

Reducing Energy Demand in Bradford

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Energy Team Manager



Approach, Actions and Impacts

- Introduction
- Structure and team
- Approach
- Actions
- Impacts
- Challenges
- Next steps

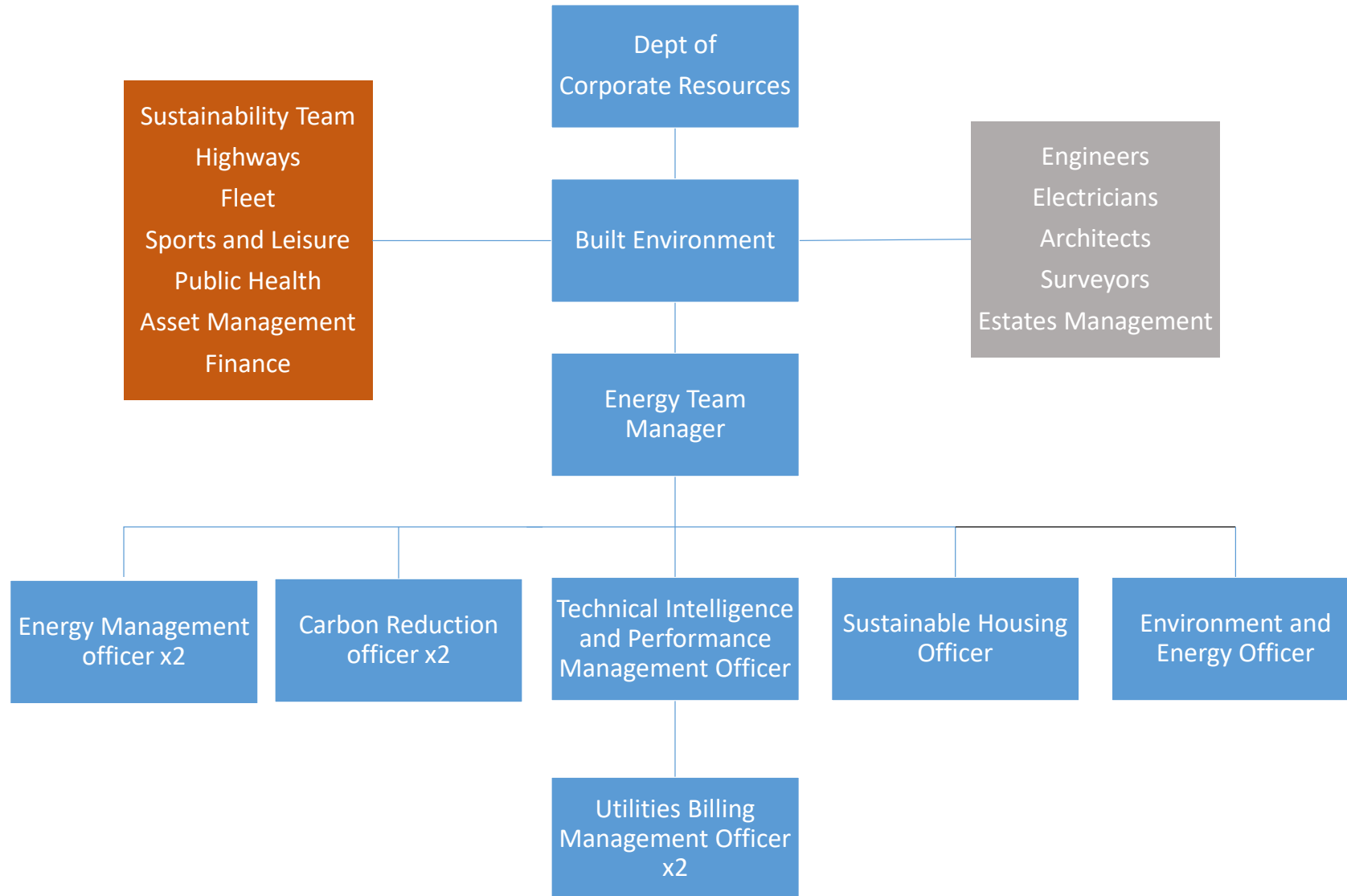


Introduction

- 150 Main buildings
- Influence 200 schools
- Hundreds of sports pavilions, small buildings and pieces of land
- BMDC has over 8,000 employees
- Wide variety of building types
- High level of listed and thermally inefficient buildings
- Disposal plan to bring in capital receipts



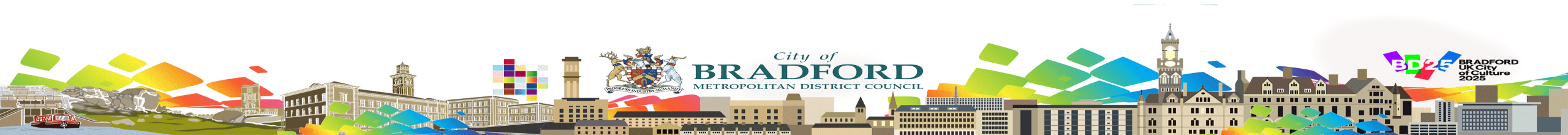
Structure and Energy Team



Energy Team Activities

Target – net-zero carbon by 2038 – 10% CO2 emission reductions pa

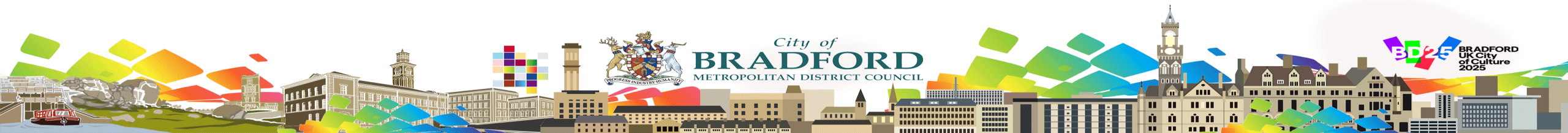
- Energy management – BMDC buildings and estate
- Carbon reduction – EPCs, DECAs
- Utilities contracts and billing
- Provision of data
- Domestic housing retrofit – LAD3, ECO4, ECO-Flex, GBIS, new UK government warm homes projects and Pilot programmes
- Renewable energy projects
- Electric vehicle charging points



