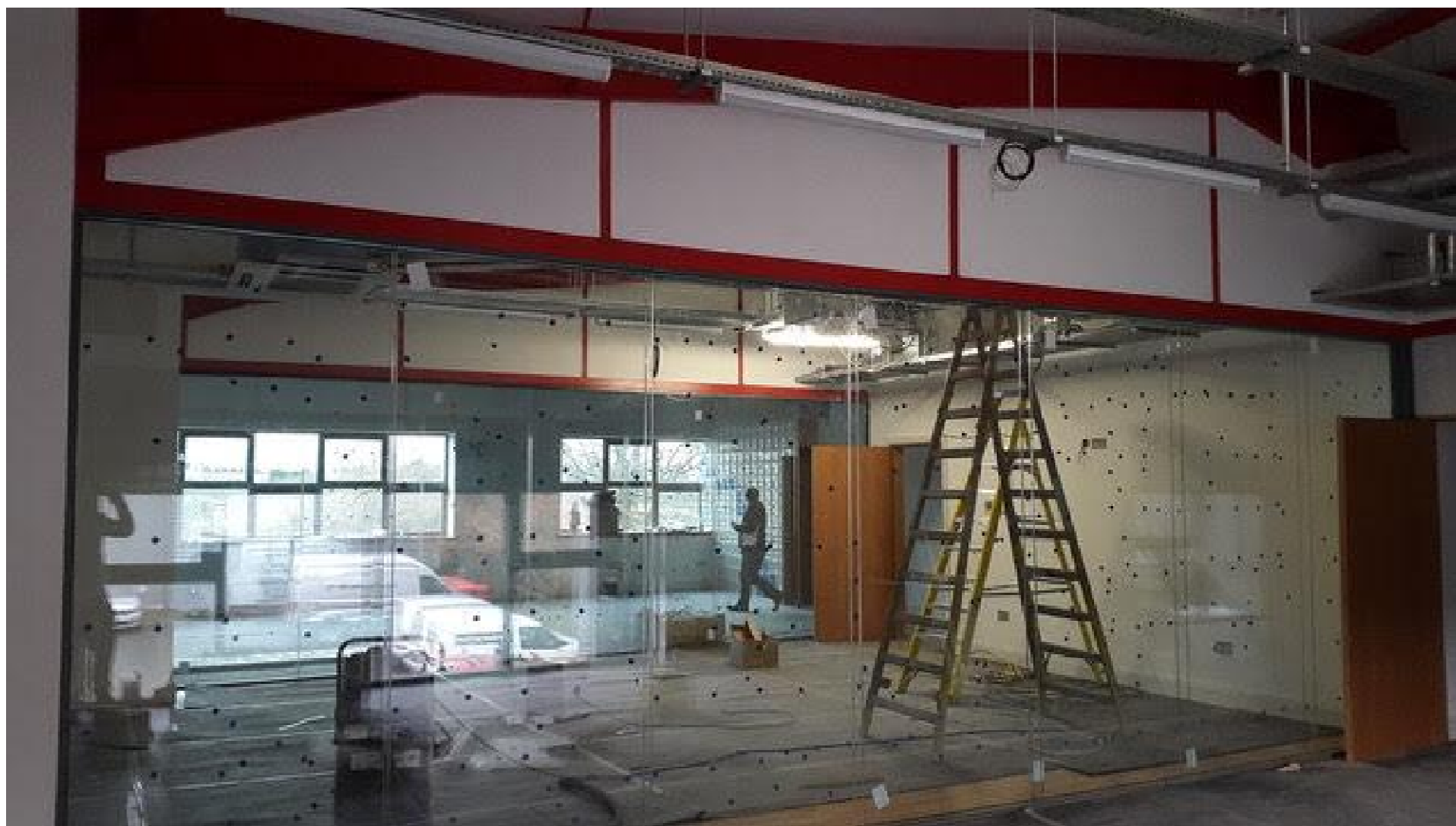
Creating a blank canvas...

