zero carbon
keeping promises

Abergavenny & Crickhowell **Friends of the Earth** - 10th July 2023

Steven Harris

CRSH Architecture and Energy
and
Energence Ltd.

Photo **James French**

Energence Ltd :
www.energence.co.uk

Catherine Roberts and Steven Harris
Architecture and Energy

Who am I?

Steven Harris BscDipArch ARB RIBA he/him

Principal **- CRSH Architects**

RIBA Chartered Practice, zero energy homes and domestic architecture

Technical and Policy Director **- Energence Ltd.** (The Energy Monitoring Platform)

Planning and Regulation compliance monitoring, Smart metering, field trials

Director **- Steven Harris Ltd.**

Energy Efficiency and Renewable Energy Consultancy and Research

Advisory Committee Member (Sustainability) **- Welsh Government**

Building Regulations Advisory Committee for Wales

Previously I have been…

Director **Abergavenny Energy CIC**
Technical Lead at **The Energy Saving Co-operative**
Head of Low Carbon Technologies at the **Energy Saving Trust**
Technical Director (and co founder) of **ZEDfactory**
Senior Architect at **Michael Hopkins and Partners**

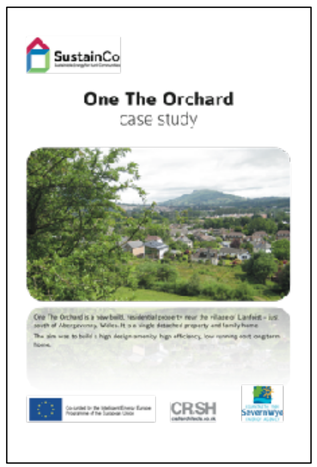
Other previous roles – Fellow of the **Centre of Refurbishment Excellence**, Expert peer reviewer - **Retrofit for the future**, Working group member - **Zero Carbon Hub**, Strategic Advisory Group member – **Energy Technologies Institute**, External advisor (Code for Sustainable Homes) **- DCLG**, External advisor (zero carbon stamp duty) **– HMTresury**, External advisor - **GLA**

BBC NEWYDDION

9 Gorffennaf 2013 Diweddarwyd 09:48

Rhestr fer Medal Aur am Bensaernïaeth yr Eisteddfod

Eisteddfod Genedlaethol Sir Ddinbych a'r Cyffiniau
3 – 10 Awst / August 2013
Denbighshire and District National Eisteddfod



Michael Hopkins Architects

ZEDfactory

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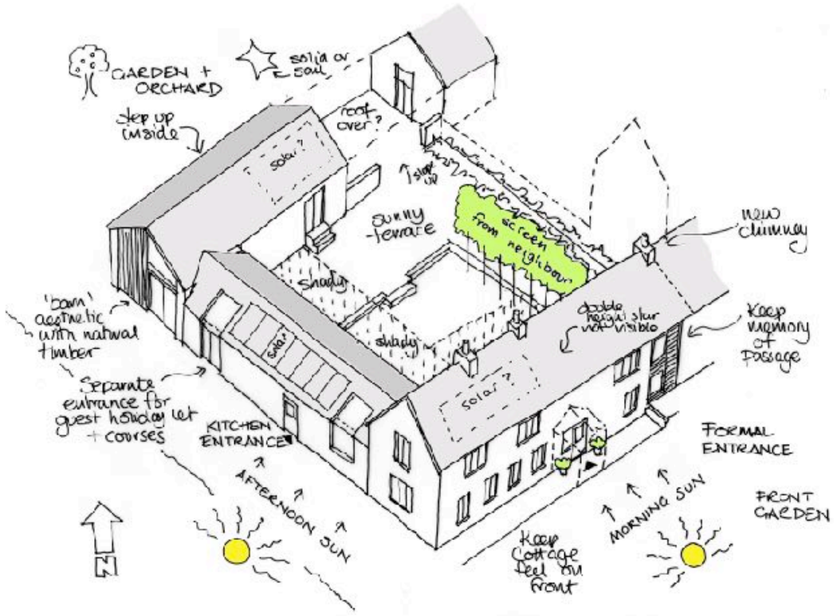
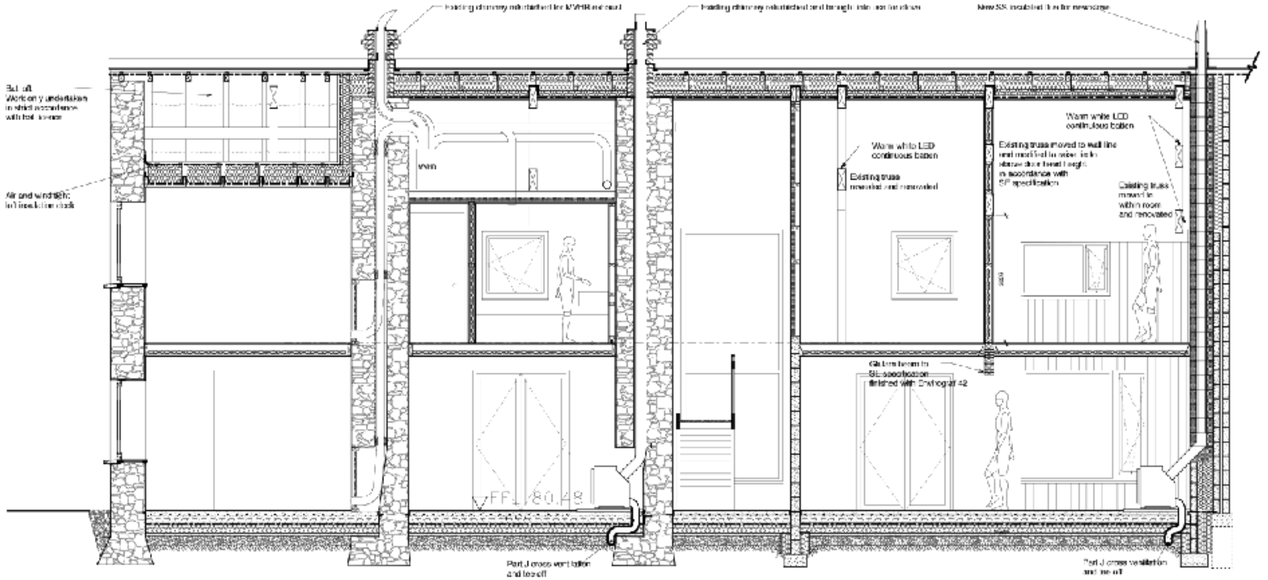
RIBA Chartered Practice
arb Architects Registration Board
AECB building knowledge