Approach – Main Principles

The lowest carbon kwh is the one you never use

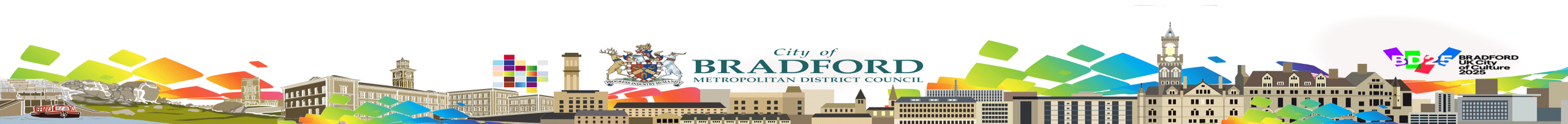
The cheapest kwh is the one you don't use



Approach - plans and people

Plans

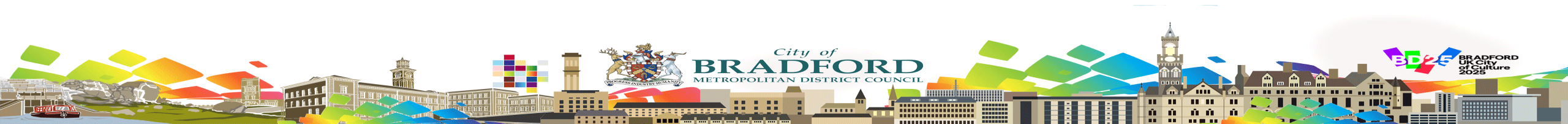
- Heating plan – signed off by council executive – sets parameters
- Sustainable Design Guide – must be adhered to in all new projects
- Projects budget for minor works of £500k plus each year
- Climate Action plan – wider scope than just council



Approach - plans and people

People

- Energy Team Staff, Built Environment Colleagues and other departments – understand and use capabilities, experience/expertise
- Industry/commercial – specialist knowledge and innovative solutions
- Customers – listen to, act on issues, educate and inform
- Psychology of heating
- Making it enjoyable for people to deal with us



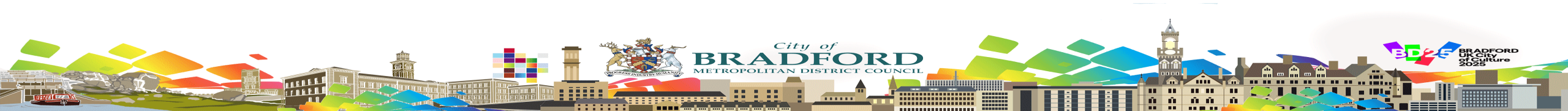
Approach – data and control

Data

- Monthly updates – gas and electricity - overall and individual building
- Monitor, identify issues, measure impacts of changes

Building Energy Management Systems

- **100 of our main buildings** - Real time monitoring of temperatures in buildings – reporting over a period of time
- Able to optimise heating and lighting plans for each building
- Replicate and measure impacts of potential solutions



Approach – Technology and Industry

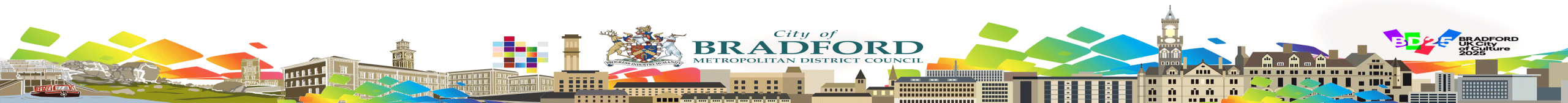
Technology

- Work closely with companies (many local) to identify, test and trial solutions
- Be open to staff bringing in potential solutions
- Be open to companies bringing in potential solutions
- Look for low cost – high impact solutions that can be rolled out across estate – value for money
- Be prepared to make mistakes



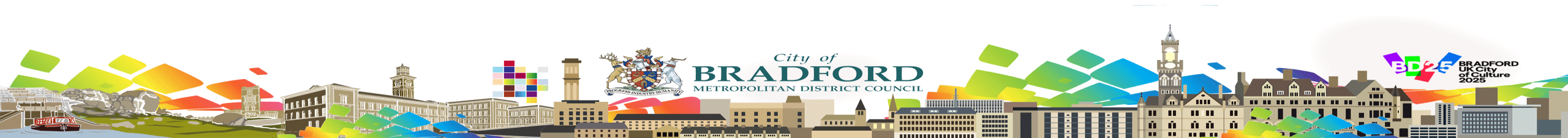
Approach – Best practice

- Internal – find out from teams what has been tried in the past - build on success – if it worked in the past - use it again
- External – regular communications with other councils, public sector organisations, trade bodies (REA), private sector, companies and individuals
- APSE – annual event (very good) – presentations and peer discussions
- APSE – informal dinners, regional events and internal expertise
- Only useful if you do something with the knowledge



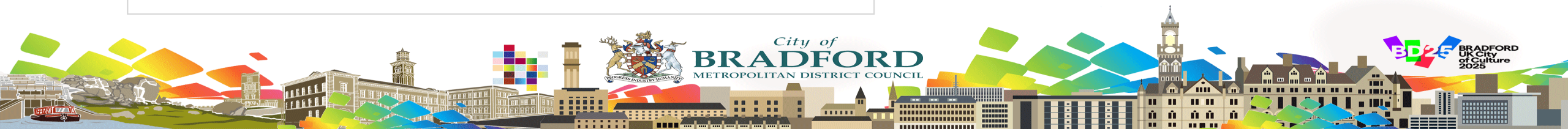
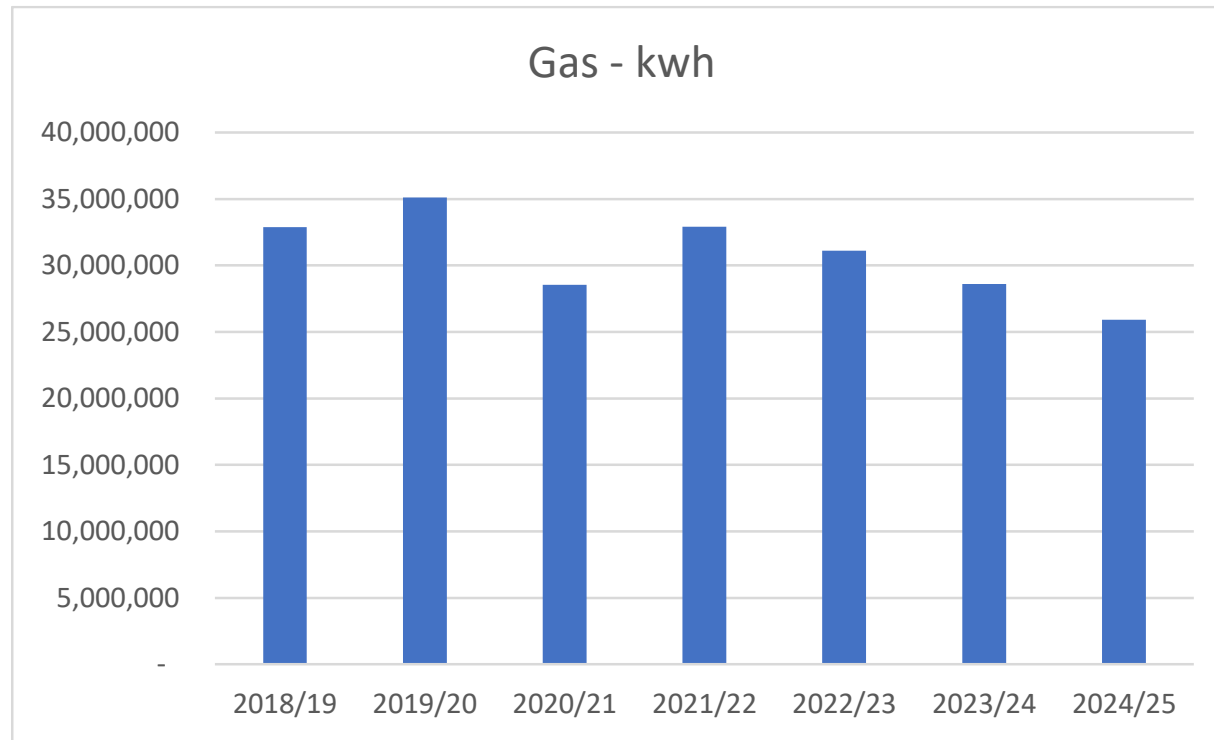
Actions - impacts

