

Sustainable development issues in implementing PPP's

by

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MCBAINS COOPER

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Sustainability

- Meeting the needs of the present generation without compromising the ability of future generations to meet their needs.
- “We’re running an uncontrolled experiment on the only home we have.”

Bill Collins, National Laboratory, California



Climate change to last

Forecast for 2050: Catastrophic floods, crippling droughts and intense heatwaves

Change will overload
planetary system, warns Oxfam

Global warming could swamp cities
in Philippines, ADB warns

Heatwaves and flash floods
to be norm by 2050

**Coastal communities may be in
greater peril**

Climate change sparks skin cancer alert

1-Faster ice melt seen as
part of climate treaty

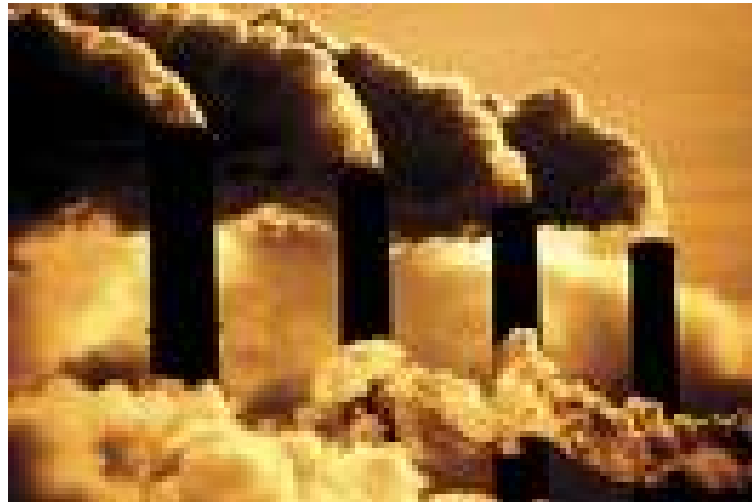
Cyclones, storms and hurricanes
- all symptoms of climate change

Climate change impacts on regional air quality
report just released by EPA

Climate change hitting entire Arctic
ecosystem, says report

The Challenge ahead

- Unprecedented financial turmoil
- Government debt levels increasing
- Energy demand and prices increasing
- Carbon emissions increasing
- Climate change effects worsening
- European Legislation compliance increasing



How perceptions change

Eco-activist, c. 1990



Daniel Hooper, aka
'Swampy'

Eco-activist, c. 2008



Stuart Rose,
Chairman, M&S

Target - 80% reduction in carbon emissions by 2050

- Much better buildings AND decarbonisation of the electrical grid
- Improvements in new AND existing buildings
- Almost all energy efficiency measures AND a huge amount of low / zero carbon energy generation on / near site



Pre-1940: 31%



1940-1985: 46%



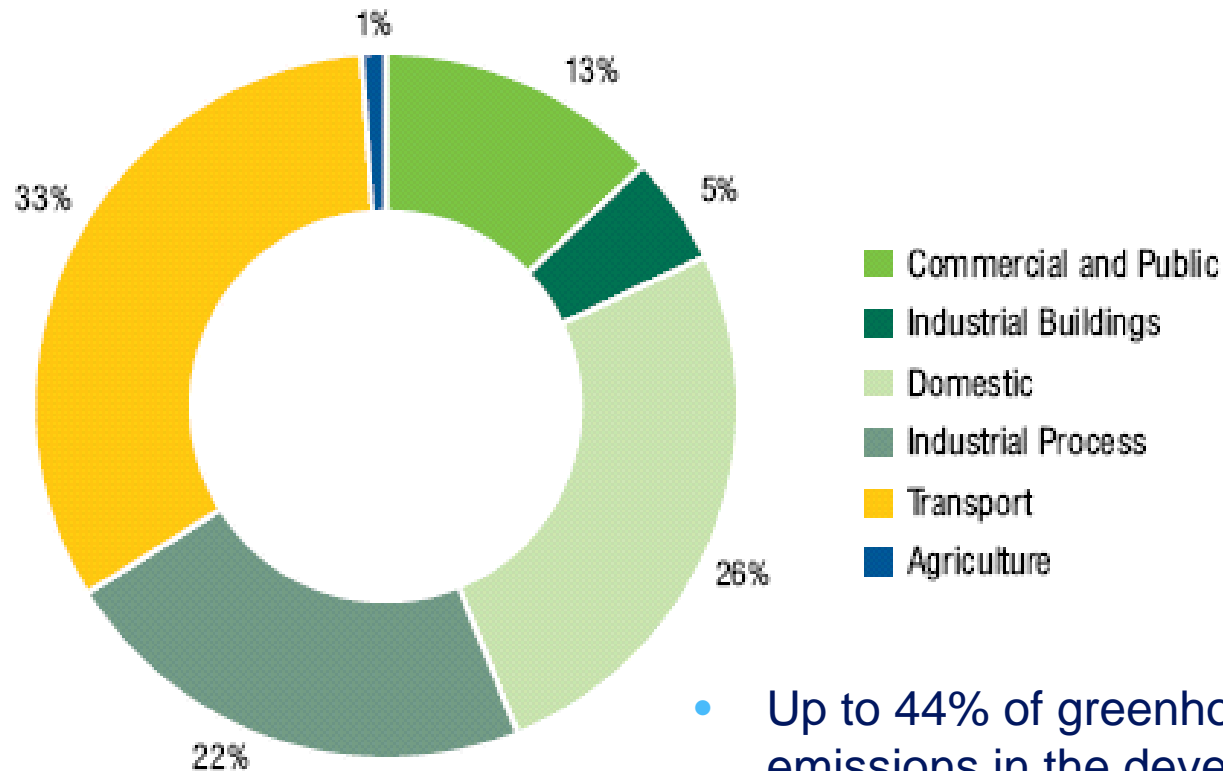
1985 on: 23%



2006 Gloucester Police Building: 5%

* Source: Carbon Trust

Buildings and carbon emissions

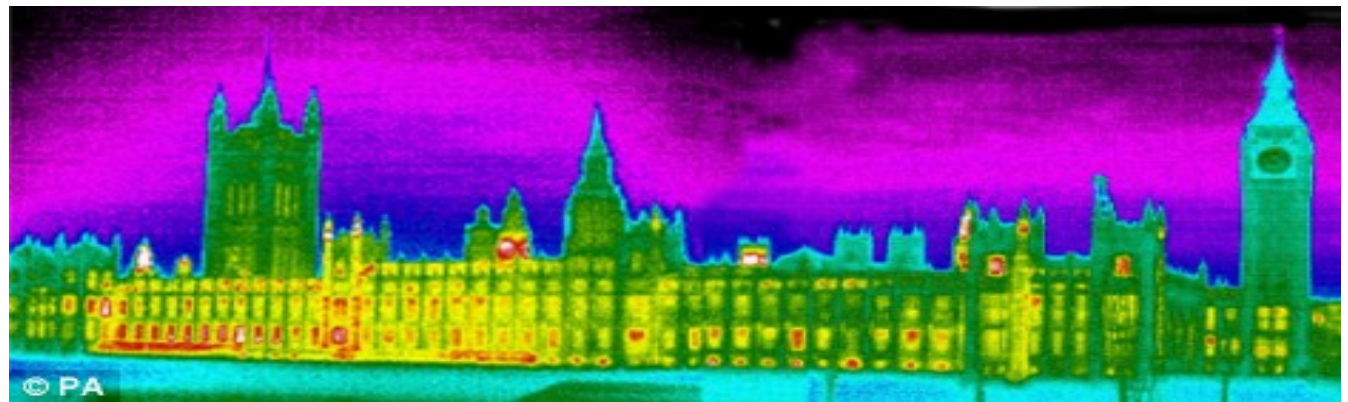


Source: BRE

- Up to 44% of greenhouse gas emissions in the developed world are from buildings
- The current road map to 2050 is lined with energy inefficient buildings.
- We must create through our public buildings a better road map