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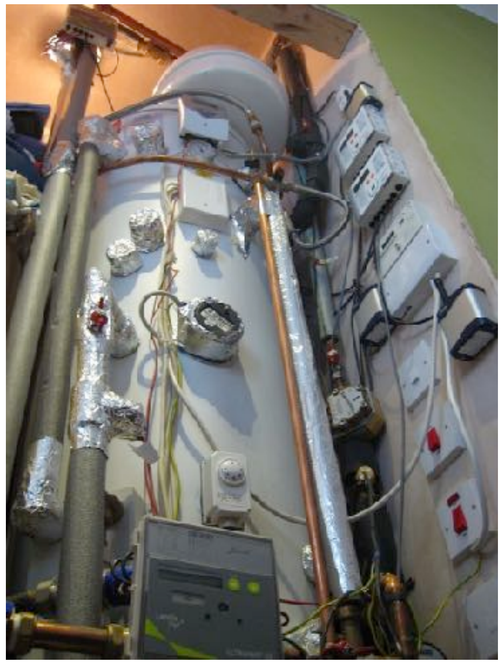
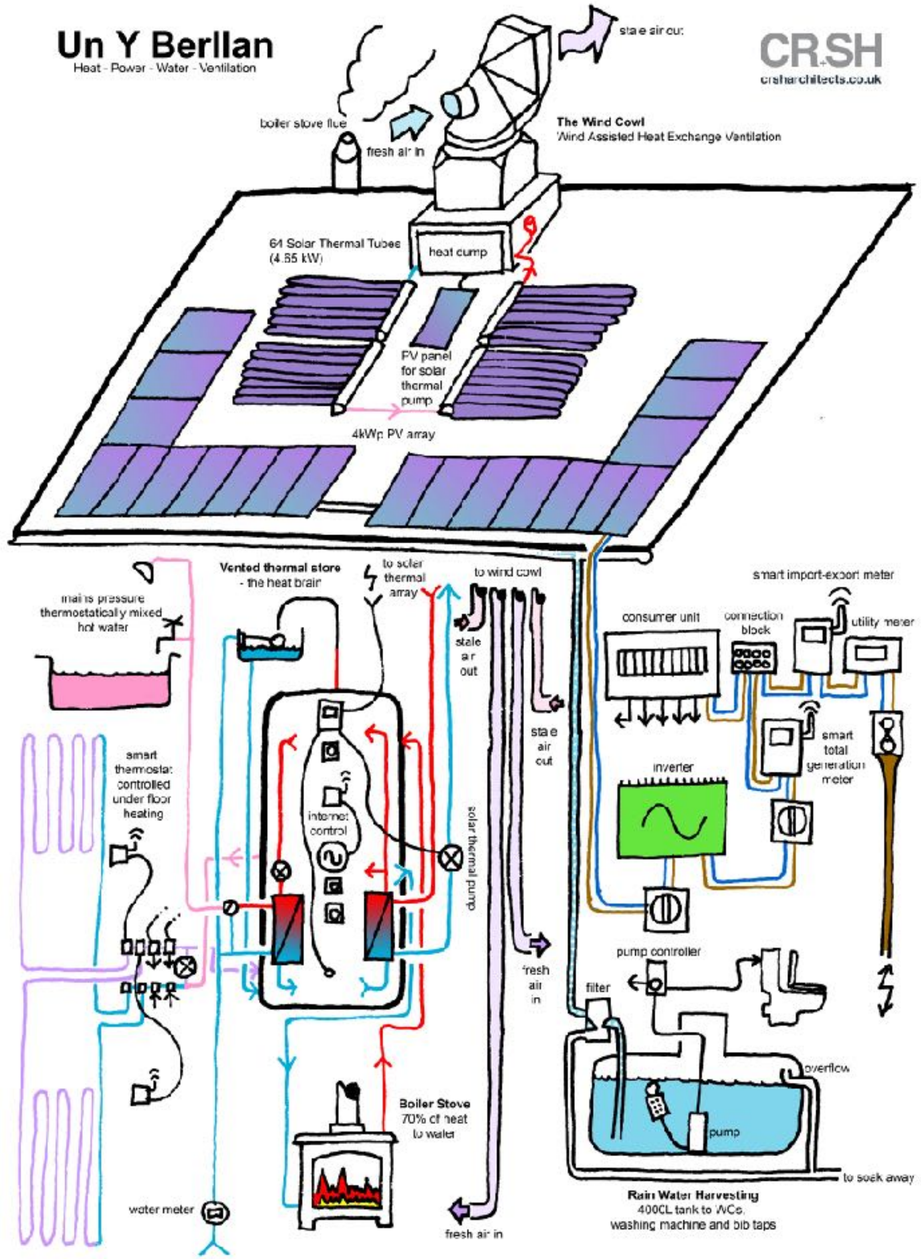
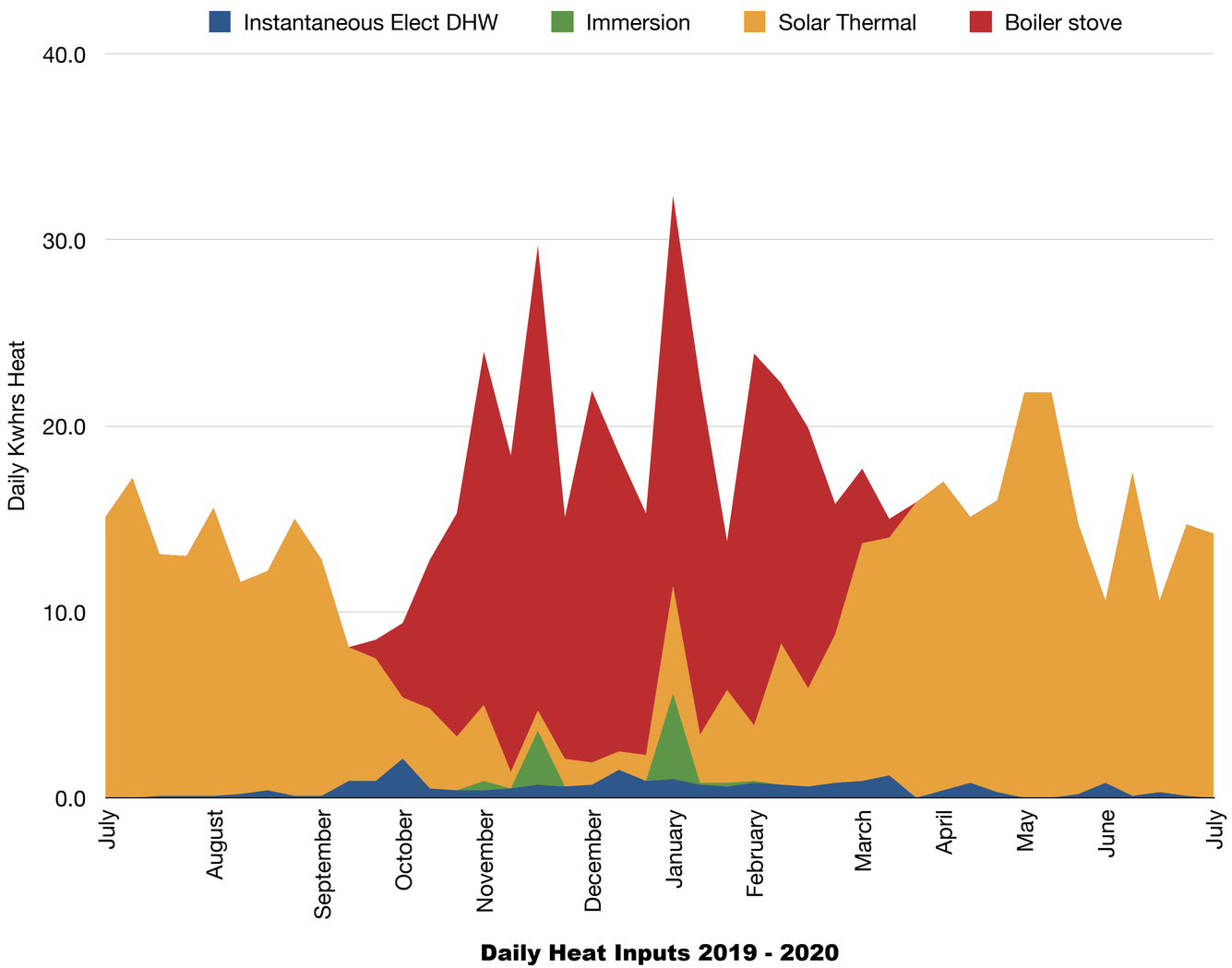
Keeping promises - **is it really zero carbon?**