- Optimised heating/lighting plan for each building
- Sensors (movement, heat, noise, CO2) – sports halls 40% reduction
- Selective lighting controls – sports pitches 30-50% reduction
- Radiator additive (Delta-T) - 10 to 30% reduction in gas usage
- Smart electric motors for air handling units – 35% reduction
- Controllable LED lighting – lighting levels set by specific areas – 3-4 year paybacks – better lighting conditions for individuals



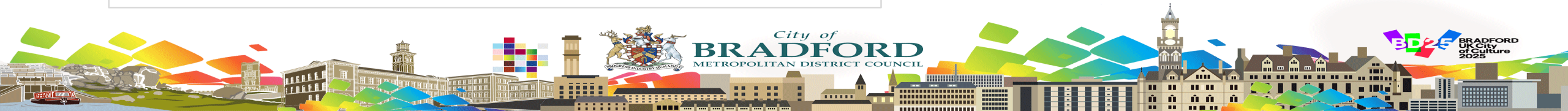
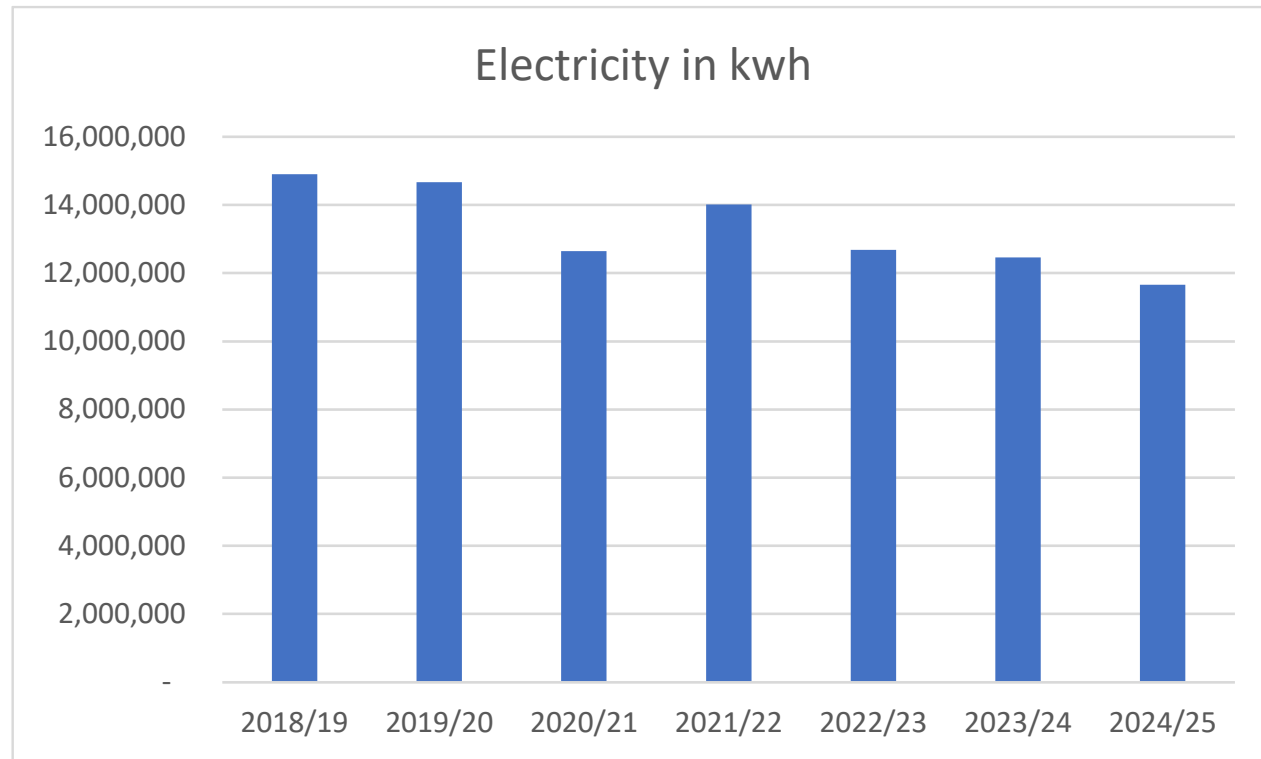
Impacts – Gas usage

- Since peak in 2019/20 – reduction of 18.5% (forecast 26.2%)
- Since 2021/22 – reduction of 13.1% (forecast 21.1%)



Impacts – Electricity usage

- Since peak in 2019/20 – reduction of 15.0% (forecast 21.8%)
- Since 2021/22 – reduction of 11.1% (forecast 16.9%)



Impacts – CO2 Emissions

Scopes 1 and 2 plus small number of easily measurable scope 3s

- 2018/19 – 47,446 tonnes CO2e
- 2022/23 – 21,432 tonnes CO2e
- 55% CO2 emission reduction in last 5 years