The energy we waste in our buildings

- In Europe, we waste 20% of the energy we consume
- Europe's buildings waste € 270 billion every year
- Will increase 53% by 2030
- 80% of the buildings we will occupy in 2050 are standing today



Energy or carbon?



- Politically, security of supply is the biggest energy issue, followed by economic impact.
- How important is the pursuit of zero carbon, compared to very low energy?



- Consideration of the lifecycle
- Energy is typically 30% of a building life-time operating costs
- Programme effect
- Sustainable ideas and guidance should be easier

BREEAM Target Areas



Management



Energy



Water



Land Use & Ecology



Health & Wellbeing



Transport



Materials & Waste



Pollution

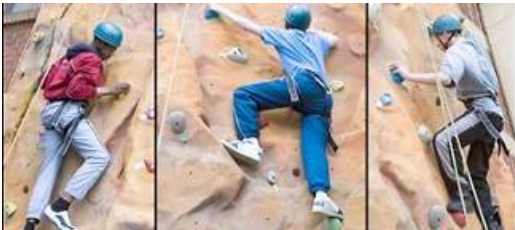
- Label for measuring the performance of ‘green’ buildings
- Scope:
 - All building types i.e. retail, schools, homes...
 - Each stage of building life cycle
- Structure:
 - ‘Credits’ based system
 - All credits allocated into ‘issue categories’
 - Brought together in an overall score and rating

Aims of Green Standards?



- Reduce environmental impact of buildings
- Provide high quality environment for occupants
- Allow easy comparison of buildings
- Progressively evolve and improve through:
 - **Staying ahead of regulations**
 - **Research & development**
 - **Industry feedback**

Why Green Standards are good for PPP's

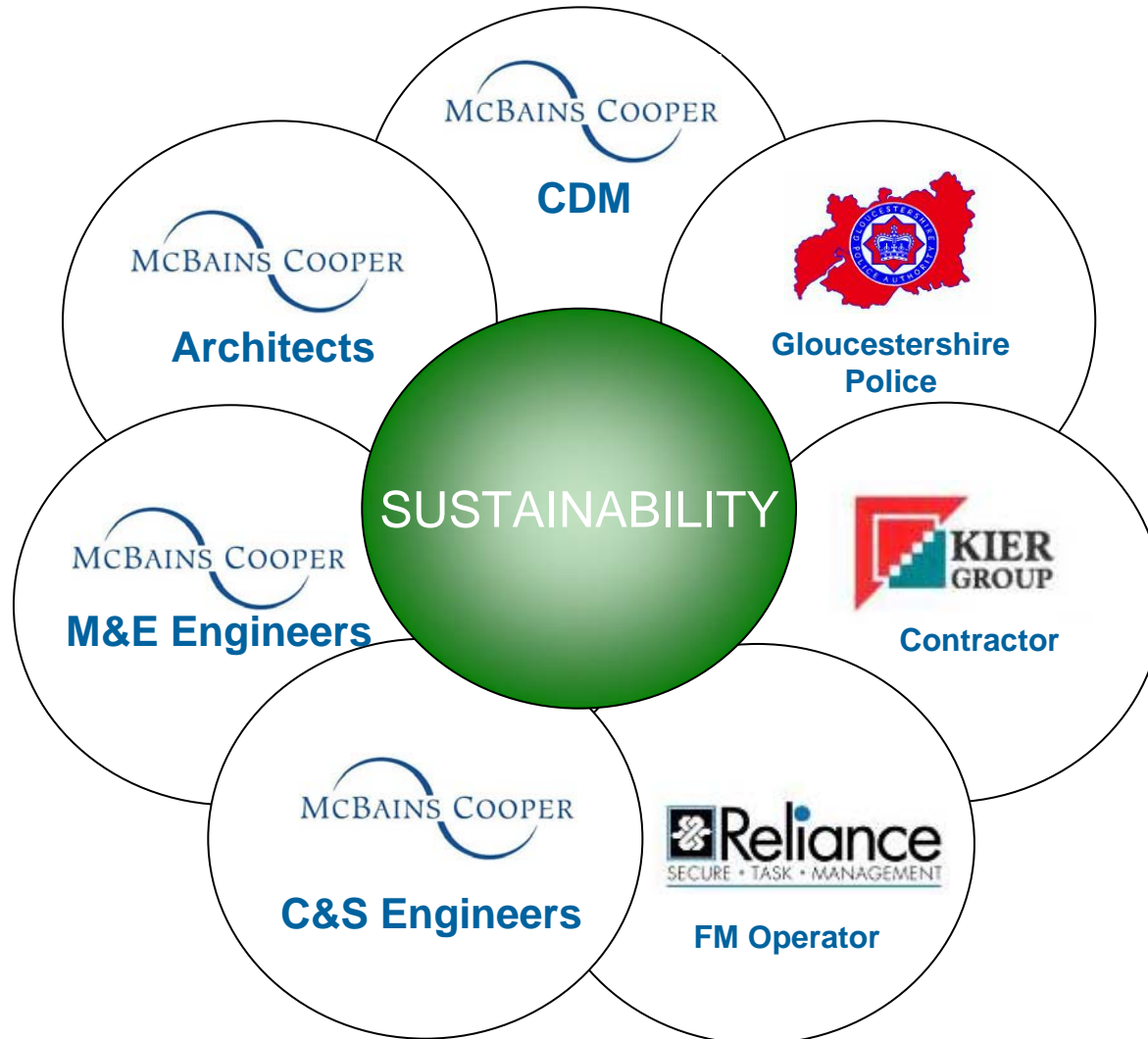


- Reduced environmental impacts
- Improved functionality, flexibility and durability
- Higher user satisfaction
- Demonstrate improved performance (design & operation)
- Future proofing buildings



How Do We Do it?