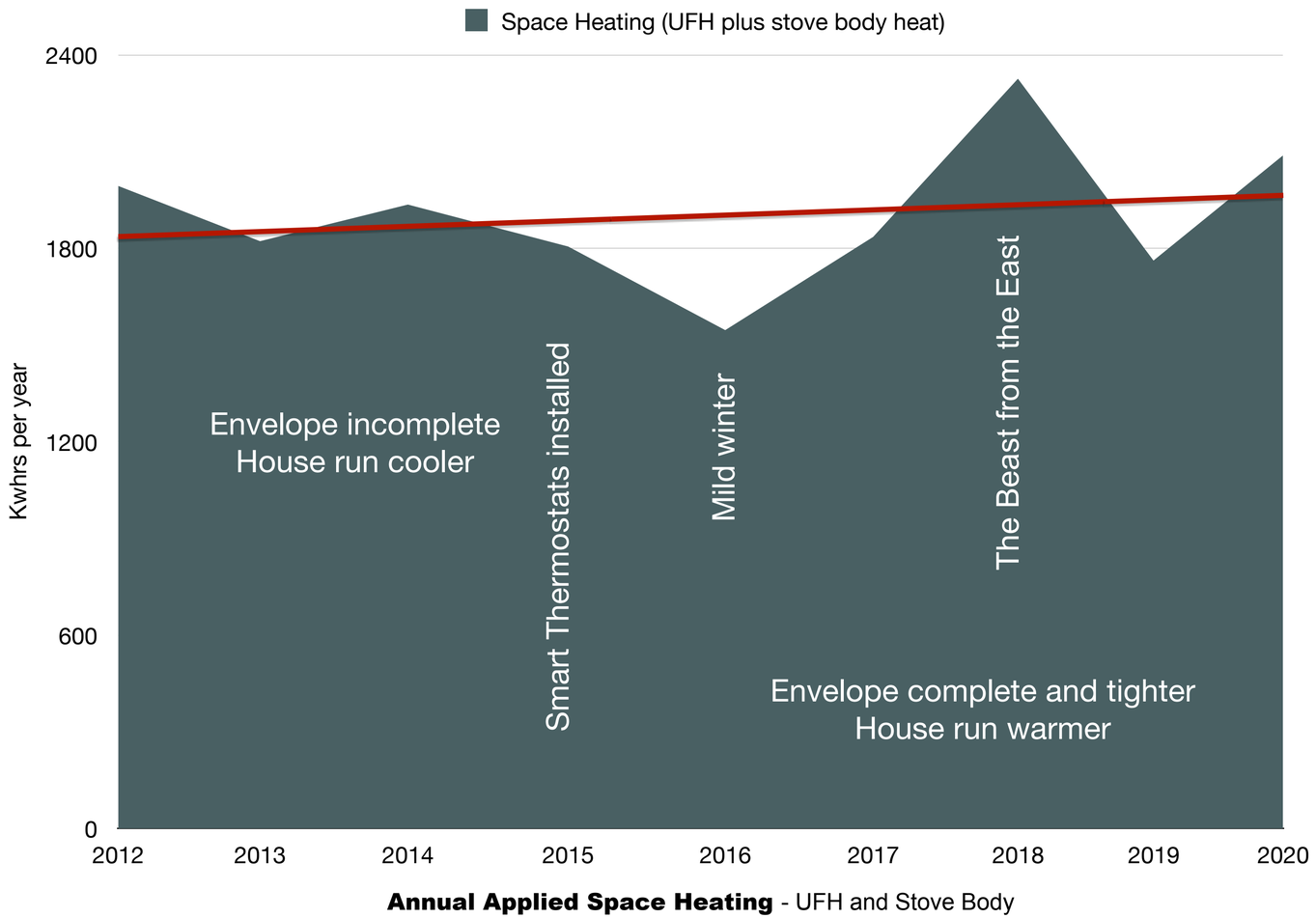
Heat in - **where heat comes from through the year**



