

INFLUENCE!

Inspiration and insight to change
minds and policy

19 - 20
June 2019

University of Manchester



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To work with our customers to deliver long-term positive impact on cost, resilience, wellbeing and carbon reduction

Projects



Energy efficiency and onsite generation through infrastructure engineering and upgrades



Connect



Design, build and operate integrated energy control and building monitoring solutions through an open technology platform



Asset Manage



Managed finance solution for energy assets providing capital release, backlog investment and life-cycle funding



A selection of our clients



**East Kent
Hospitals University**
NHS Foundation Trust



Bwrdd Iechyd Prifysgol
Hywel Dda
University Health Board

NHS
Northern Care Alliance
NHS Group

St George's Healthcare **NHS**
NHS Trust

Bolton **NHS**
NHS Foundation Trust

**Epsom and St Helier
University Hospitals** **NHS**
NHS Trust

Plymouth Hospitals **NHS**
NHS Trust

Portsmouth Hospitals **NHS**
NHS Trust



Cardiff University



Highlights

- c.£14.0M Energy Performance Contract
- c.£5m Tower Block Fabric Upgrade
- 220,000m² across 73 academic buildings
- c.£1.6m p.a. guaranteed savings
- Project due for completion 2021

Objectives

- Secure interest free loan funding from Welsh Government Salix Fund framework
- Execute phased approach
- Meet stringent research & faculty operational requirements
- Collaborate with the University Hospital of Wales (UHW) to deliver an integrated project approach
- Deliver projects with the BEIS Energy Systems Catapult MEP project at the University
- Renew inefficient, deteriorated and high priority systems
- Improve comfort levels, student and staff satisfaction

Energy Projects for consideration

- LED lighting & controls retrofit
- Combined Heat and Power (CHP) plant installation
- Private wire network and Smart Grid management
- Distributed Heat Network
- Ground Source Heat Pumps
- Solar PV
- Significant HVAC upgrades
- Water supply bore hole
- Systems re-commissioning for operations and maintenance upgrading
- BMS upgrades & consolidation

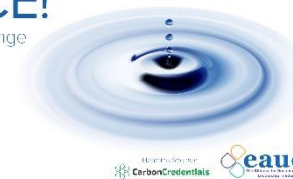


Introduction

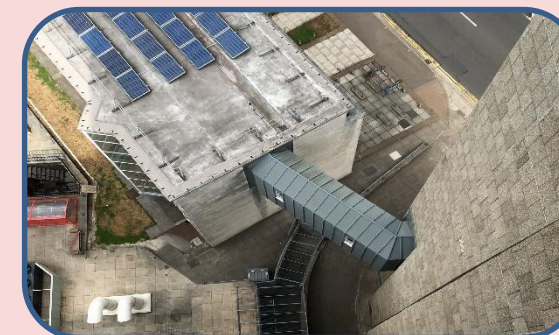
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“Its engineering Mark but not as we know it...?”



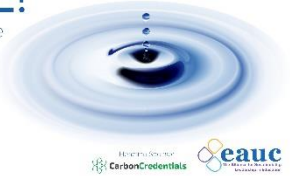
Content



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- Introductions
- The challenge
- Procurement & funding
- Energy Performance Contract
- Research Partnerships
- Priorities



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Mark Durdin
Maintenance Officer
(Energy & Sustainability)
Cardiff University



Stuart Bowman
Engineering Director
Breathe Energy

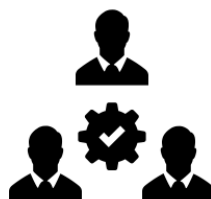


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Energy & CO2 reduction



| # | Cluster | No. of buildings | GIA, m2 | total MWh/yr | total £m/yr | Emissions, tCO2/yr |
|--------|---------------|------------------|---------|--------------|-------------|--------------------|
| 1 | Park Place | 7 | 70,506 | 27,073 | £2.18 | 7,071 |
| 2 | King Edward | 4 | 35,113 | 12,625 | £1.05 | 3,454 |
| 3 | Llys Talybont | 22 | 14,569 | 4,663 | £0.36 | 1,129 |
| 4 | Queens | 9 | 42,964 | 12,395 | £1.03 | 3,443 |
| 5 | Heath Park | 4 | 9,314 | 6,231 | £0.61 | 2,006 |
| 6 | Colum Drive | 7 | 46,371 | 11,274 | £0.95 | 2,886 |
| totals | | 53 | 218,837 | 74,260 | £6.18 | 19,988 |