Integrated approach

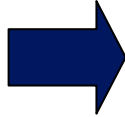


Our approach to sustainability



Use less energy

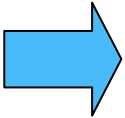
“Be Lean”



- **Reduce consumption through Good Design**
 - Optimisation of building orientation
 - Natural ventilation
 - Optimisation of daylight penetration
 - Improved U values Solar control glass
 - External shading
- **Reduce consumption through behavioural change**

Supply energy efficiently

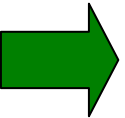
“Be Clean”



- **Use efficient systems**
 - High efficiency lighting and controls
 - Heat recovery ventilation
 - Low energy fan coils and chilled beams
 - Ground Source heat pumps, CHP
 - Rain water recovery
 - Web based BEMS
 - Energy targeting software

Use renewable energy

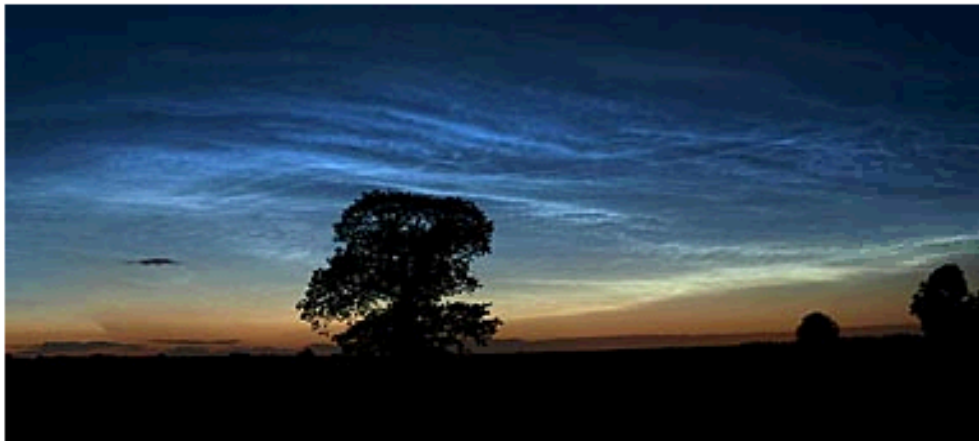
“Be Green”



- **On site - install renewable energy technologies**
 - Geothermal Energy Closed Loop
 - Wind Turbine
 - Biomass
 - Solar Thermal panels,
- **Off site - import renewable energy generated elsewhere (Green Tariff) - wind cottaging**

We should all be committed to:

- promote and support the most effective adaptation to climate change
- incorporate passive design measure into the design of our building
- incorporate living roofs wherever possible
- manage surface water run-off as close to source as possible
- manage impact on water demand and existing water capacity by minimising use of treated water and maximising rain water harvesting