Daily Heat Inputs 2019 - 2020

- Solar thermal provides (almost) 100% of heat April to September
- Solar thermal still providing some heat in mid winter
- In the summer the solar thermal heat has to be dumped as DHW demand is only an average of 7.5kWhrs a day

space heat - **applied heating**

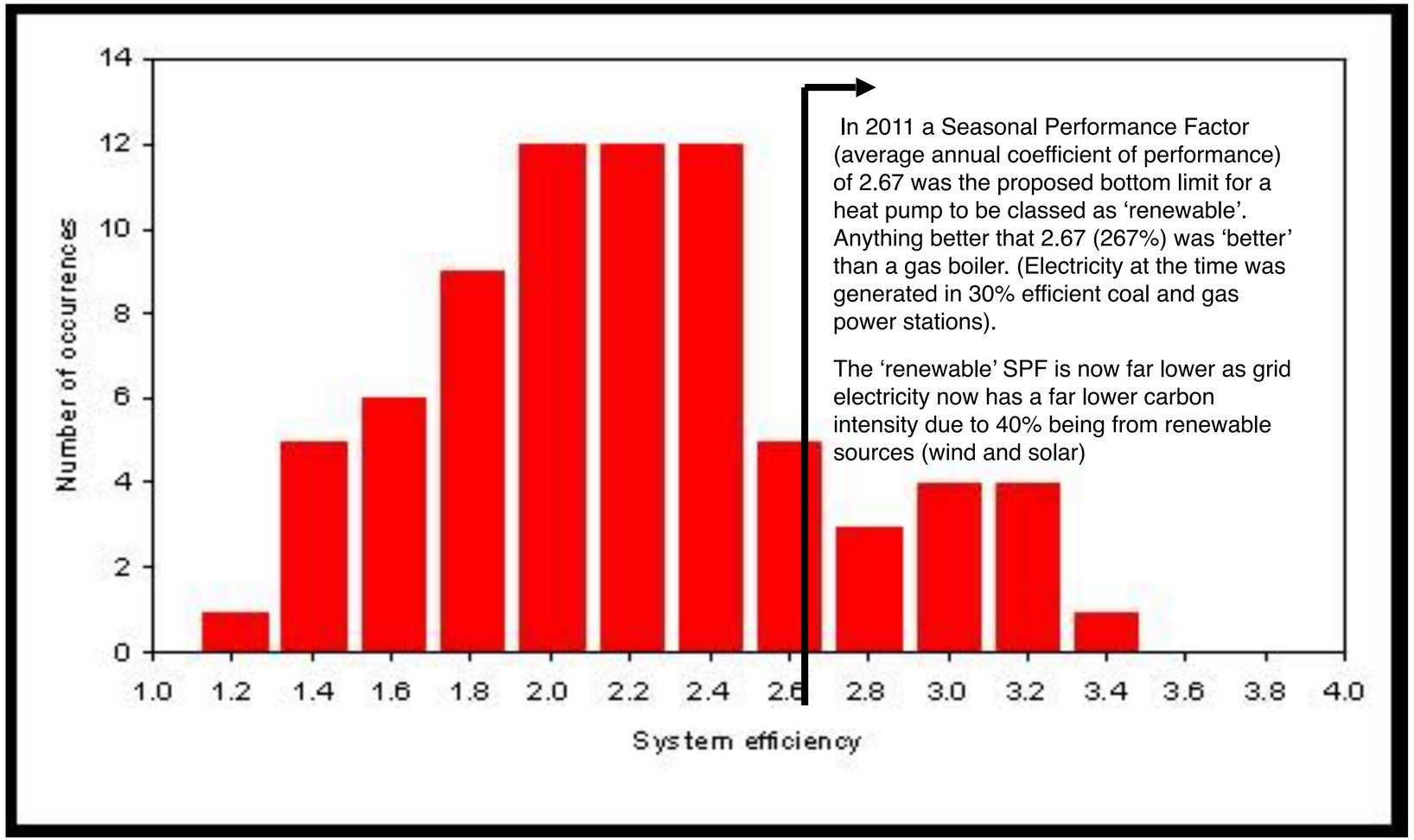


Annual Applied Space Heating - UFH and Stove Body

- Metered heat from the under floor heating plus 10/7 (42%) of the metered heat from the boiler stove. (The boiler stove is rated at 70% of heat to water - 30% to the room)
- Average annual applied heating of 1975kWhrs
- Floor area of 165m2
- Annual Applied Heating of