Domestic Retrofit Programmes

- LAD 3, ECO 4, ECO Flex, GBIS, new UK government Warm Homes and pilot projects
- Solutions based on technology and approaches we know works and that the local supply chain can deliver at scale
- Fabric first approach – not only improves thermal efficiency but also enhances the experience of living in the property
- Pilot project with WYCA – using practical experience of solutions we have tried in BMDC estate and replicating in domestic homes



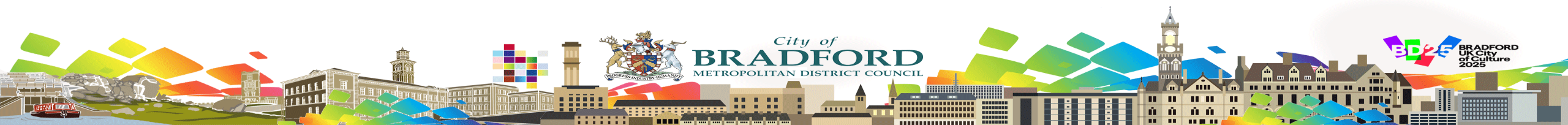
Domestic Retrofit Programmes

- Aim is to have cost effective solutions that reduce energy usage, increase deployment of renewable energy (solar PV) and improve comfort levels and living conditions for users
- Solutions include internal insulation, draught proofing, low temperature fan assisted radiators, building energy management systems, smart TRVs, smart air bricks, radiator additives and low carbon hot water
- Prepare buildings for the next stage of deployment of renewable and low carbon heating options – heat network or heat pumps

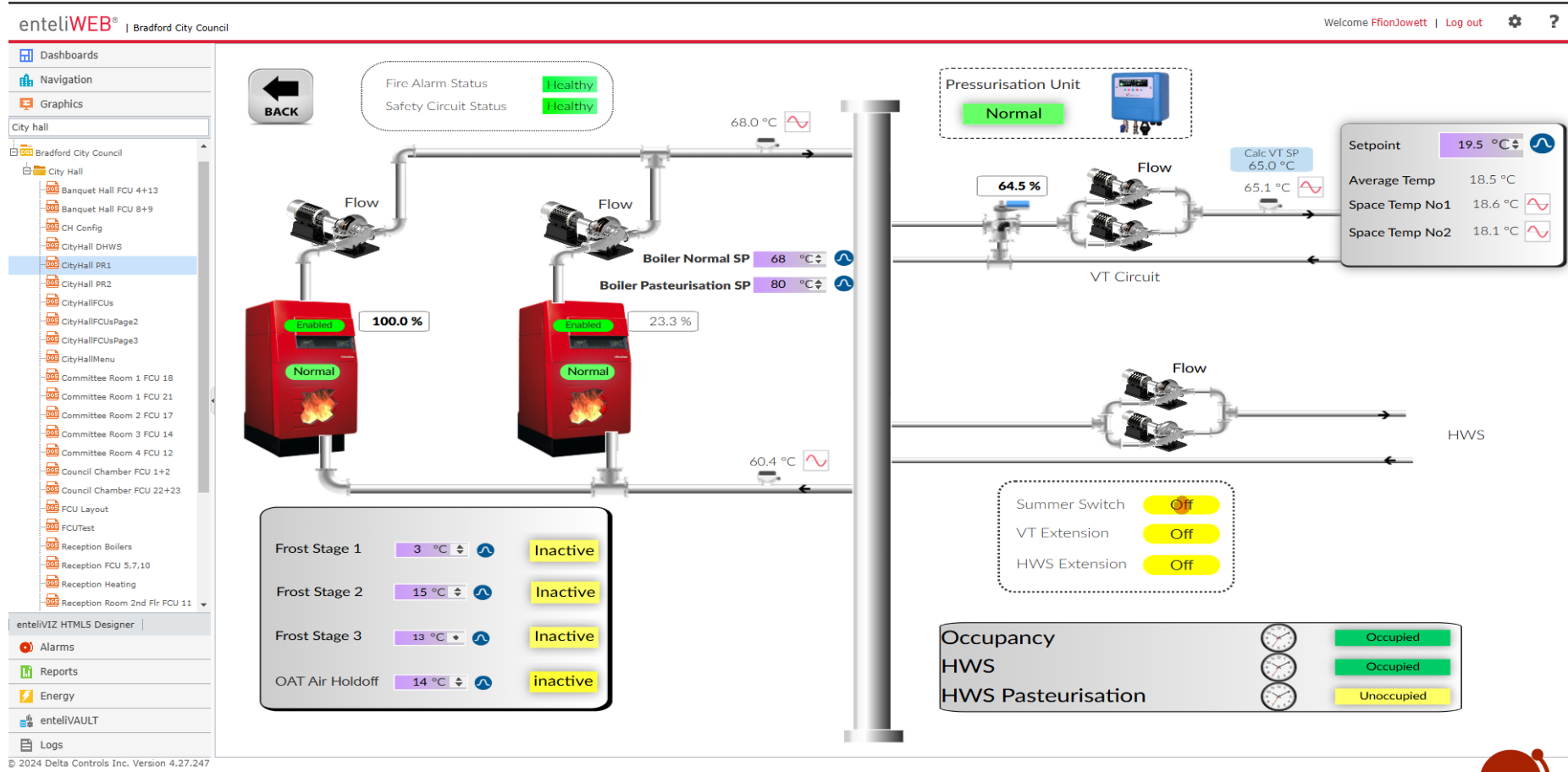


Building Energy Management Systems

- BEMS is at the heart of everything we do
- 100 buildings fully controlled
- Enables optimisation of heating/lighting/HVAC systems
- Allows us to monitor and measure the impacts of new solutions
- Allows us to try things and measure the human responses
- Removes the need for behavioural change
- Built up steadily over the last 10 years
- You need to have the people to monitor and operate BEMS



City hall





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Fan Coil Units

Click For More Details



		Space Temp		Setpoint		
FCU 1 / 2 / 22 / 23 - Council Chamber		19.6 °C		19.5 °C		
FCU3 Room 201 2nd		15.9 °C		20 °C		
FCU 4 / 8 / 9 / 13 - Banquet Hall		16.9 °C		20 °C		
FCU5 & 7 & 10 Reception Ground Floor		20.0 °C		20 °C		
FCU6 Room 202 2nd Floor		20.1 °C		20 °C		
FCU11 Reception Room 2nd Floor		16.5 °C		20 °C		