IT'S A MARATHON, NOT A SPRINT



Gloucestershire Constabulary Headquarters



Gloucestershire Constabulary Headquarters

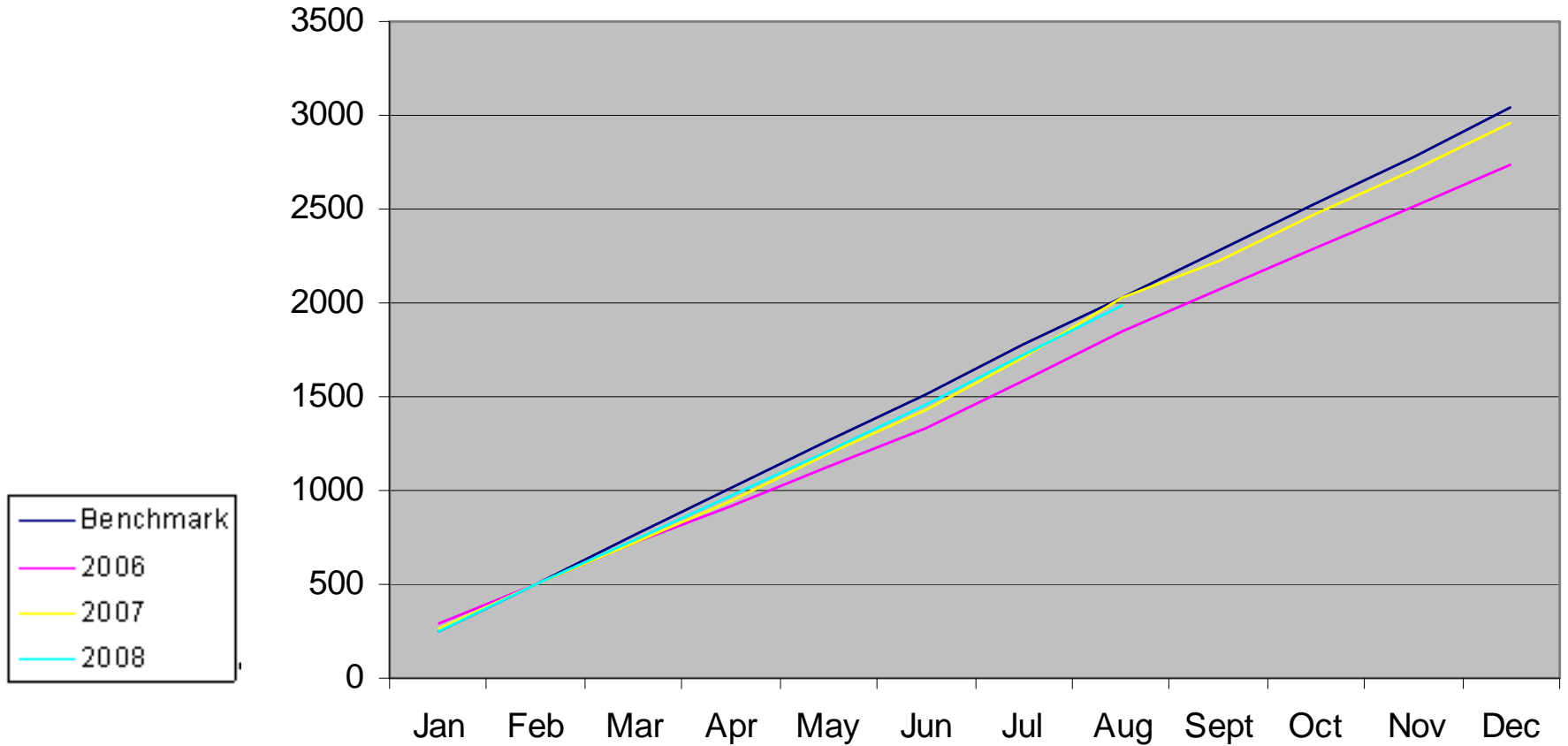




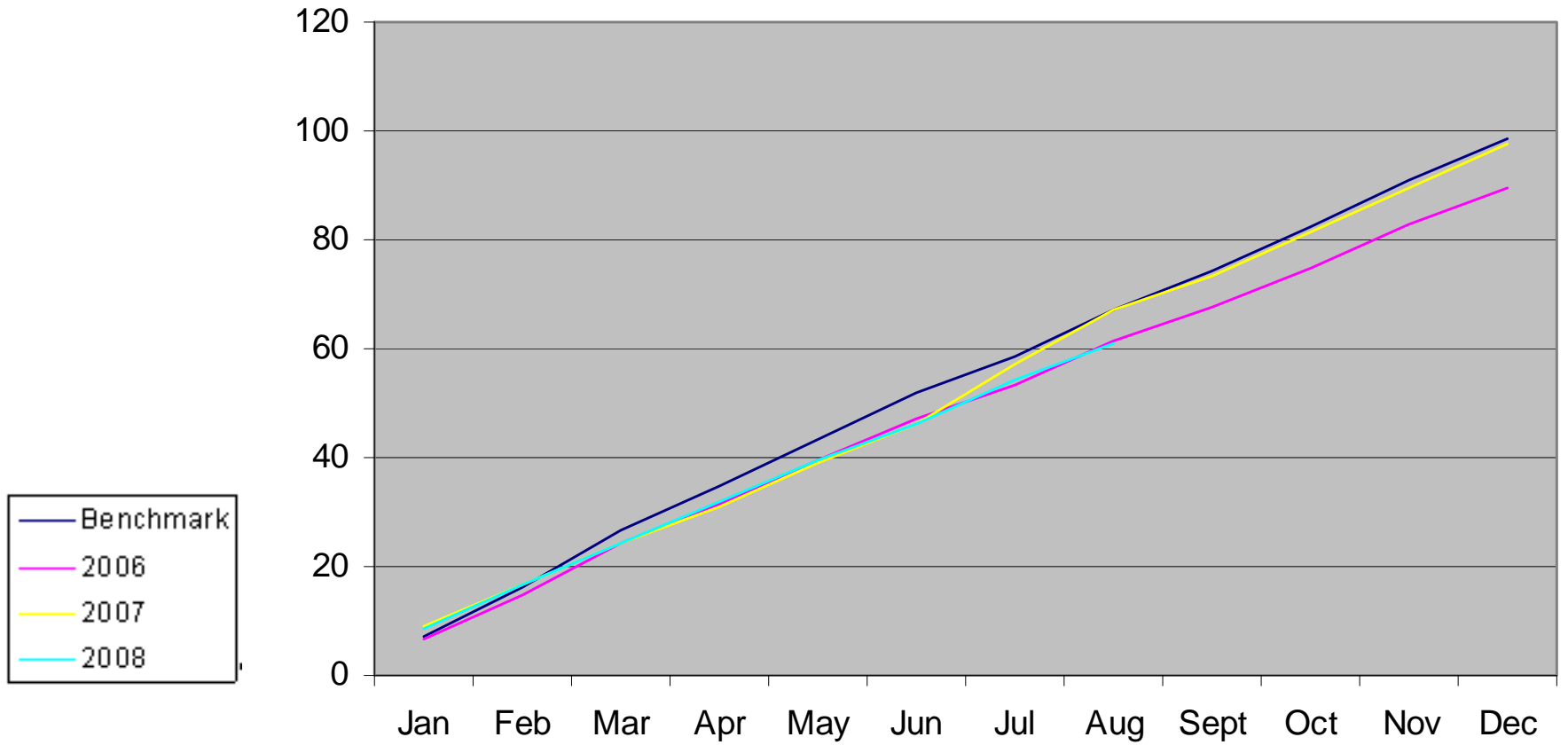
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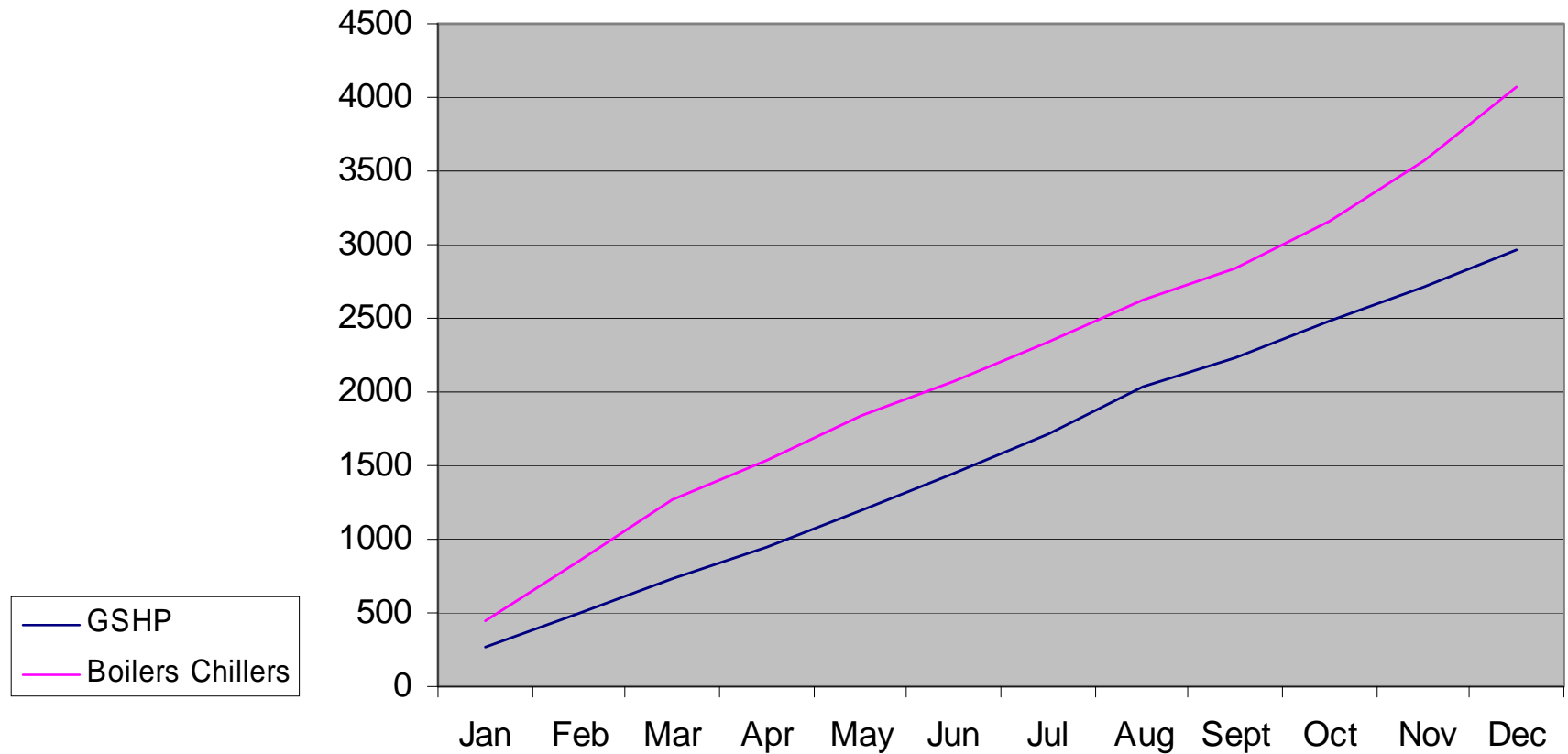
cumulative electrical data ('000s kWh)