12 kWhrs/m2/yr

2011 - **The UK heat pump field trial phase 1**

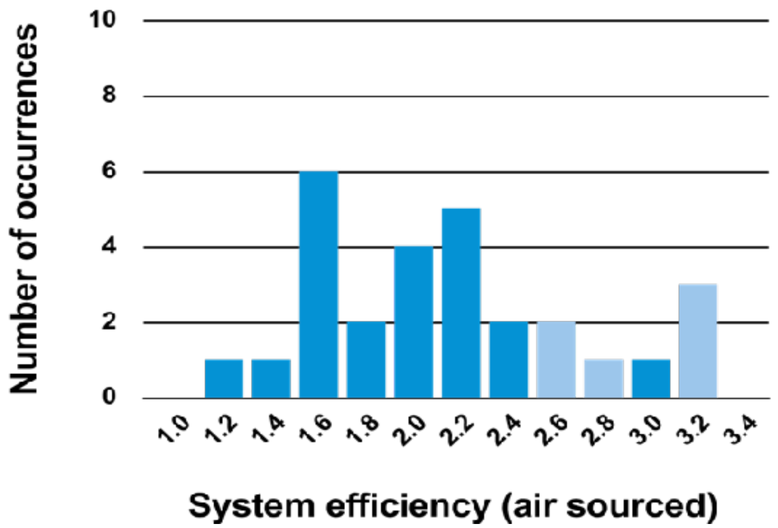


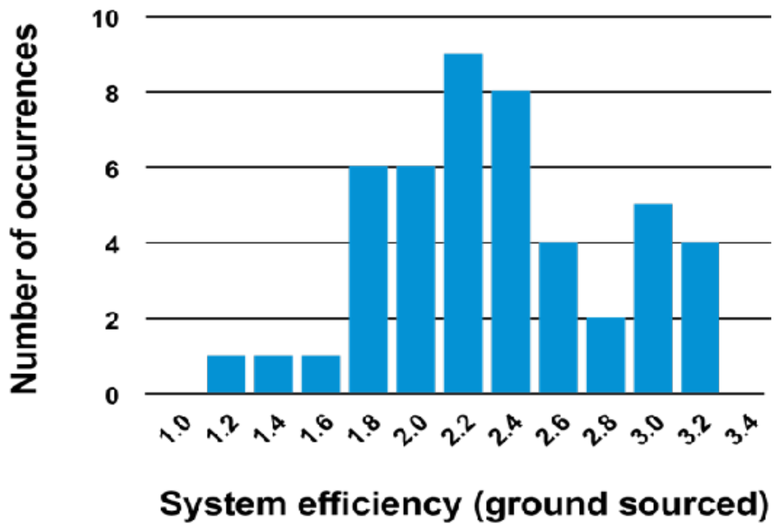
In 2011 a Seasonal Performance Factor (average annual coefficient of performance) of 2.67 was the proposed bottom limit for a heat pump to be classed as 'renewable'. Anything better that 2.67 (267%) was 'better' than a gas boiler. (Electricity at the time was generated in 30% efficient coal and gas power stations).

The 'renewable' SPF is now far lower as grid electricity now has a far lower carbon intensity due to 40% being from renewable sources (wind and solar)