They stripped the building back to its shell

Repurposed to meeting demanding Wellness Standard





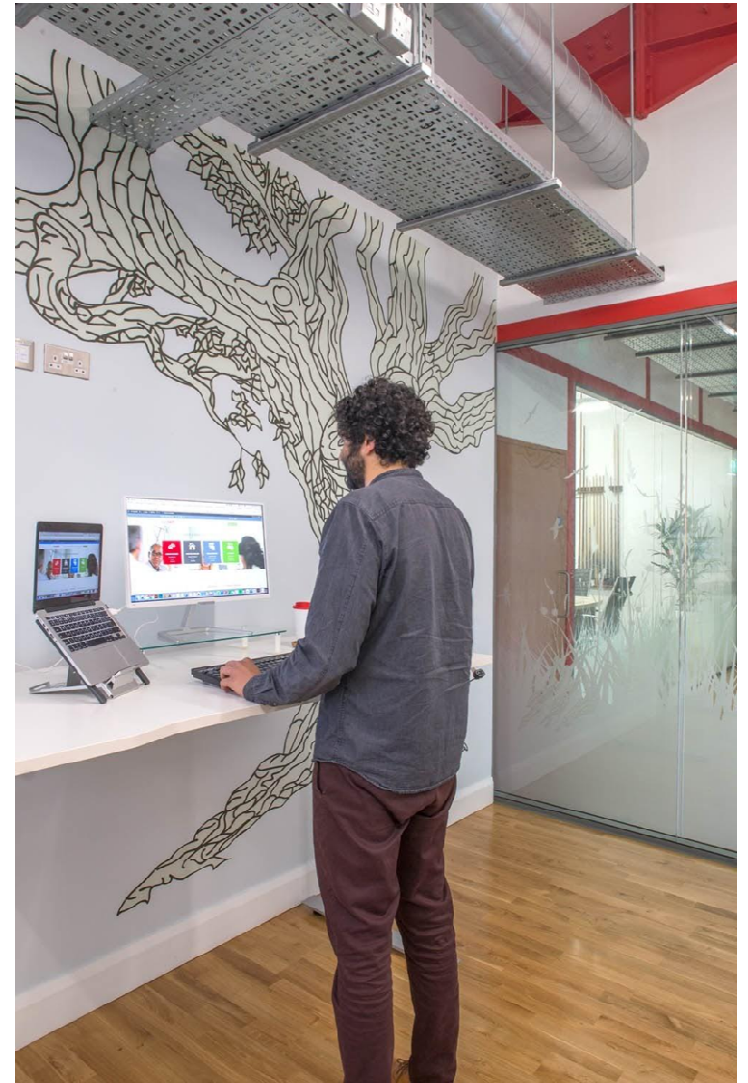




# **The Well Building**

The finished product...

A comfortable, healthy and efficient building where the occupants needs were prioritised above all else.