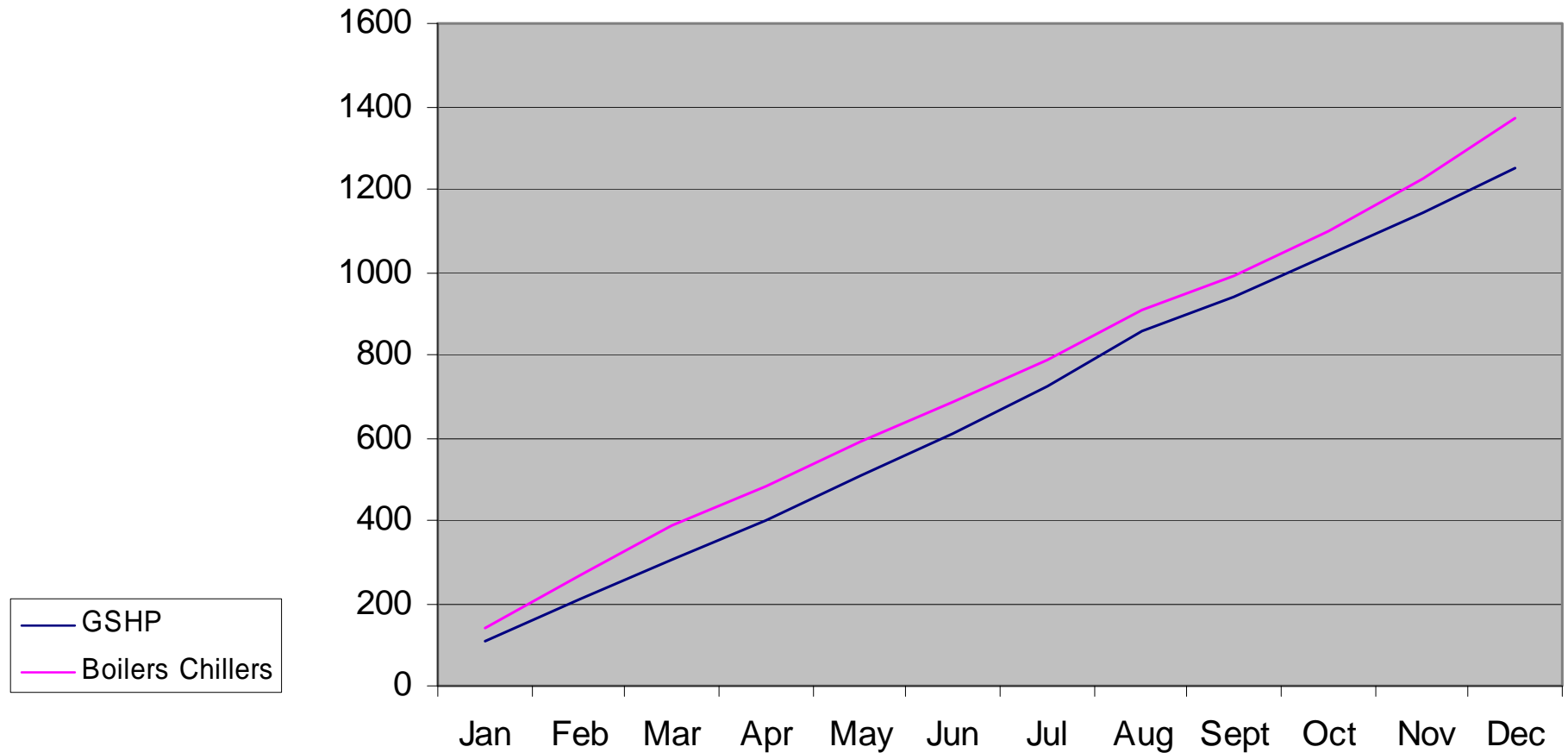
cumulative gas data ('000s kWh)



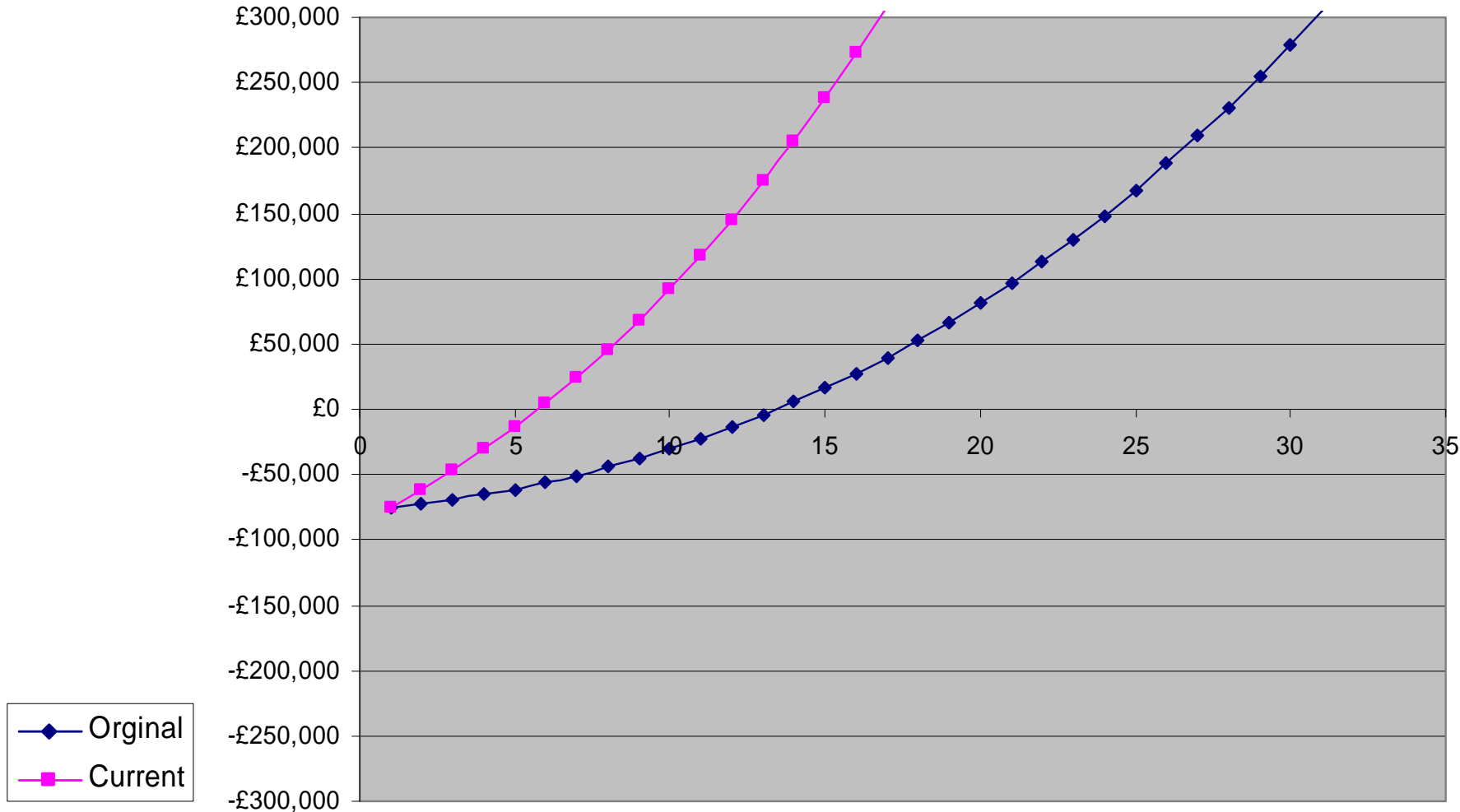
cumulative energy data ('000s kWh)
30-40% energy savings



cumulative emissions data (kg CO₂)