Benefits to local
business and
work force

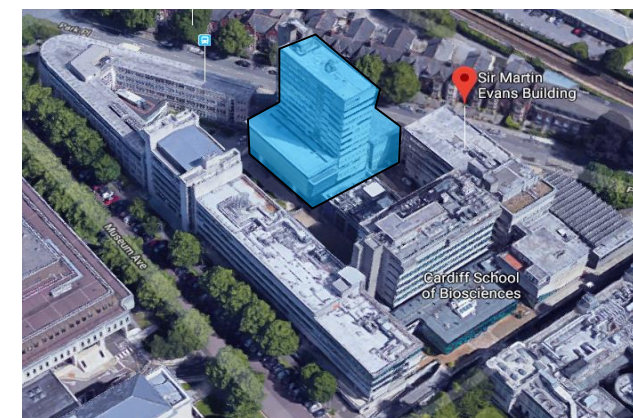


Funding &
finance

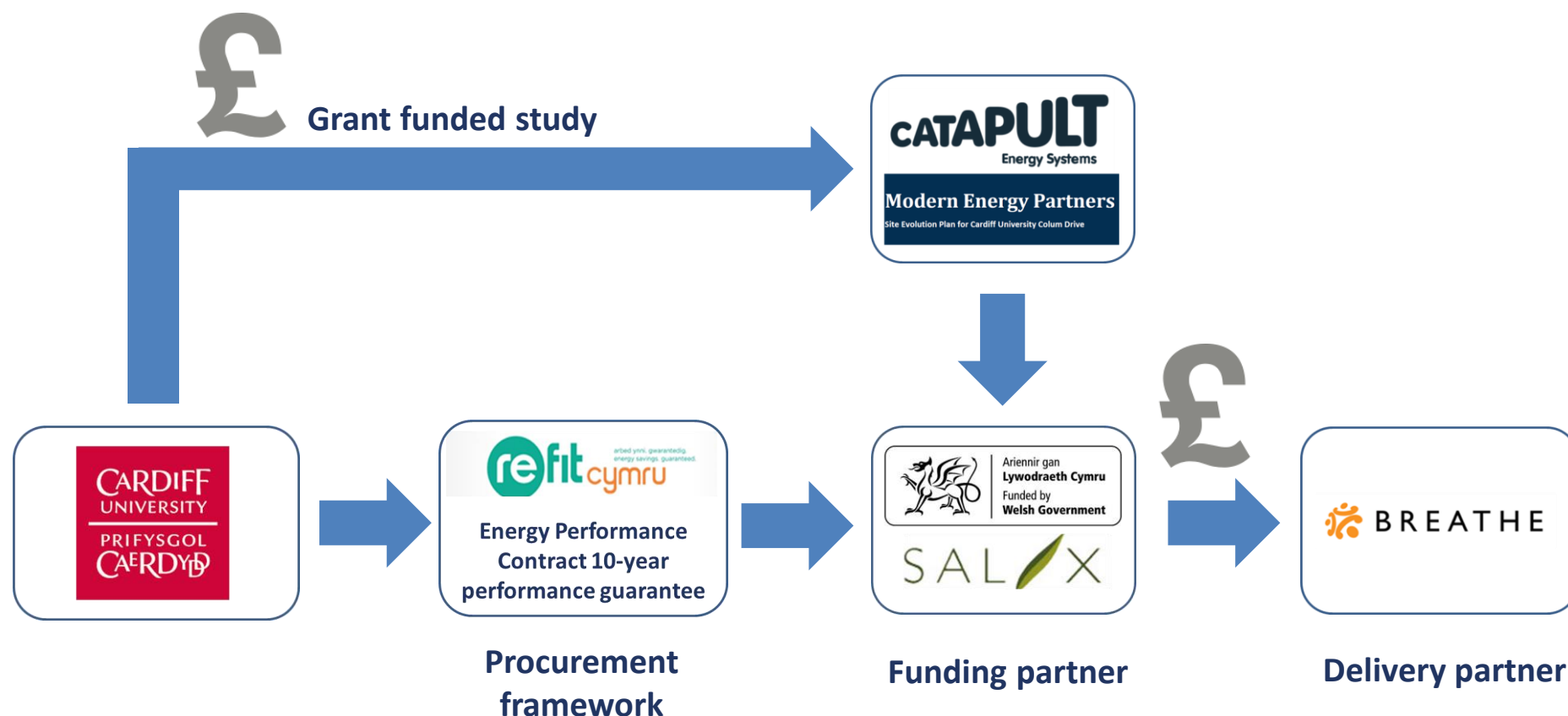


Student & faculty
research engagement(s)