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Space Temps

[Menu](#)

Plant Room 1

Ground floor Museum	14.7 °C	
Ground floor Police area	19.2 °C	
Ground floor Wedding corridor	19.5 °C	
1st flr Labour Exec members	18.6 °C	
3rd flr Peace Studies room	17.1 °C	
Existing Space Temp No.2	18.1 °C	

Average Space Temp No.1

18.5 °C

[Click here for Plant Room 1](#)

Plant Room 2

Occupational Health waiting room	24.5 °C	
Ground Floor prayer room	19.1 °C	
Ground floor Reception corridor	21.2 °C	
1st flr Meeting Rm Conservative	18.1 °C	
1st flr Committee secretary office	22.6 °C	
1st flr Leader of Conservative	19.4 °C	
2nd flr Civic Affairs	22.3 °C	
3rd flr Media room	21.1 °C	
3rd flr Room 312	19.4 °C	
3rd flr Room 304	18.2 °C	
4th flr 1960's block	21.7 °C	
Existing Space Temp No.1	18.6 °C	

Average Space Temp No.2

20.2 °C

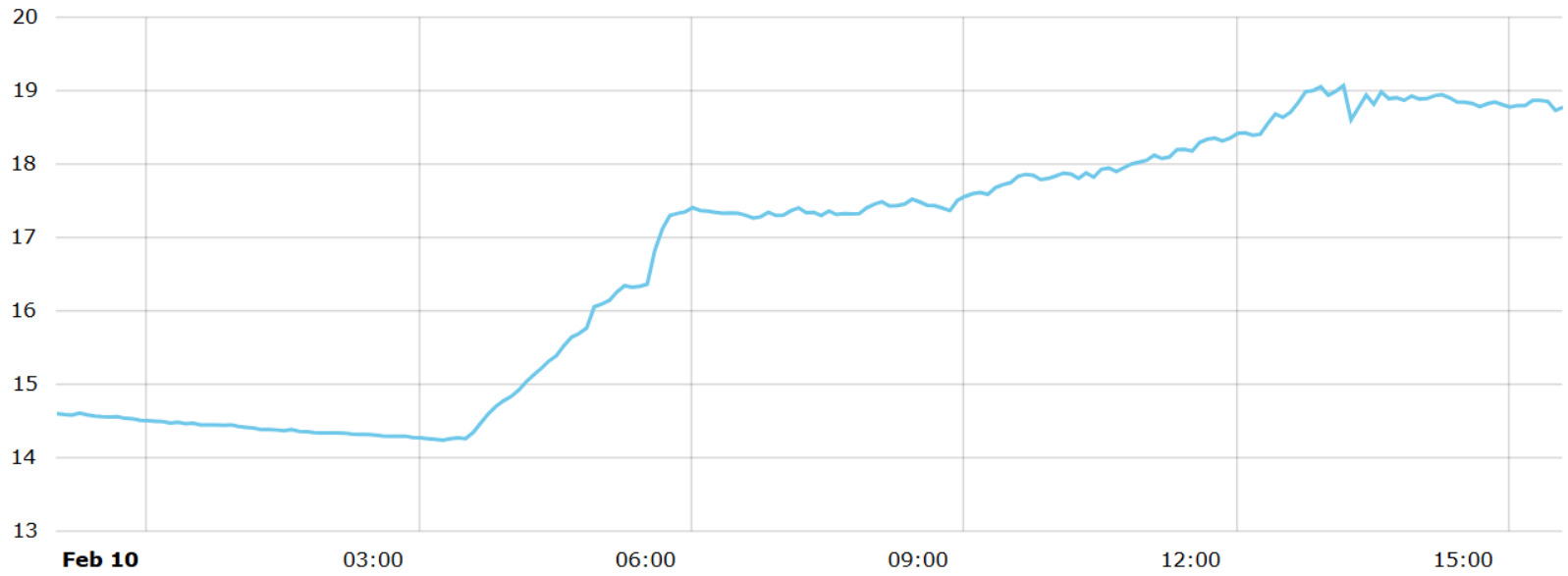
[Click here for Plant Room 2](#)

Trending

Enabled Disabled

Number of Samples Logged: 1984
Log Type: Polling
Sample Interval: 5 Minutes
Archiving: Enabled (enteliVAULT)

Sample Data



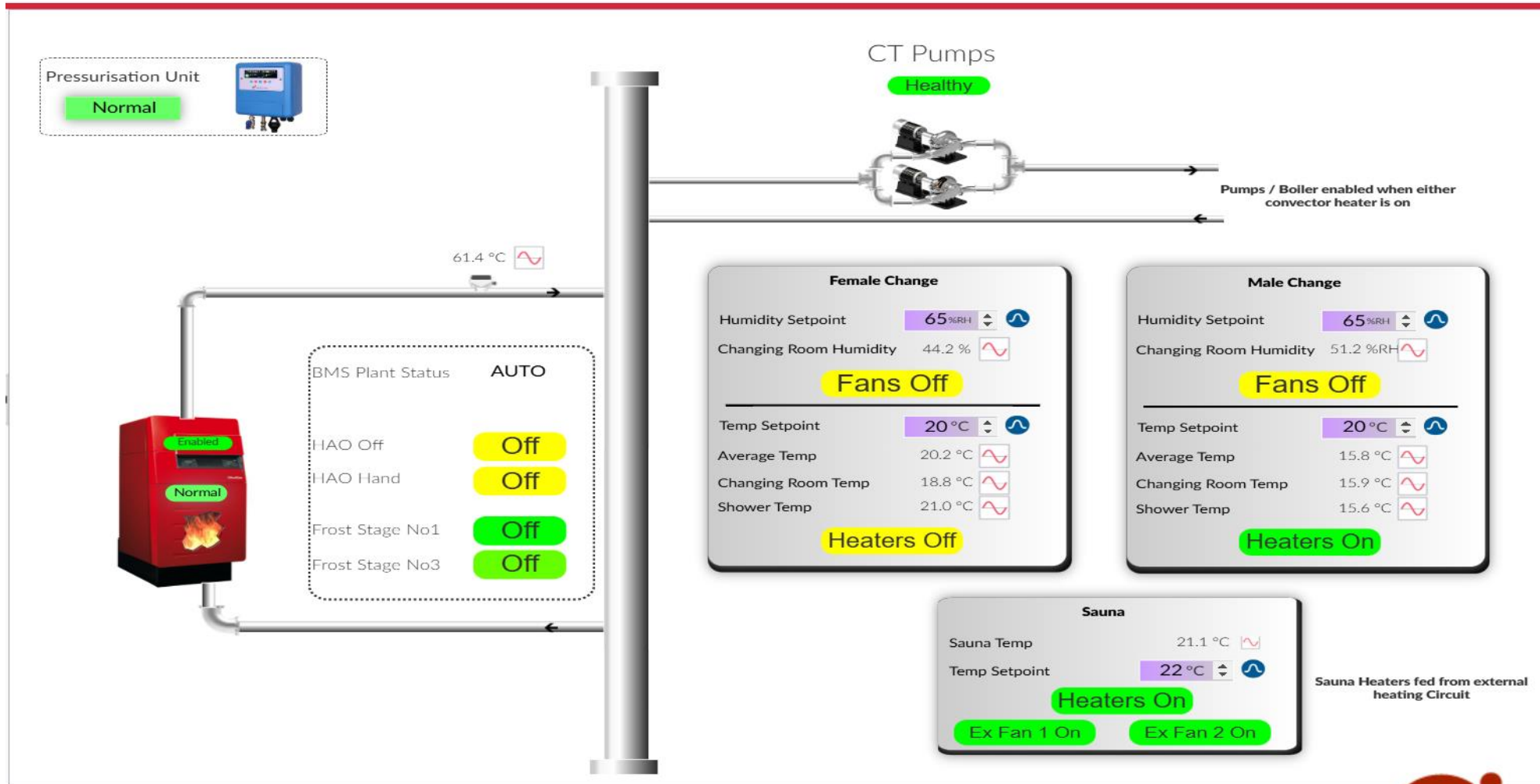
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Monitoring