NPV payback GSHP



Awards & Accolades



Timothy Brain QPM BA PhD FRSA
Chief Constable of the Gloucestershire Constabulary

Tel: 0845 090 1234
Fax: 01452 - 726824

Police Headquarters
No.1 Waterwells
Waterwells Drive
Quedgeley
Gloucester GL2 2AN

Our ref:tb/pac

23 August 2007

Mr Keith Young
Interdisciplinary Director
McBains Cooper Consultancy Limited
Seacourt Tower
West Way
Oxford
OX2 0JJ

Dear *Keith*

I am writing to express my thanks and congratulations to you for the wonderful design of our Headquarters building here at No 1 Waterwells, which really did display 'proof of concept' during the recent water emergency.

The 'overlay' of the Gold Emergency Centre on floor one worked extremely well. The open plan office allowed the agencies to work in their respective cells, but enabled close contact with each other. The Gold Control Room and its attendant Conference facilities on the same floor allowed Gold Command to work very efficiently. All who worked in the Emergency Centre, police and other agencies commented favourably on how the building had 'come into its own'.

In addition, the 'grey water' system allowed us to continue operations until an emergency water supply could be arranged.

You really have something to be proud of. Please pass on my thanks and congratulations to all those who worked on the project.

Once again, very many thanks for this wonderful building.

Yours sincerely

TJ Brain
Chief Constable



Awards & Accolades



- Winner – ACE Engineering Excellence Awards 2008 – Low Carbon Technology
- Winner – Gloucester Civic Trust Awards 2006 - Most Environmentally Friendly Building
- Winner – LABC National Built in Quality Awards 2005 – Best Thermal Innovation
- Finalist (Highly Commended) - ACE Engineering Excellence Awards 2008 – Sustainability
- Finalist – Building Services Awards 2008 – Project of the Year
- Finalist – Public Private Finance Awards 2006 – Operational Project with the Best Design
- Finalist – BRE Sustainability Awards – Sustainable Innovation
- Finalist – Building Services Awards 2006 – Project of the Year
- Finalist – Building Services Awards 2005 – Innovation of the Year

Our only Roadmap



- Through knowledge share develop technologies, design skills and solutions that work.
- What is missing is political will and client demand.
- History shows that legislative change is the big driver
- A strong worldwide directive and collective action is essential.

In summary



We must TRANSFORM

THIS IS OUR PLAN A, AS THERE IS NO PLAN B

- Good Design - LEAN - CLEAN - GREEN
- Measure Green Buildings – BREEAM, LEED, Green Star
- Consider the 60 + year life of a building
- Consider the Facility Management and Training

QUESTIONS

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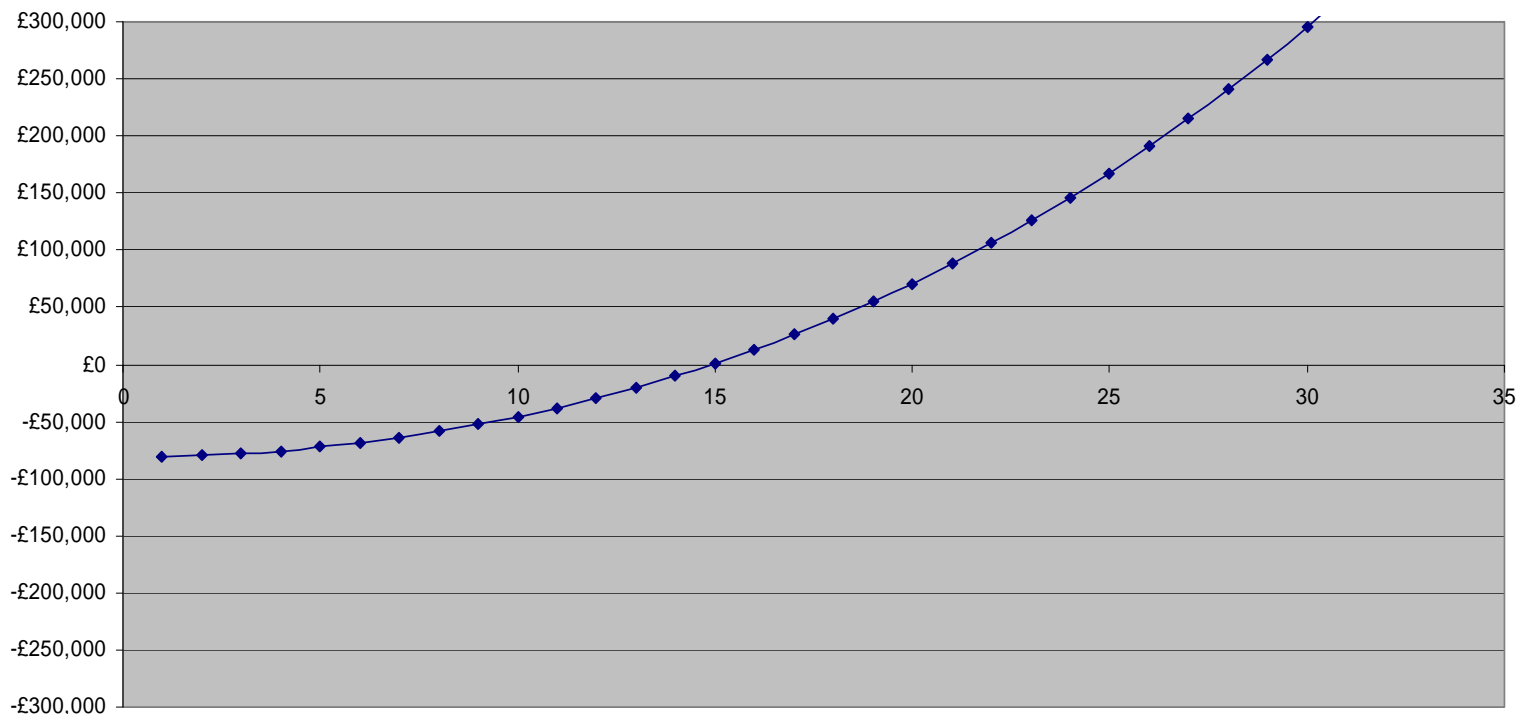
**Director, International PPP &
Environmental Initiatives**