Aging infrastructure - the
Tower Fabric renewal



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Breathe is all about positive impacts (NHS & other)

Energy Cost Reduction

Combined our projects are reducing energy bills by **£9.8m** p.a., guaranteed.



Reduction of CO₂ emissions

Cumulative **53,000 tCO₂** saving p.a. through the energy efficiency & renewable measures.



Construction Waste Recycling

98% waste recycling on St Helier Fabric construction project. Sets the target for future schemes.



Avoided Maintenance Cost

Breathe Connect platform helped clients avoid **c.£1.3m** in reactive maintenance costs in 2018.



Client's Own Service Enhanced

We have delivered **£37.6m** of critical backlog projects reducing client clinical risk & makes for their own service to be more reliable



Improved Patient Recovery

LED lighting, improved HVAC proven to **reduce hospital stays by up to 8.5%**, getting patients better quicker and freeing up bed space.

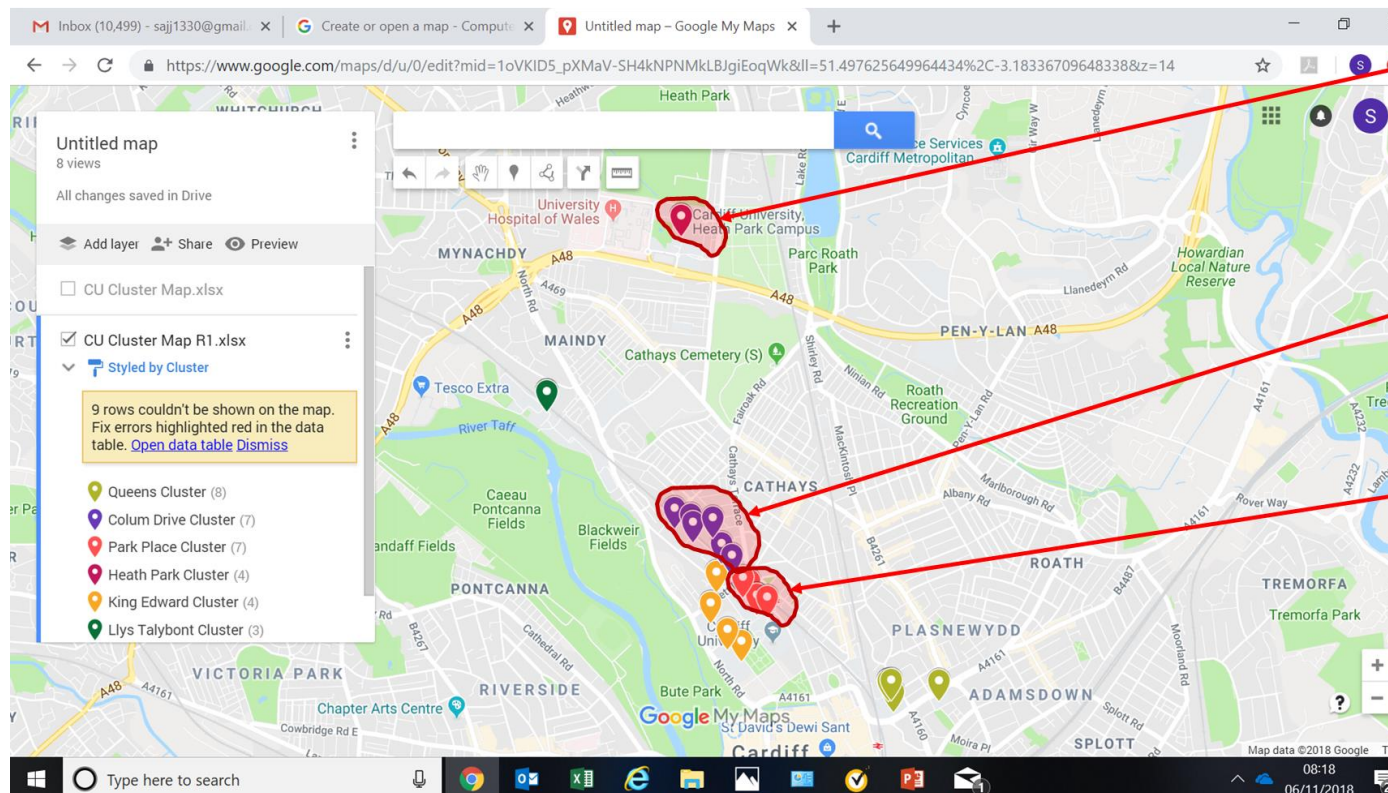




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The Campus Energy Challenge

| Programme | Investment | Annual Saving | tCO ₂ Reduction | Payback |
|-----------|------------|---------------|----------------------------|------------|
| Core | £14m | £1.6m | 3,800 | 8.75 years |



University
Hospital subject
to upcoming
separate Refit c.
2 months

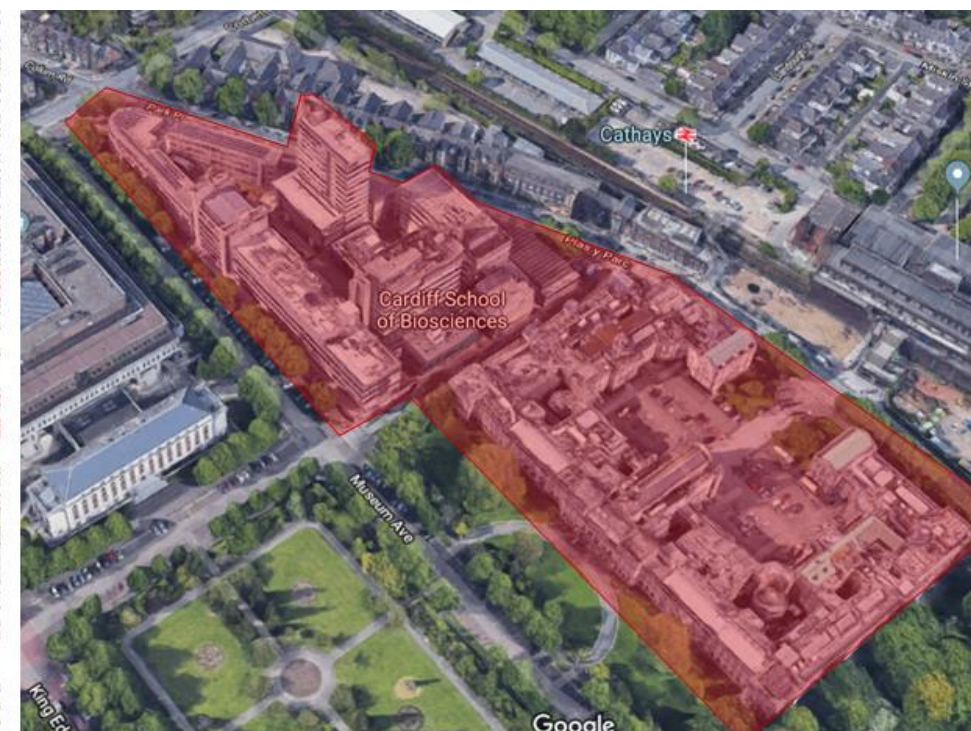
The Colum Drive
Cluster buildings
are subject to a
high level
Catapult study

