Hosted by TfL
5 Endeavour Square, Stratford
London, E20 1JN

LONDON BOROUGHS ENERGY GROUP

LBEG Winter Meeting
Wednesday 7th February 2018

Kindly been sponsored by CircoSense

CircoSense

Minutes

Attendees

Name	Organisation
Catherine Arotsky	Brent
Andrew Keogh	Carrier
Ian Shaw	CBRE
Craig McKendrick	CircoSense
David Joliffe	CircoSense
Darren Britnell	CircoSense
Bob Fiddik	Croydon (Chair)
Malcolm Bell	Croydon
Risa Wilkinson	Ealing
Andrea Latter	Enfield
Shaun Spencer	Hackney
Saeed Atlas	Harrow
Anis Robinson	Hammersmith & Fulham
Lucy Padfield	Islington
Andy Morgan	Kent County Council (LASER)
Shadia Snelling	Kingston RB
Richard Neal	Merton
Tony King	Royal Palaces
Dion D'Silva	Surrey County Council
Rodrigo Matabuena	Sutton
Beata King	Transport for London
Hakeem Makanju	Transport for London
Jane Jemmett	Transport for London
Rachael Mills	SE^2 (Secretariat)
Nimish Shah	Waltham Forest
Chris Little	Westminster

Apologies

Name	Organisation
James Young	Brent
Gerry Kelly	Bromley
Kamar Zaman	Haringey
Jason Ademola	Islington
Gonzalo Jimenez	Kensington & Chelsea RB
Jacob Adekunle	Redbridge
Quentin Babcock	TfL

All presentation slides from the meeting are available at
https://www.lbeg.org.uk/meetings/our-last-meeting-7th-february-2018/

1. **Chairman's update**
   Bob Fiddik, LBEG Chair
   Bob Fiddik announced that he is stepping down as Chair of LBEG after this meeting. It's been a tough 8 years with deep cuts, but there is reason to feel optimistic for the future. The Government is having to be more commercial and innovative, and we're seeing strong policy backing from the Mayor of London. Lucy Padfield and Andrea Latter are also stepping down as Committee members: other LBEG members are encouraged to volunteer to join the committee in their place.

2. **Energy savings through intelligent water circulation**
   David Jolliffe, Managing Director, CircoSense
   D.Britnell@circosense.com
   Also see video at https://circosense.com/

- CircoSense is smart technology to reduce the energy currently wasted in secondary return systems.
- CircoSense first learns how the system is used, then switches to active use and provides hot water when required (and is otherwise is dormant mode unless there is ad hoc water demand, which it will respond to). It is cited close to the secondary return pump and only takes about a day to fit (as there's no need to go into the pipework, it's just an electrician job).
- Hot water accounts for around 25% of the total energy bill (though this does vary depending on building type: in leisure facilities it's 40%). Most of this is wasted as it's being circulated when it's not needed. CircoSense can save 25-45% of energy costs related to the hot water bill.
- The first pilot was at a primary school, where CircoSense achieved a 42% reduction in the hot water element of the energy bill. Four more sites were then trialled, which gave savings of 35-45% (all verified by Strathclyde University). This in turn lead to another 77 sites (via competitive tender)

- The whole commissioning process works like this:
  1. Client provides billing information for CircoSense to calculate high level ROI/savings: we're usually looking to beat Salix (7 years), but usually it comes in at 3-6 years.
  2. CircoSense carry out a site survey
  3. Performance criteria are agreed with the client (eg % savings or years payback)
  4. CircoSense is installed and left to run for 2 weeks in pilot/learning mode, during which meter readings are also taken
  5. CircoSense then switches to active mode for 4 weeks (with more meter readings alongside data loggers for full verification) – there are always some savings
- The average saving for all installations is 37.5% of the hot water element of the energy bill (c8-9% of the total energy bill)

Building Type	Average % of Energy Bill for Hot Water
Care Home	25%
Community Centre	29%
Further & Higher Education	20%
Leisure Facility	40%
Office	8%
Public Facility	14%
School	21%

- Case studies
  - **Heathrow:** two systems installed with a payback of 5 years. There were no operational issues and Heathrow are now looking to roll CircoSense out across other buildings.
  - **Nottingham Council:** 25% hot water savings and payback of 1.75 years. Nottingham are now installing 12 more units across 10 more sites.
  - **Surrey Police**: 43.2% hot water savings and payback of 3.15 years. 4 more units going in at 3 more sites.
  - **Dumfries & Galloway Council**: the original 4 sites averaged a 42.75% saving and a payback of 2.8 years. 30 more units have now been installed
  - **North Ayrshire Council**: CircoSense was installed at a site with biomass and BMS – savings can be realised whatever the fuel source and even at very low gas prices (savings will therefore be higher as gas prices rise. The two sites realised 45% and 52% savings: 44 more units have since been installed.
  - **Tower of London**: 32.5% saving on hot water and a 9 tonne annual carbon saving lead to another 44 units being ordered
- CircoSense is eligible for Salix funding (Heating-Boiler Controls category). Lifetime is 15 years with annual maintenance.

- Version 2 is being developed and CircoSense would be interested in your ideas as to what that could include, for example savings calculator, user interface with live data, remote updates. Launch of version 2 is expected to be 6-7 months

Q1: Can you baseline again?
A1: Yes – just return to the initialisation phase. This helps you respond to building changes.