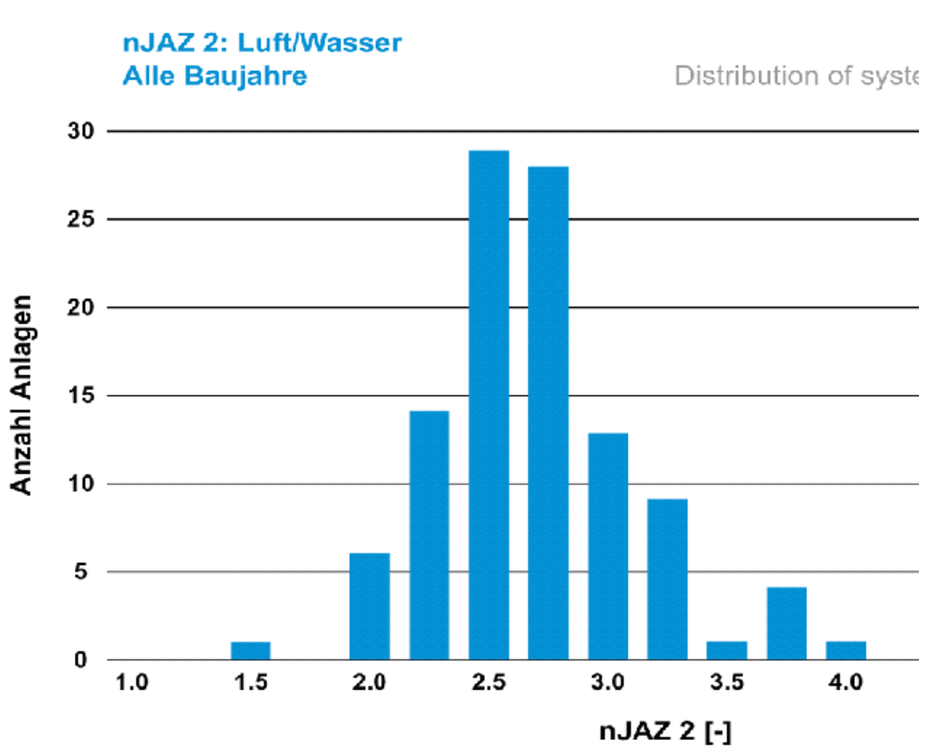
energy saving trust®

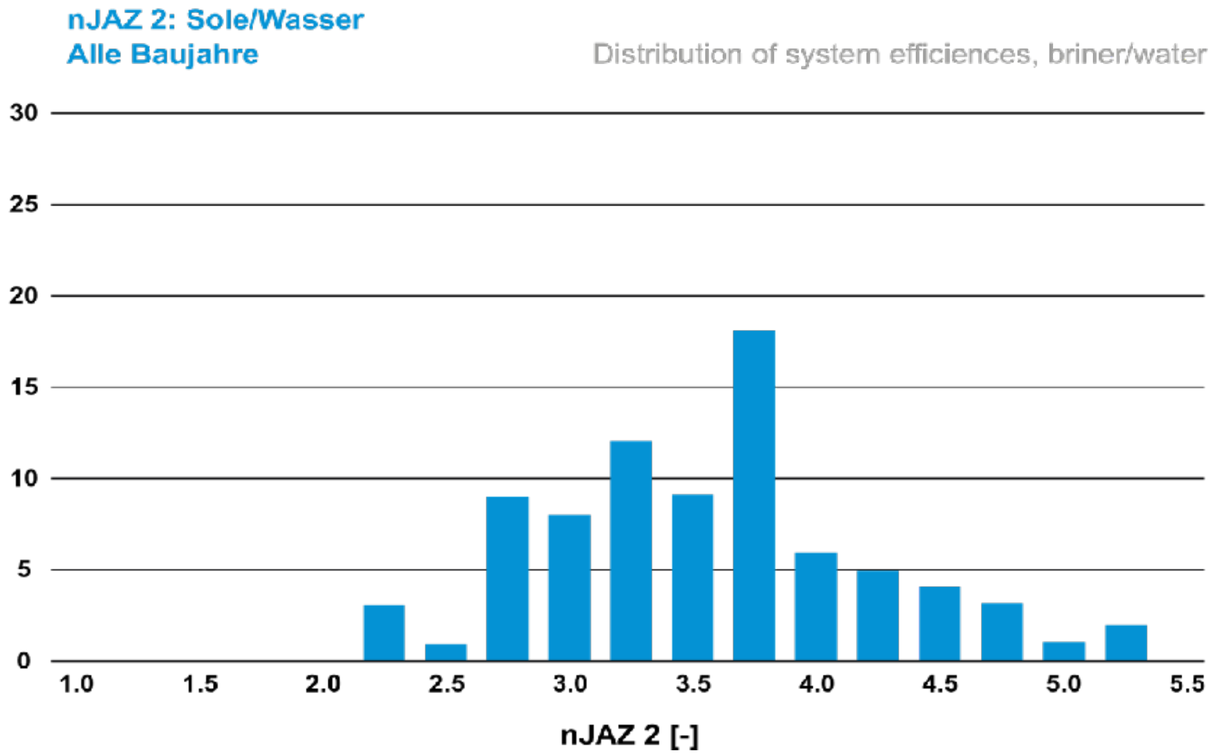
System Efficiency - ASHP / GSHP





Swiss results





Confirming Compliance with London Plan Energy policies

In the GLA all projects have to be **zero carbon**

Minimum 35% better than Building Regulations **has to be** achieved by -

Lean : Clean : Green, and now **Be Seen**

Lean - energy efficient buildings (insulation etc.)

Clean - energy efficient heating and cooling technology (CHP, clean boilers etc.)

Green - on site renewable energy (PV, heat pumps etc.)

Be Seen - energy monitoring and publishing (smart meters)

Anything that cannot be made zero on site must be offset upfront at **£95/tonne for 30 years**

- Carbon offset is by far the most expensive option and generally developers over achieve on Lean:Clean:Green measures rather than offset

Energence offer two main services to Local Authorities

1. Evaluating Energy Strategies submitted with planning applications

Question: Is the energy strategy fully compliant with policies and following the latest guidance?

Energence can check them over for you and:

- Write up an informative report for the case officer
- Draft up the relevant planning conditions and Legal Agreement definitions and clauses, and
- Cross-check the Carbon Offset contribution

2. Post-construction monitoring of the renewable/low-carbon energy systems

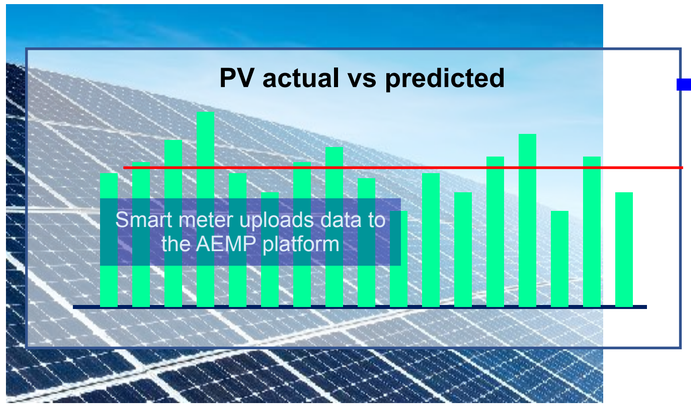
Question: Are the heat pumps, PV, CHP, etc actually installed and are they working properly (or been switched on even) - and delivering the carbon emission cuts predicted in the energy strategy?

The Automated Energy Monitoring Platform (AEMP) service solves this problem and enables the Council to truly confirm compliance with the energy policies.

Energence has provided the AEMP service for
London Borough of Ealing
for over 10 years
and is now working with the
Royal London Borough of Greenwich

*“Upon final construction of the development the agreed suitable devices for monitoring the performance of the renewable/low-carbon energy equipment **shall** be installed.*

The monitored data shall be automatically submitted to the Council at daily intervals for a period of four years.”



Dashboard

LD Ealing-043: St Benedict School	PV	ASHP	123.88%

PV and ASHPs performing well – discharge conditions

LB Ealing-044: Adelaide Wharf & Gordon Rd	PV	ASHP	87.36%

Doing OK – but would require annual health check

LD Ealing-045: Rectory Gardens	PV		64.26%

Automated email alerts triggered – remedial action required by developer/owner

LB Ealing-048: Sherwood Close	PV	ASHP	22.97%

Refer to Enforcement - and possibly subject to an Additional Carbon Offset fee

Data scrambled for data protection anonymity

Development Control – Monitoring & Compliance

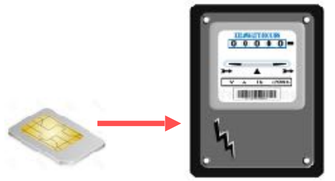
System partner Energence Ltd

Time for PV/ASHP/CHP installation – however….