a.coumidis@mcbainscooper.com



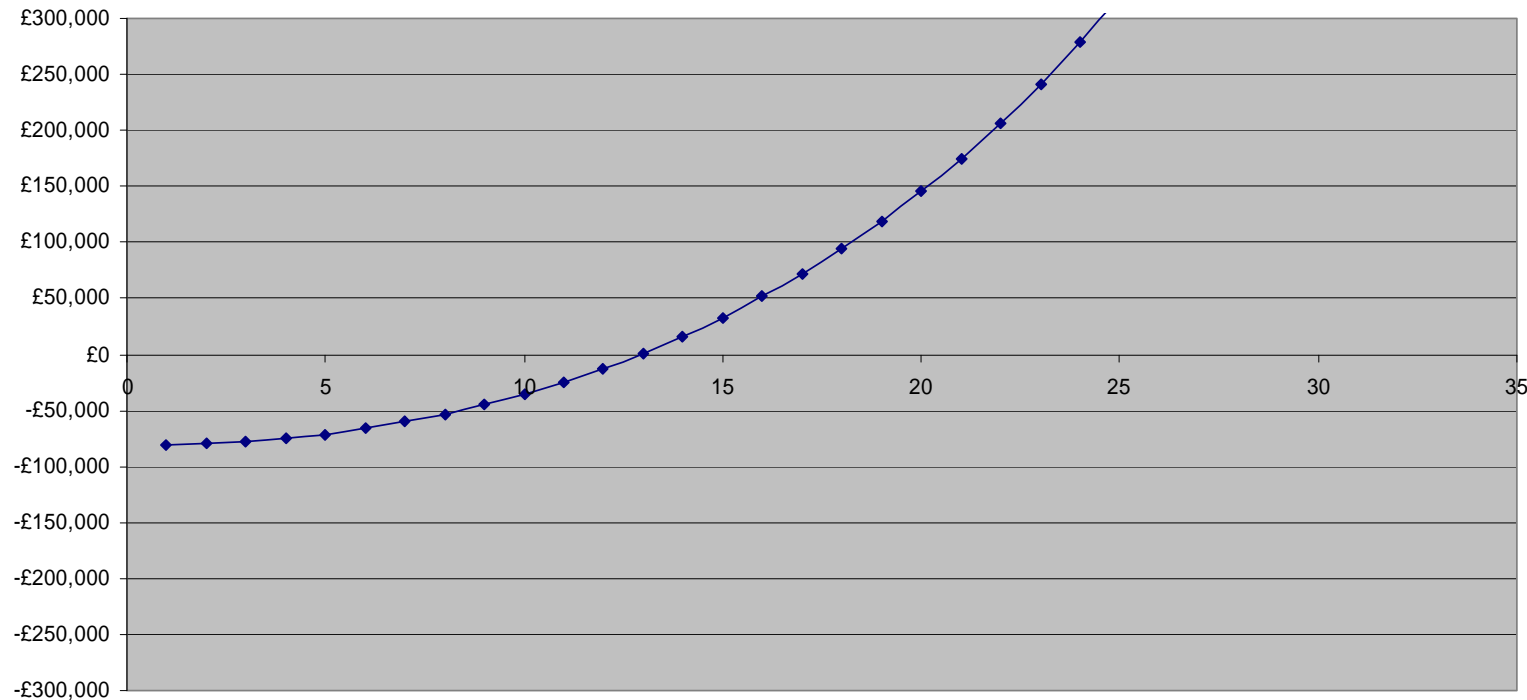
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NPV payback GSHP Gloucester PFI – energy inflation 3%



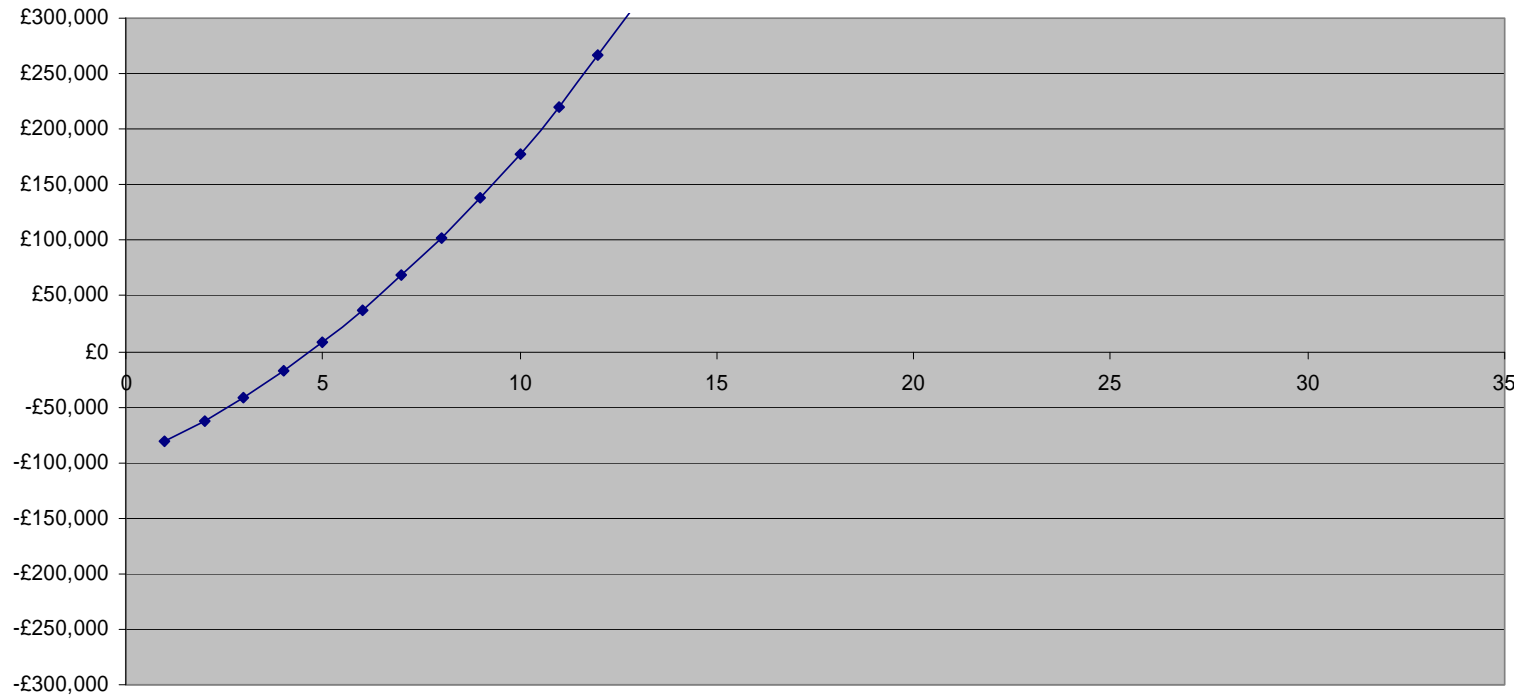
Key Parameters					
Energy Inflation		3%		GSHP Capital Cost	£387,000
Interest Rate		7%		B/C Capital Cost	£311,000
Cost of Gas		£0.0114		Additional Capital Cost	£76,000
Cost of Electricity		£0.0275		Energy Saving	£6,158.46
Carbon Saving		56375 kg CO2			