Q2: How much does it cost?
A2: £5250/unit – trying to standardise regardless of any potential installation issues

Q3: Does it come with a guarantee?
A3: It comes with a 2 year warranty. You can also take out a new-for-old maintenance option

Q4: How responsive is CircoSense to ad hoc water demand when it's in dormant mode?
A4: Users tend not to notice. It depends on the pipes and pump, but maybe 30-40 seconds

3. Cooling technologies: what the future holds in store

Andrew Keogh, Carrier Air Conditioning
Andrew.keogh@carrier.utc.com

- HVAC can account for about 40% of building energy use
- UK legislation, through Part L of the Building Regs, is getting tougher: cooling now 50% less energy than it did 10 years ago. The zero carbon commitment in London and the EPBD (for now at least) will continue to push this down further
- **New ideas**
  - **Passive cooling / natural ventilation:** not a new idea, and can only be part of the solution as it's limited by building design, form and function, and by the fact that you can't make the building cooler than the air outside. Passive cooling could be specified more liberally which would make it cheaper (ie make the indoor temperature tolerable most of the time, rather than perfect all of the time). Natural ventilation restricts the re-use of buildings as any internal reorganisations restricts air flow: there can also be issues with humidity and external air pollution.
  - **Mixed mode:** uses a combination of passive cooling with conventional technologies to 'top up' system capacity during periods of peak demand.
  - **Absorption/adsorption + radiative:** using PV to radiate heat. This technology is available now but is only likely to provide a modest improvement in system performance, under some ambient conditions.
  - **Hybrid terminal:** another way of delivering cooling into the space. Combines the attributes of a fan coil with a chilled beam / ceiling.
    - Energy saving mode = fresh air
    - Normal mode = fresh air + coil

    - Booster mode = fresh air + coil + fan

- **Compressor choice:** doesn't seem to be anything else coming down the pipeline, other than variable speed drives.
- **Refrigerants:**
    - **HFCs** all have a potential global warming impact and because voluntary initiatives haven't worked, the supply side is now being restricted so they can be phased down. There will be availability until 2030 to keep existing plant going, but new plant will have to look elsewhere.
    - There's not many alternative options – **see slides for new refrigerants**. There's a balance to be struck between flammability and global warming impact. Even those that are only just flammable will have restricted use (eg on rooves or in modified plant rooms)
    - Perhaps we'll have to move back to water-based air conditioning?
- The technology is available now to deliver **zero carbon buildings.** We need to be looking at heat recovery, heat sinks (eg sewage waste outflow), heat pumps for data centres (turning costs into a revenue stream – think holistically, and of heat/cooling network as an enabler.
- In summary: new emphasis – new legislation – new products – new refrigerants – but **existing tech**

Q1: Can new refrigerants be dropped into existing plant
A1: No, not quite

Comment: We need to change the parameters: people expect to be warm at work (eg not wear a jacket) – there's actually no legal upper limit to workplace temperatures.
Comment: In the Tower of London, because of the thermal mass, we just run cool air through public areas overnight.
Comment: If you specify 21° regardless, you're really fixing / limiting how cooling is designed. The more flexibility you can give (eg up to 23° 50 days a year), the fewer kW you need, and the cheaper it will be. You also have to keep FM teams regularly trained.
Comment: The UK average temperature is 12° - why not just bring in outside air (artificial draught)

Q2: How do you manage indoor air quality?
A2: Well Building Initiatives are going to be the next big thing, linked to more productivity, etc and will include temperature, humidity, smells, CO2. Users will start to challenge their surroundings (and you) with smartphone apps.

Comment: Building users want to have control but need to be more aware of the impact of increasing / decreasing the temperature
Comment: LEDs mean we'll have to adjust our heat gain calculations

4. Battery storage and solar: Hounslow case study
Chris Little, London Borough of Hounslow (now London Borough of Westminster)

- 7 Boroughs came together to form the West London Alliance Energy Manager Group (WLA). The main intention of WLA was to share energy saving and carbon reduction ideas in order to identify collaborative projects achieving the same goals, taking advantage of the scales of economy.
- The Western International Market is a night-operating wholesale market site with a combined roof area of about 11,000m^2.
- It was the largest PV array in the capital at the time with simultaneous charge/discharge, and was therefore ground-breaking
- The site had a 3.6MWh/annum consumption, with a spike at 6am where everyone plugged in their forklift trucks after the night shift. This was addressed with time-switches to shift the load into the PV curve.
- 1.73MW of PV was installed, accounting for 40% of the site's consumption, alongside 240kW battery storage. The payback is 7.2years
- Hounslow is also exploring DSR and high frequency response, to sell power back to Heathrow. Other sites are also being explored for a 12MW scheme.

Q1: What's the electric output/m^2 installed?
A1: Not sure, but the cost is £1000/kW

Q2: What happens if a panel or invertor fails?
A2: The invertor would switch to the factory default. We're able to login to a portal to assess problems (eg dust, shadow, bird poo): we also get an alert signal. The system has an annual clear with purified water (to avoid calcium build-up)

Q3: What's the battery life?
A3: We're using Tesvolt, which I think comes with a 20 year guarantee

Q4: How are users charged?
A4: Everyone is charged differently. There's a GVA 3rd party managing agent, with a contact on-site who manually goes round and does sub-meter readings. This is very labour intensive and open to human error, so we're hoping to get AMR installed

Q5: You projected a 7.1 year payback – how's that going?
A5: We've only been operational for one year, but we're on par with expectations. Energy bills have reduced by 40%, due largely to the timer switches.