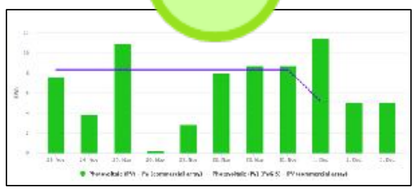
Pre Occupation Enforcement Condition 24 says must be monitored

Construction manager calls ENERGENCE

ENERGENCE calls PV/Heat pump installer and sends meters



Installer fits meters (at same time as PV panels) and ENERGENCE confirms live meter reading



Monitored data checked and displayed on web-dashboard

ENERGENCE liaises with case officer

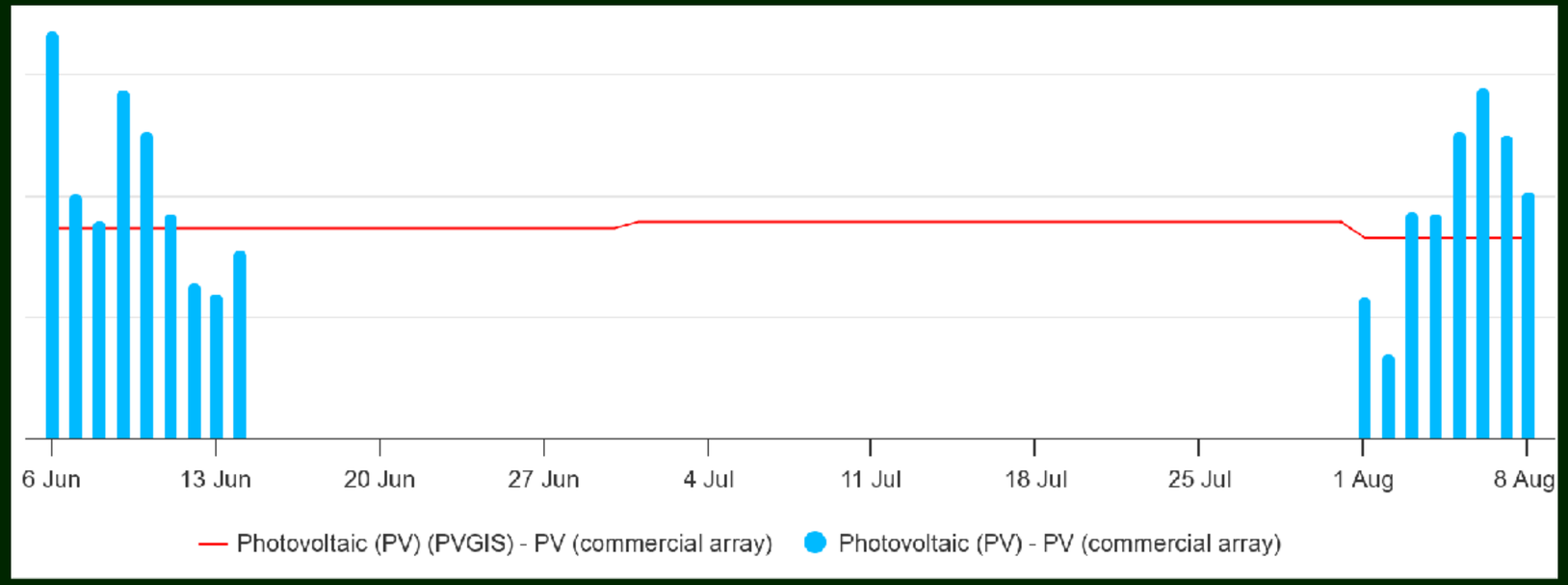
Condition discharged

Or if not….

The developer is not legally permitted to occupy the building until the meters are fitted and are online

Even if the PV (or heat pump) has been installed – this does not mean it is actually working…!!

On the right is just one part of an extended 18 month chasing up email exchange to get a big 82 kWp array online – that went offline yet again a year later.



An AEMP automated email alert was triggered to the PV installer who then fixed the problem – *not quickly enough though.*

From: Steve Harris <steve.harris@energence.co.uk>
Sent: 02 August 2021 18:08
To: Dave Redacted (PV installer)>
Subject: Re: Redacted School 186831FUL - Planning requirement for renewable energy monitoring

Hi Dave,

Re: Array not working

I've just checked the PV for final sign off before handing it over and unfortunately it appears to have not been working since the 3rd of July. The meter is online, so it has AC power, but the reading has not increased. Something must have tripped out between the panels and meter. We've even seen exploded inverters when this has occurred before. Can you get back to me with an update.
All the best
Steve

Steve Harris ..
Technical and Policy Director
Energence Ltd.
Energy planning policy consulting on behalf of Ealing Council Planning services

Renewable energy monitoring planning policy - compliance solution

Energence Ltd: Energy planning consultants (LB Ealing, RB Greenwich)

Monitoring equipment requirements:

- **PV**: GPRS smart meter(s)
- **ASHP** (communal/network loop or individual dwelling):
  Heat meter (Sontex/Kamstrup/etc) + GPRS datalogger + parasitic load meter(s)
- **CHP**: heat meter + GPRS datalogger + electric generation meter + gas use meter

The plug-and-play meters/dataloggers have SIM cards pre-loaded with 5 years of data credit

Cost of the Automated Energy Monitoring Platform – turnkey solution:

- Basic platform fee (set by a formula depending on the size of the development)
- Monitoring equipment (some or all of depending on requirements)
- Officer/staff time (planning, admin and/or technical)

Approx costs from £1,000 for a small development to £2,500 for 100 res unit dev

To conclude - **Why the market won't deliver zero carbon**

- **Question** - How much is a new house? (simplified and generalised)
- **Answer** – it is how big it is (sq. ft.) times the sales rate per square foot in that location

- **Question** – how much mortgage can I raise to buy this house?
- **Answer** - it is how big it is (sq. ft.) times the sales rate per square foot in that location

But this house is better than the same size house next door as **this house is zero carbon!!**

IT IS WORTH…how big it is (sq. ft.) times the sales rate per square foot in that location!

But its worth more than that to me as it is zero carbon!

….you must be a cash buyer then!

Why the market won’t deliver zero carbon

- As the market price of a house is fixed (by size and location), and build costs are generally already negotiated down to the bone, something else has to reduce to allow build costs to increase.