Phase 1 – Park
Place Cluster



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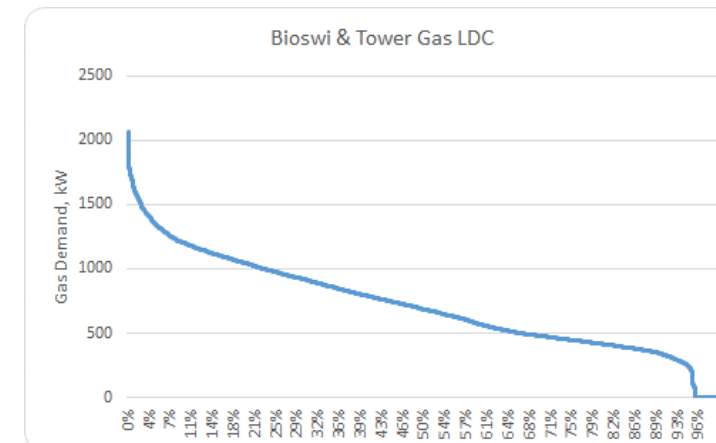
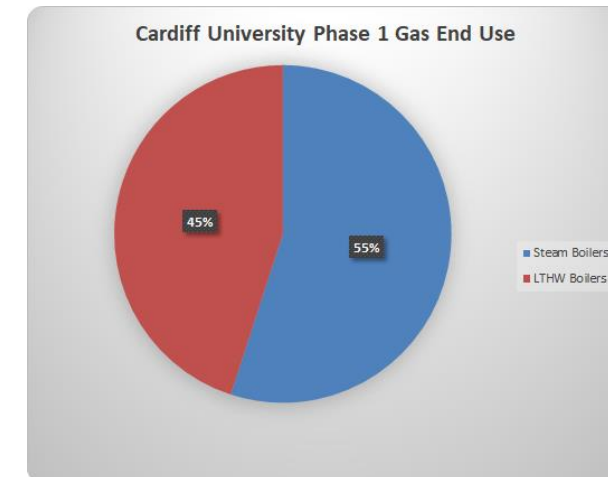
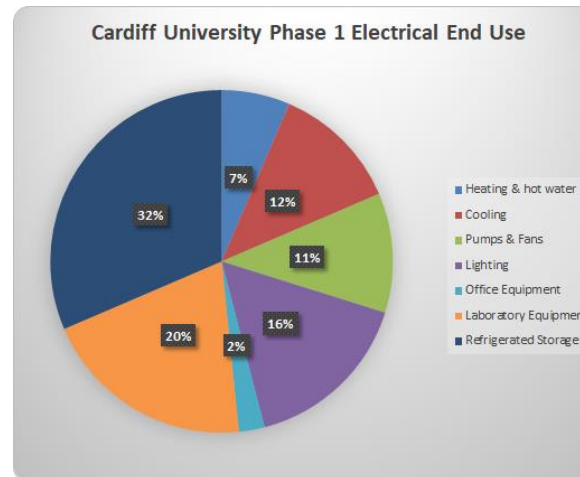
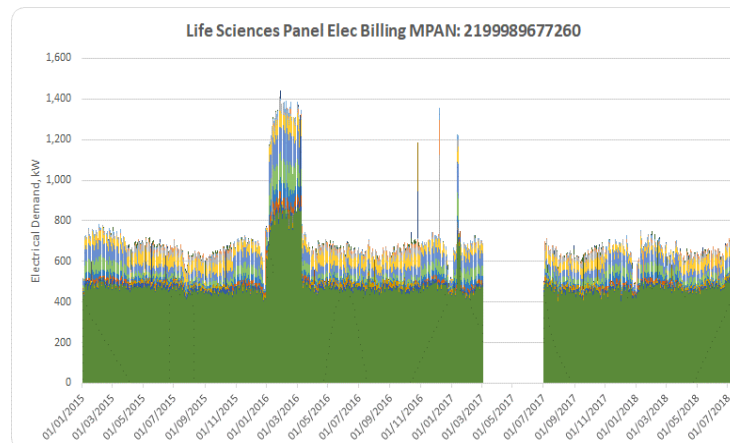
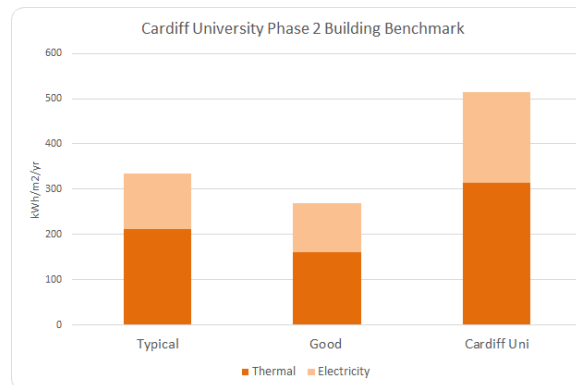
Phase 1 – Park Place Cluster