Space Temp 18.8 °C

History

Manningham sports



Full Pitch

Note - Once Overriden the lights will go out 15 minutes after Occupancy has gone off

The interface consists of four panels, each representing a different state of the lighting system. Each panel features a light pole icon on the left and right, a 'Light Level' slider, and a 'Lights On SP' slider. Below the sliders are three buttons: 'Occupancy Not Detected', 'No Motion', and 'Times'. A yellow 'Override' button is located at the bottom of each panel.

- Top Left Panel:** Light Level: 65.0 lx, Lights On SP: 150 lx. Buttons: Occupancy Not Detected, No Motion, Times, Override.
- Top Right Panel:** Light Level: 89.0 lx, Lights On SP: 200 lx. Buttons: Occupancy Not Detected, No Motion, Times, Override.
- Bottom Left Panel:** Light Level: 78.0 lx, Lights On SP: 200 lx. Buttons: Occupancy Detected, Motion, Times, Override.
- Bottom Right Panel:** Light Level: 92.0 lx, Lights On SP: 200 lx. Buttons: Occupancy Not Detected, No Motion, Times, Override.

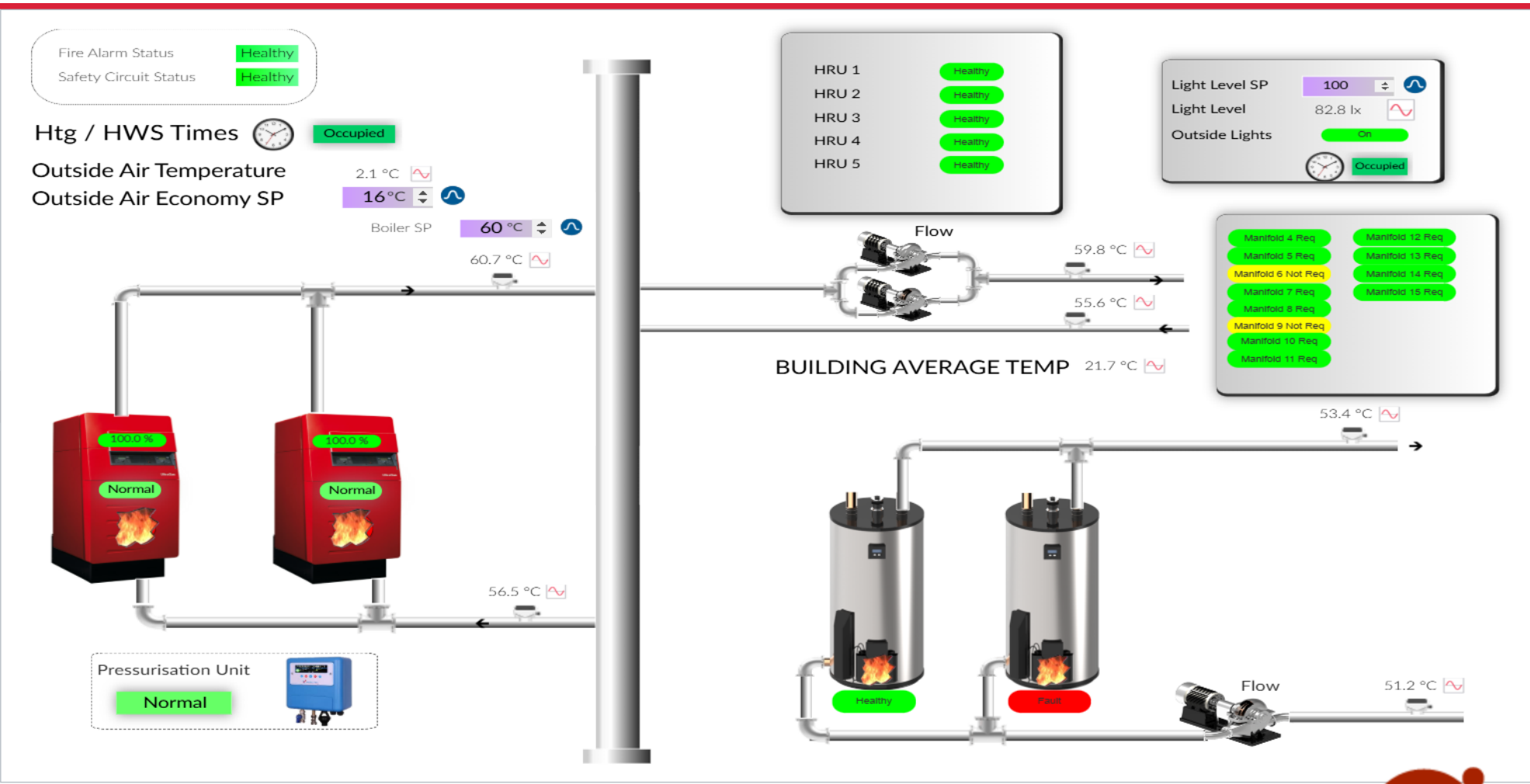
Override Key Switch

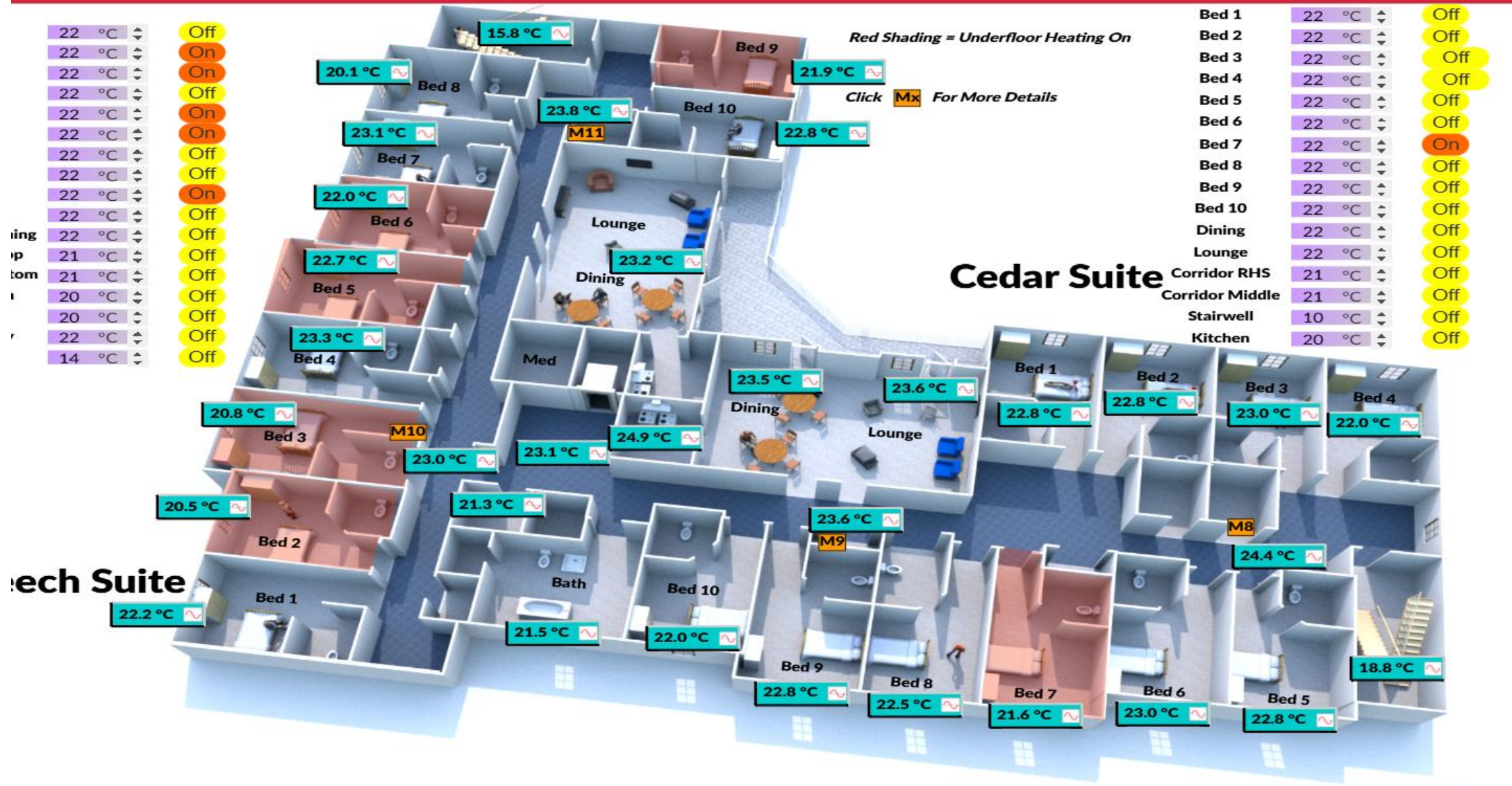
- Sports Hall Inactive
- Pitch Inactive

Main Entrance



Valley view court

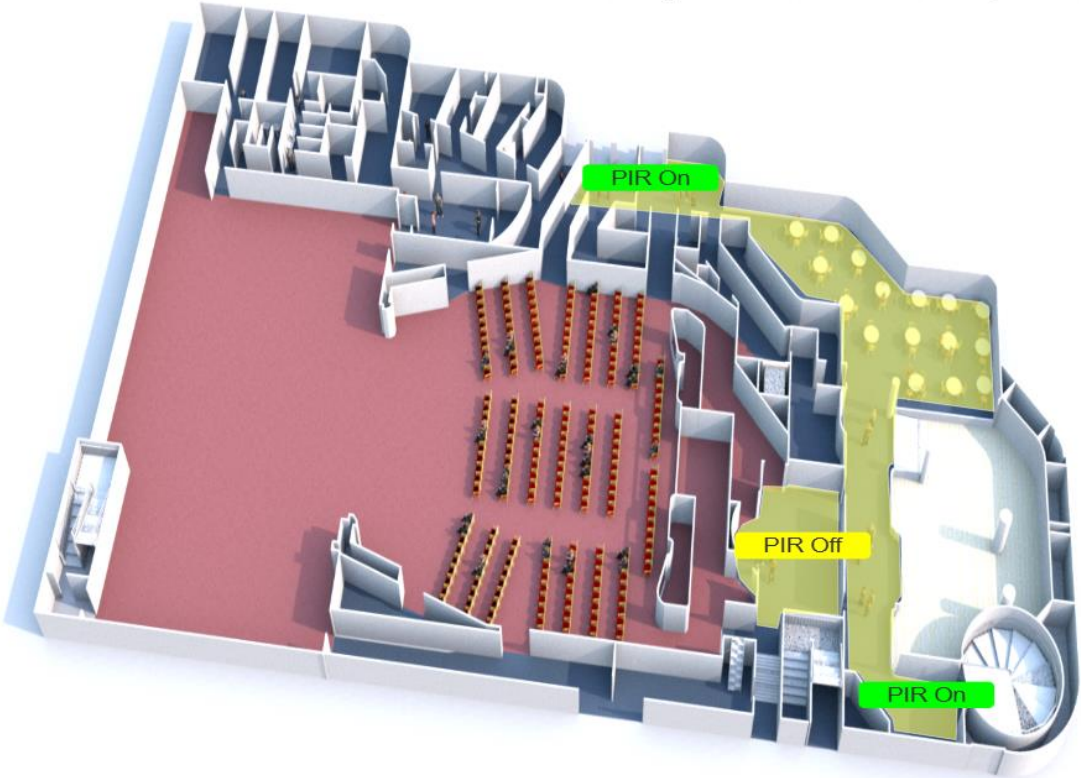




Alhambra lights



certain lights run into other zones see description in text boxes



PIR Overrun

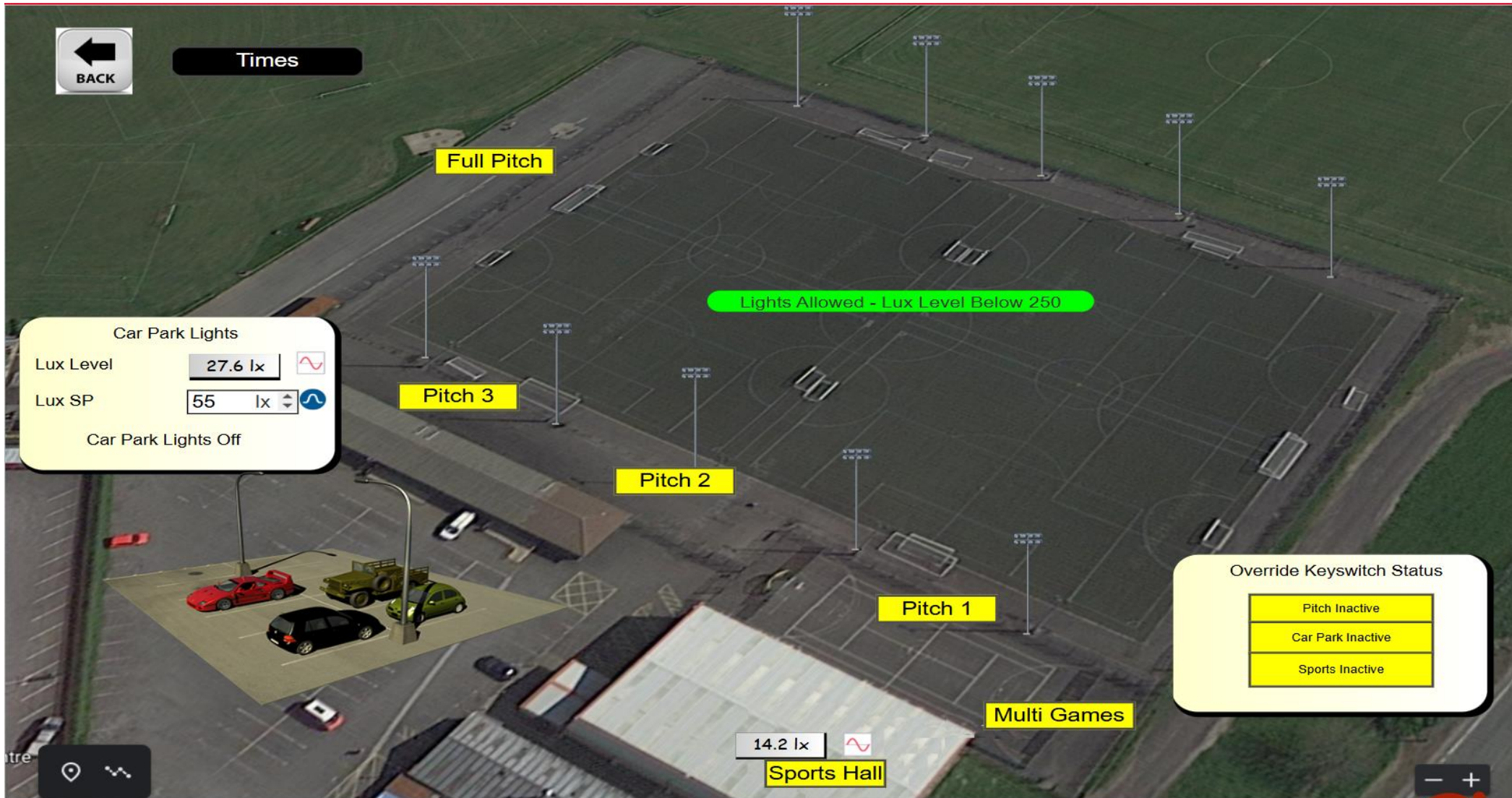
30 min

Stalls

- Lights No1 On
- Stalls Ent On
- Lights No3 On
- Occupied
- Service Switch Off

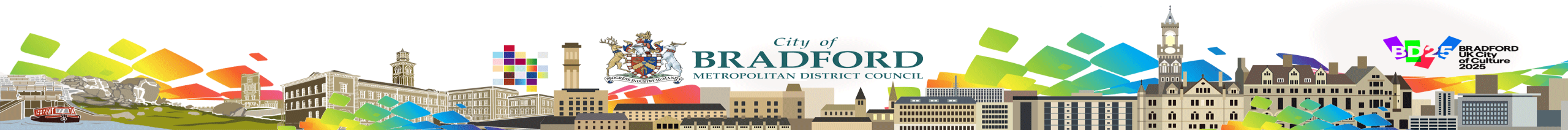


Marley



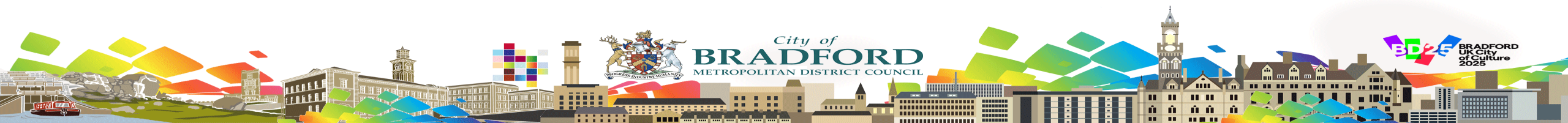
Challenges

- Public sector processes including IT, procurement and legal
- Silo approach
- Early comprehensive engagement on projects
- Lack of joined up thinking with strategies/plans linking to objectives
- Poorly designed and delivered projects – value engineering?
- Budgets
- Funding applications
- Lack of sharing of knowledge and best practice



What next

- Further optimisation of heating and lighting plans
- Continued deployment of BEMS, smart sensors and radiator additives
- Vortex kit for wet heating systems – in trial phase
- Ceramic micro-filtration systems for pools – ongoing – 30-40%
- Solar PV – solar farms and buildings – gradual deployment
- District Heat Network
- HyBradford – advanced fuel facility
- Co-ordinated estates and energy strategies/plans with BMDC plans



Thank you

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