NPV payback GSHP Gloucester PFI – energy inflation 6%



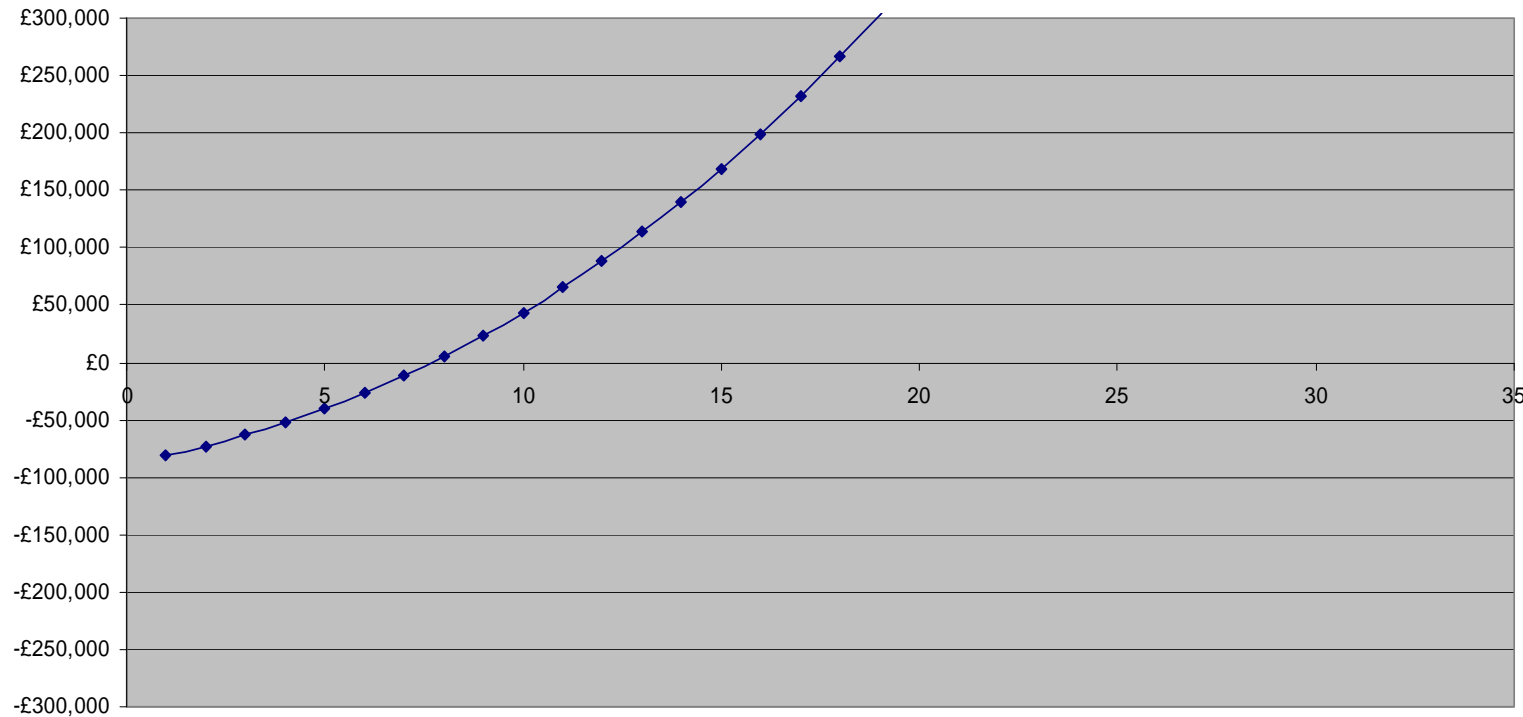
Key Parameters					
Energy Inflation		6%		GSHP Capital Cost	£387,000
Interest Rate		7%		B/C Capital Cost	£311,000
Cost of Gas		£0.0114		Additional Capital Cost	£76,000
Cost of Electricity		£0.0275		Energy Saving	£6,158.46
Carbon Saving		56375 kg CO2			

NPV payback GSHP Gloucester PFI – cost of gas and electricity up

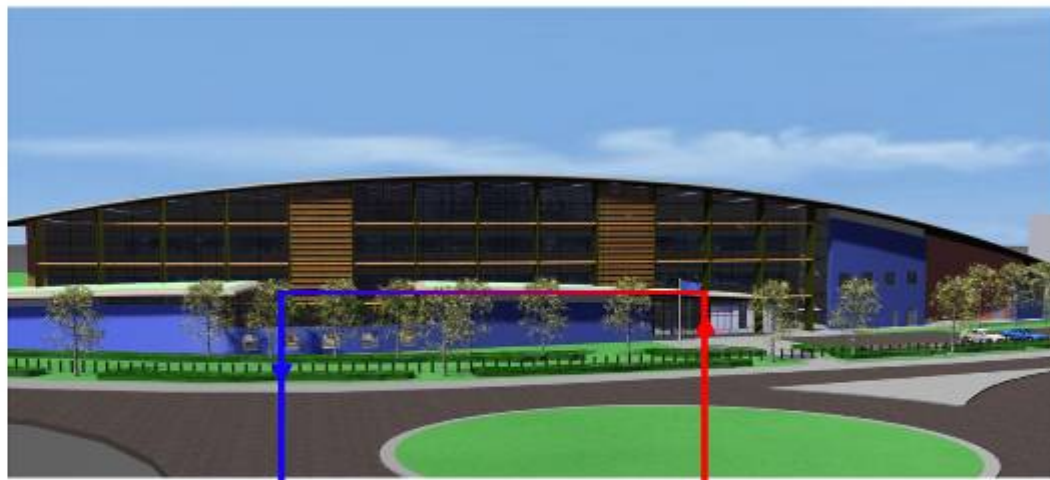


Key Parameters					
Energy Inflation		3%		GSHP Capital Cost	£387,000
Interest Rate		7%		B/C Capital Cost	£311,000
Cost of Gas		£0.0350		Additional Capital Cost	£76,000
Cost of Electricity		£0.0750		Energy Saving	£22,644.29
Carbon Saving		56375 kg CO2			

NPV payback GSHP Gloucester PFI – cost of electricity up



Key Parameters					
Energy Inflation		3%		GSHP Capital Cost	£387,000
Interest Rate		7%		B/C Capital Cost	£311,000
Cost of Gas		£0.0350		Additional Capital Cost	£76,000
Cost of Electricity		£0.1000		Energy Saving	£12,737.58
Carbon Saving		56375 kg CO2			



WINTER HEATING MODE.