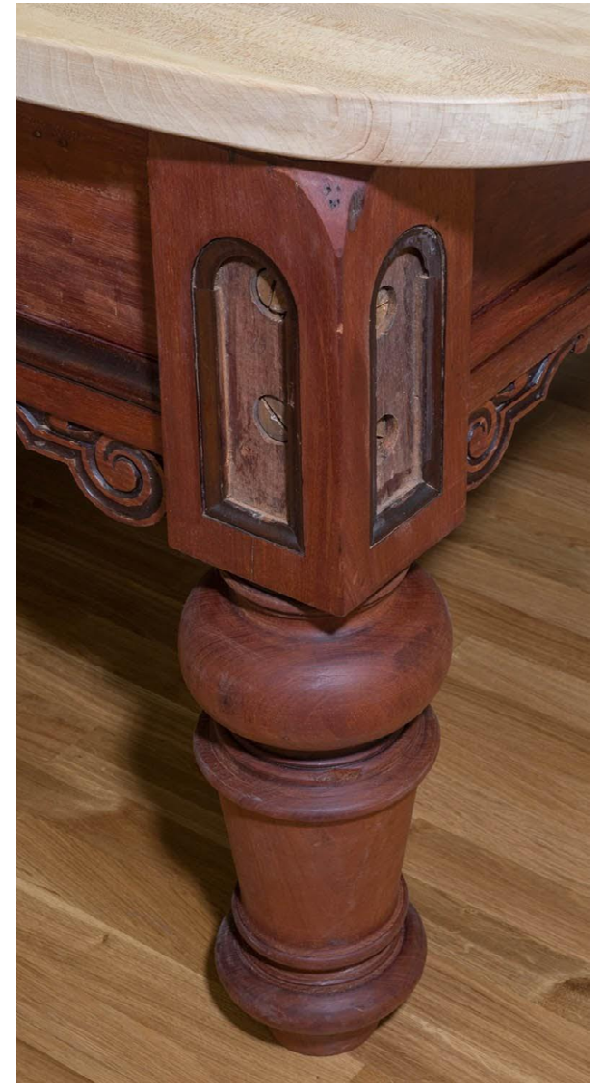
















## The Well

[Home](#) / [Infernit/Sirus Buildings](#) / Building Dashboard

COMFORT SCORE

82

WASTE ENERGY

0 kWh

### Worst Performing Zones

Zone Name	Building	Setpoint	Min Temp	Max Temp	Avg Temp	Avg Dev	Comfort Score
Canteen	The Well	20.00 °C	0.00 °C	22.86 °C	19.88 °C	3.02 °C	38
EazySafe Office	The Well	24.00 °C	15.80 °C	25.10 °C	22.77 °C	1.58 °C	82
Breakout Room 2	The Well	20.00 °C	14.10 °C	22.10 °C	20.45 °C	0.99 °C	82
Breakout Room 1	The Well	20.50 °C	17.35 °C	23.10 °C	21.55 °C	1.38 °C	82
Eazysafe Technical Office	The Well	23.50 °C	15.64 °C	26.83 °C	21.53 °C	1.19 °C	84

[View All](#)

[Zones](#) [Assets](#) [Asset/Plant Activity](#)



Comfort

Deviation

### High Criticality

EazySafe Office

High



COMFORT SCORE  
82

SETPOINT  
24 °C

AVG DEVIATION  
1.58 °C

Eazysafe Technical Office

High



COMFORT SCORE  
84

SETPOINT  
23.5 °C

AVG DEVIATION  
1.19 °C

Board Room

High



COMFORT SCORE  
86

SETPOINT  
21 °C

AVG DEVIATION  
1.39 °C

## Zones

[Home](#) / [Zones](#)

\* Showing average values for the last 24hrs



Search Zones

The Well ▾

Medium Criticality ▾



38

**Canteen**

The Well

Criticality  
**Medium**Setpoint  
20.00 °CAvg Temp  
19.88 °CAvg Deviation  
3.02 °C

82

**Breakout Room 2**

The Well

Criticality  
**Medium**Setpoint  
20.00 °CAvg Temp  
20.45 °CAvg Deviation  
0.99 °C

82

**Breakout Room 1**

The Well

Criticality  
**Medium**Setpoint  
20.50 °CAvg Temp  
21.55 °CAvg Deviation  
1.38 °C

84

**Small Meeting Room**

The Well

Criticality  
**Medium**Setpoint  
21.00 °CAvg Temp  
19.55 °CAvg Deviation  
1.50 °C

85

**Chill Room**

The Well

Criticality  
**Medium**Setpoint  
20.00 °CAvg Temp  
19.08 °CAvg Deviation  
1.04 °C