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Analysis – Park Place





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Projects for consideration

| ECM | Tower | Life Science & CUBRIC | Sir Martin Evans | Main Building | Law Building | Park Place Houses |
|---|-----------|-----------------------|------------------|---------------|--------------|-------------------|
| LED Lighting Retrofit | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Retrofit Plug Fans & decks to AHU | | ✓ | ✓ | | | |
| Rebalance of Lab Space HVAC | | ✓ | ✓ | | | |
| BMS Optimisation | ✓ | ✓ | ✓ | ✓ | ✓ | |
| District Heat Network & GSHP | Site wide | | | | | |
| Gas fired CHP | Site wide | | | | | |
| Generator Triad Management | Site wide | | | | | |
| Battery Storage | Site wide | | | | | |
| Demand Side Response | Site wide | | | | | |
| Optimise & replace -80°C freezers | | ✓ | ✓ | | | |
| Fume Cupboard optimisation inc EC fans to Fan Coils | | ✓ | ✓ | | | |
| Boiler replacements | ✓ | ✓ | ✓ | | | |
| Roof mounted solar PV | ✓ | ✓ | ✓ | | | |



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The Tower Fabric renewal



*Note All Existing windows and screens to be removed are Steel Crittal.

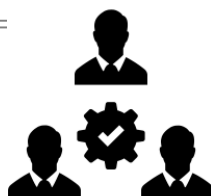
- Assume these screens are not in scope as built in by Previous extension. Would need a second viewing to confirm
- Ribbon windows/Screens. Assume need to be installed in Black Aluminium due to size and to match other recently installed screens to extension area.
- Assume this screen to be within scope, However the bottom third is internal due to main entrance canopy extension. Need to allow for removal/ reinstatement of roof finishes and waterproofing interface detail.
- Vertical Curtain wall screen in Staircase, to be Black Aluminium, fixed back to Stair landing. Screen needs to tie in to new Ribbon windows. Due to sequencing, allow for temporary seal at each Ribbon window junction.
- Vertical slot curtain walling screen to be Black Aluminium, fixed to adjacent walls. Current opening circa 560mm wide. There is potential that sections of the existing stone cladding may need removing/ broken out to gain access to the cleats to allow removal of crittal screen.

Breathe project for St Helier NHS



- Maternity Tower Block
- £12m project
- Roofing, windows and façade

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| Benefit | Plan |
|---|---|
| Maximise local expenditure | <ul style="list-style-type: none"> ✓ Procurement strategy for this contract will focus on Cardiff-based SMEs, encouraging them to apply for works on this project. ✓ All opportunities will be advertised through Sell2Wales, |
| Local presence | <ul style="list-style-type: none"> ✓ Will commit to opening a Breathe Wales office to support this project, Cardiff University, and other Welsh projects as they arise. ✓ We see this office as a great opportunity to expand our presence into the Welsh energy management sector, using local staff and suppliers |
| Local employment | <ul style="list-style-type: none"> ✓ Expect to create four new Cardiff-based jobs, including two Apprentices, one Construction Manager and one Administrator |
| Local education | <ul style="list-style-type: none"> ✓ Will provide local people with work experience – ✓ One field and one office-based work experience per quarter – typically 1 week per student. ✓ We expect to create at least two apprenticeships across 24 months within the construction period., |
| Sub contractor use of local supply chain partners | <ul style="list-style-type: none"> ✓ Will let c.£6 m of sub-contract packages. ✓ We expect our subcontractors to support and promote local employment and use of local SME's ✓ We will monitor their performance against these promises |



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Student & faculty research engagements

Medium term

- ✓ Bachelor & Masters
- ✓ Dissertations & Major Projects

Long term

- ✓ Feed into master plan
- ✓ 1 x PHD student & 1 x research project

Potential subject areas

- ✓ Building optimisation
- ✓ Application of fuel cell technology
- ✓ Application of heat pumps in a high temperature medium
- ✓ Low carbon master planning



Breathe are a ready-made procured implementation test bed

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*Complete the
Investment Grade
Proposal*



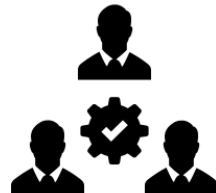
*Complete detailed
design & tender for
Tower fabric project*



*Continue to work
with Welsh
Government & Salix*



*Link the Breathe
Connect platform
with the BMS system*



*Set up Sell2Wales
within Breathe
procurement platform*



*Continue Catapult;
Engage with School of
Engineering, & Flexis
to develop plan*

The SDG Accord

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