- What has to change is LAND VALUE

- In a Development Appraisal land value is formally called RESIDUAL LAND VALUE

- This is the sum left over once you have taken **all** your costs and profit away from the market price

- In areas with low market prices land price can be NEGATIVE

- **Zero carbon requirements/policies will reduce land value**

Why the market won’t deliver zero carbon

- When the **Code for Sustainable Homes** was launched in 2006, we (I was an advisor to the team) said the code was a road map to how standards would improve over the next ten years.
- We assumed that as building homes became more expensive, house builders would take this into account and start offering less when buying land
- What we didn’t realise – because in many cases it’s all wrapped up **offshore in shell companies** is that…

- **The major house builders and the land bankers already owned the land!!!! Any decrease in land value directly hit their projected asset values.** (The real money is made in land value – not building homes)

Soon after the election of the David Cameron Government, the Zero Carbon policy was dropped.

- At the time of the last general election, the largest donor (by industry) to the Conservative party remained **volume house builders/property developers/land bankers**

The solution

- The market is by nature ‘red in tooth and claw’. It will only do what it has to (or the business will fail)
- Policy and Regulation sets the level of the playing field
- Warm vague words about ‘zero carbon ready’ are pointless without enforceable measurable metrics
- Set legally enforceable standards - check they are being met - cash in bonds/charge offset when they aren’t
- Policy makers/setters and enforcers hold the tools to a zero carbon future. They must use them!
- Building Regulations are about **‘Building’** - only Planning Regulations are about **‘Built’**
- The most powerful tool in the local authorities box is the Planning **Section 106 legal agreement**

The solution

All Welsh and English Local Authorities have the power to legally demand full energy strategies with planning applications with stated energy use and generation targets and then enforce that those energy targets are actually met

Many Local Authorities (including Monmouthshire) are currently deciding not use this power even though they have declared a Climate Emergency

(Perhaps they have decided something else is more important?)

A Planning Application is a promise

We should all keep promises

Energence Ltd :
www.energence.co.uk

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Thank you

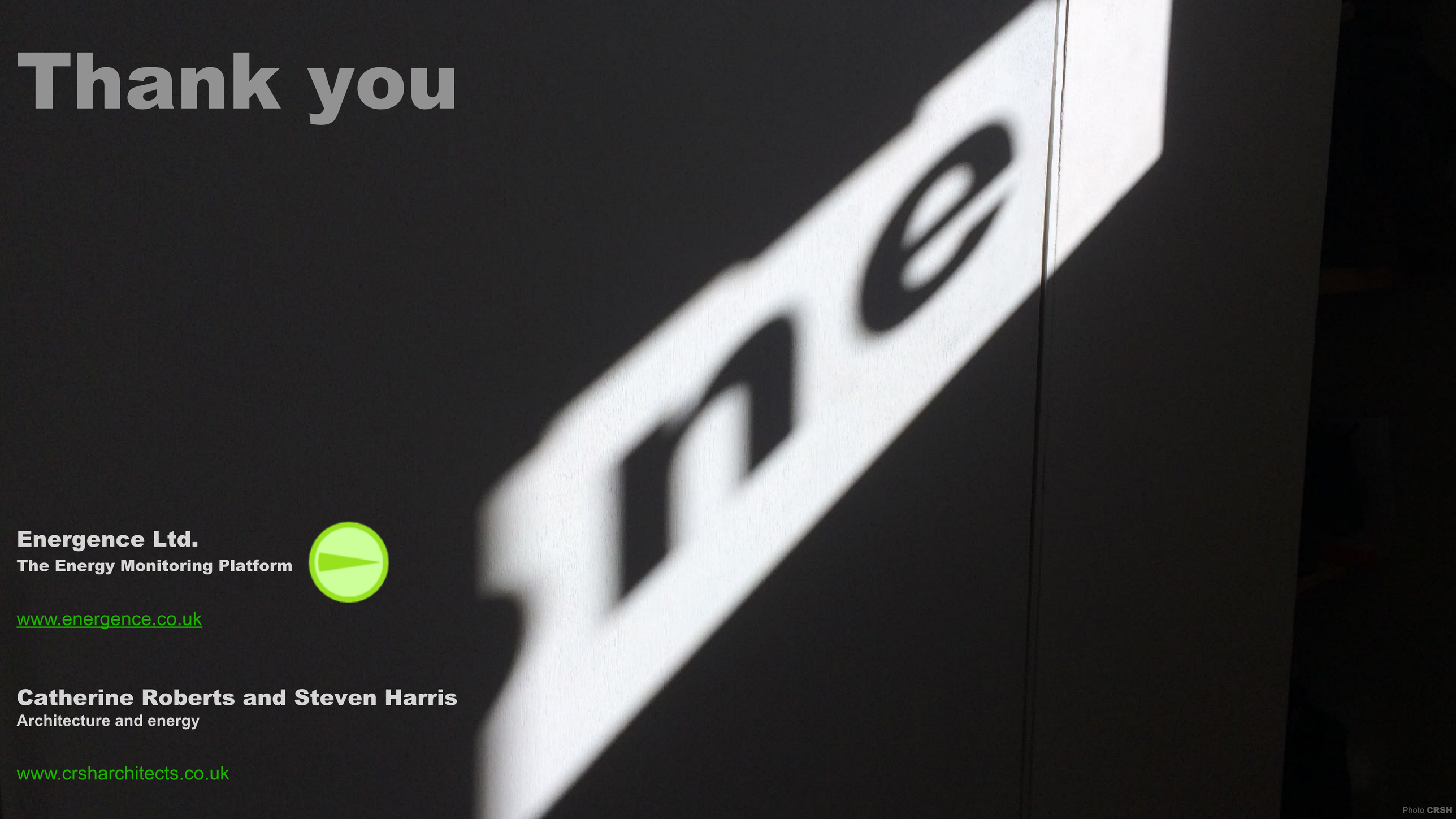

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Photo **CRSH**