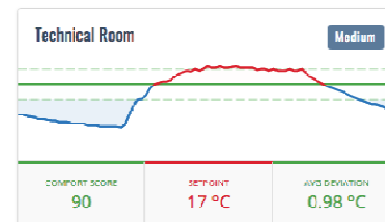
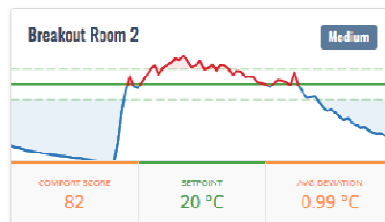
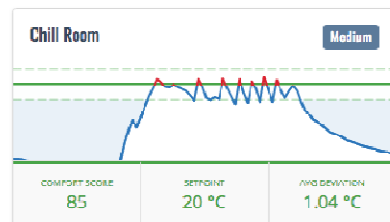
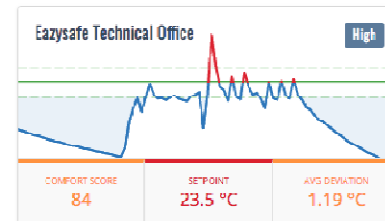
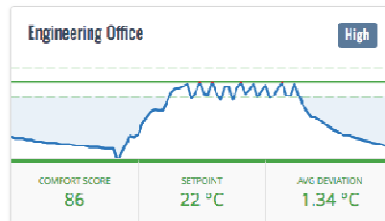
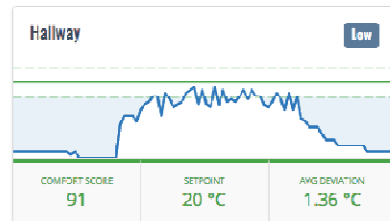
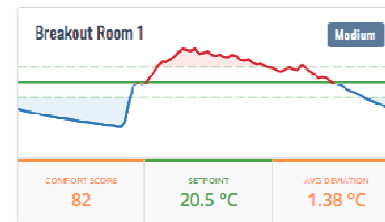
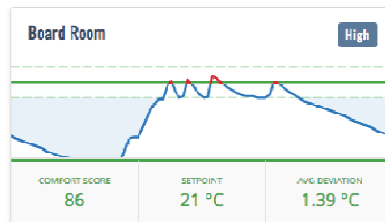
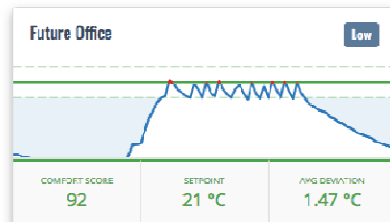
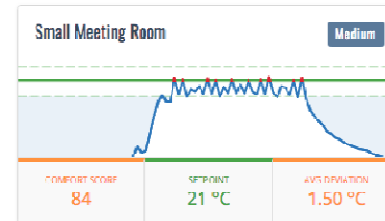
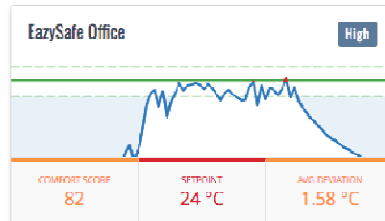
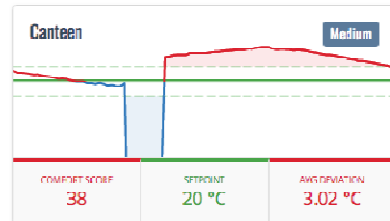
90

**Technical Room**

The Well

Criticality  
**Medium**Setpoint  
17.00 °CAvg Temp  
17.44 °CAvg Deviation  
0.98 °C

## All Zones



## Eazysafe Technical Office

[Home](#) / [Inferri/Sinus Buildings](#) / [The Well](#) / Zone Dashboard

◀

02 Feb, 2016

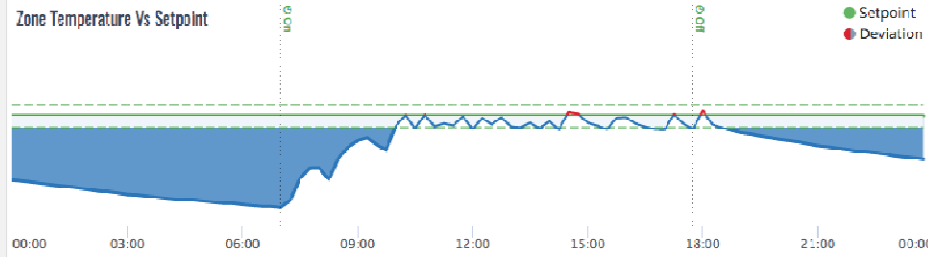
▶

COMFORT SCORE

79

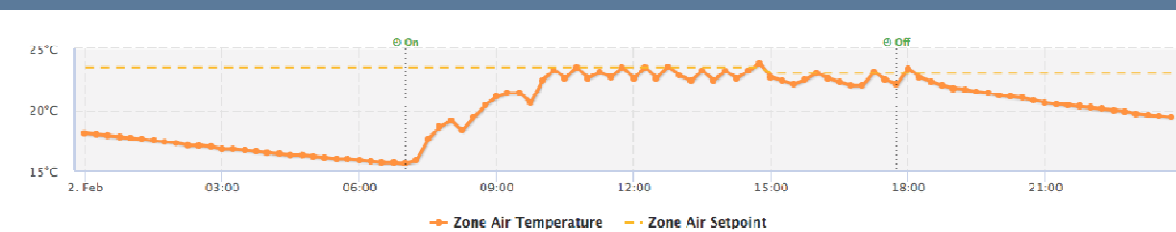
High Criticality

Zone Temperature Vs Setpoint


[Conditions](#) [Analysis](#) [Faults](#) [Assets](#) [History](#)

### Zone Sensor 1

(EazySafe Tech AC Zone Air Temperature Sensor)



### Zone Sensor 2

(Eazysafe Tech Sensor Zone Air Temperature Sensor)

Sensor Metrics (During Operating Hours)

Sensor	Setpoint	Min Temp	Max Temp	Avg Deviation	Comfort SP Achieved
--------	----------	----------	----------	---------------	---------------------

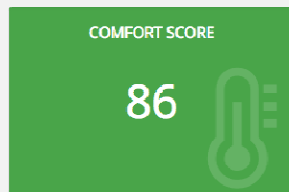
## Breakout Room 2

[Home](#) / [Inferri/Sirus Buildings](#) / [The Well](#) / Zone Dashboard

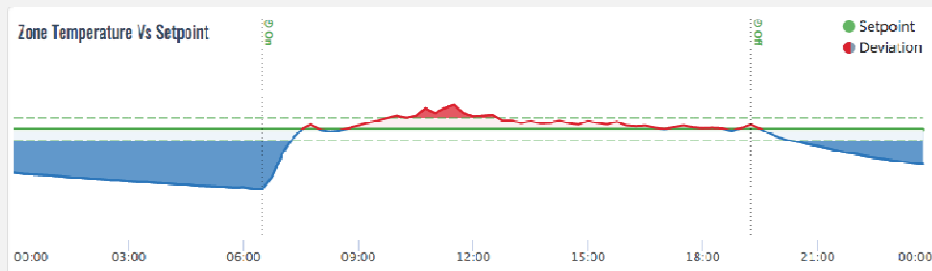
◀

07 Mar, 2018

▶



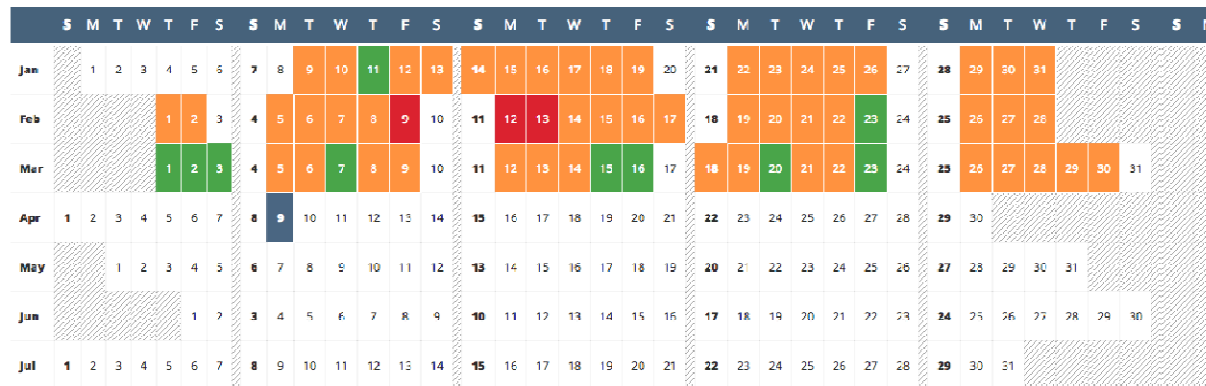
Medium Criticality


[Conditions](#) [Analysis](#) [Faults](#) [Assets](#) [History](#)

Previous Year

2018

Next Year





## Further Information

- Brown Thomas Case Study:

[www.sirusinternational.com](http://www.sirusinternational.com)

- The Well Building:

[www.thewellbuilding.com](http://www.thewellbuilding.com)

- RemoteHVAC Software:

[www.remotehvac.com](http://www.remotehvac.com)



# Thank You

Tony O'Keeffe

[tony.okeeffe@remotehvac.com](mailto:tony.okeeffe@remotehvac.com)

