



Dacorum Environmental Forum
Full Meeting Thursday 14/9/23

Attendance (Z = by Zoom)

Name	Organisation
Gruff Edwards	Chair DEF
Steve Wilson	Vice Chair DEF
Cllr Robin Bromham, BSc MEng	DEF, Consultant Engineer
Rick Jefferys PhD, FEng	Consultant in clean energy and energy storage
Sarah Burgess	Grand Union Community Energy (GUCE).
John Ingleby	GUCE, Director
Cllr John Birnie	DBC
Mike Ridley	DEF and Friends of Halsey Field
Chris Ridley	DEF and Friends of Halsey Field
Paul Harris	DEF
Mary Arnott-Gee	DEF
Cllr Nigel Taylor	Berkhamsted TC
Cllr Robert Farrow (Z)	Tring TC
Kevan Cassidy (Z)	Chipperfield PC

Meeting started at 7:30pm

1. **Apologies etc.**

Cllr Ron Tindall, DBC
Katie Tyssen, DEF and Friends of Halsey Field
Brian Worrell, Hemel resident
Cllr Jane Timmis, DBC
Cllr Kevin Fielding, Berkhamsted TC

2. **Minutes of DEF May 11th meeting and matters arising**

GE said that DBC's Strategic Planning and Regeneration Officer Rebecca Williams had given an informative presentation to DEF via Zoom on May 11th on the subject of SANGs = "Suitable Alternative Natural Greenspaces." and was subsequently very helpful to him with her suggestions for improving the accuracy of the draft minutes. Her presentation had been followed by a lively and enquiring Q&A session.

3a. Neighbourhood Heat Networks – an Engineer’s Perspective

RB's presentation was illustrated by Powerpoint slides, projected on the screen and Shared with Zoom attendees. *Because some of the photographs have possible ownership issues the presentation will not (for now) be put on the DEF website alongside these minutes.*

RB described himself as recently semi-retired from a career in engineering consultancy. His mission was and remained one of identifying opportunities and coming up with proposals for improvements in the way we do things, in particular ways of achieving environmental objectives such as Net Zero. His presentation would be about an important field within this, namely the provision of domestic heating.

He commented that, just as nowadays we wonder why Victorians did not insulate their homes, future generations would wonder why we (*in Britain*) chose expensive unsustainable and unreliable means to keep warm while Iceland had been piping hot water over many kilometres and storing it for decades.

The first slide was a schematic illustration of Heat Networks that showed how heat (typically in the form of hot water) can be generated or recovered in a carbon-saving way on behalf of hundreds of dwellings and distributed amongst them.

Typically for an individual dwelling this would mean replacing the existing domestic boiler with a heat exchanger which would transfer heat from the high temperature pipes coming into the property to the lower temperature internal pipework.

A further slide introducing the topic of heat pumps consisted of graphs of Coefficient of Performance (COP) against input temperature for various output temperatures. Roughly speaking, the COP figure represents the number of units of heat energy obtained per unit expenditure of (typically) electrical input energy, so an electric fire would have a COP of around one. For a heat pump, with an outside temperature of 10C, and heating water to 50C, a COP of around 5 would be expected. This means that for every kilowatt of electrical energy put in, 5 kilowatts of heat would be output for warming the building or domestic hot water supply. *See the minutes of the DEF Meeting via Zoom on 18/11/2021 which included a presentation on heat pumps by William Rossiter of Mitsubishi.*

The next slide displayed the pros and cons of each household installing its own air source heat pump, as many in Dacorum and elsewhere have already done. Although administratively it was the simplest way to replace gas, the disadvantages to the householder were:

- They were complex and expensive to buy.
- They created fan noise and debris when they aged.
- They required servicing.
- They had low efficiency when the weather was cold, and could ice up.
- They occupied space, (*including that for a hot water tank if converting from a combi boiler*) and could be aesthetically displeasing.

A slide with a schematic view of a Heat Hub featuring underground boreholes, solar panels, heat storage tanks and electric backup boilers and delivering heat at up to 72°C to up to 300 homes in a Heat Network listed its advantages over "go it alone":

- Use of boreholes could be extended to water supply.
- Economies of scale.
- One could choose a refrigerant that might not be safe for homes because of toxicity or flammability.
- The averaged demand over 300 homes fluctuated less than that of an individual home, meaning that less capacity was required in order to cover peaks.

Cambridgeshire County Council's project at Swaffam Prior, which **RB** had recently visited, featured:

- 200 tonnes water in insulated tanks
- Air heat-exchangers
- The use of electricity largely from a private supply solar farm
- The use of air source heat pumps in summer and ground source in winter.
- Feedback tariff rules preventing putting heat back into ground in the summer.

Air heat exchangers could also be deployed at data centres, crematoria etc. to capture waste heat. Other methods of "heat scavenging" were Combined Heat and Power and Energy from Waste plants. The latter could produce typically 20MW electrical and 40MW heat power per plant but might be too far from centres of population to use for domestic heating.

In addition Anaerobic Digesters (fuelled by food waste) like the one near London Colney could produce 3MW electrical power and probably 6MW heat power.

Pictures of two examples of Data Centres at Maylands were displayed, one (HH3) generating 20MW of waste heat from computers evidenced by a rising steam cloud and the other (HH4) at the former Lucas Aerospace site not yet operational but expected to generate 12MW. There was a voluntary code that was becoming enshrined in an EU Energy Efficiency Directive which might be adopted in the UK, framed around four basic dimensions of a sustainable data centre, namely:

- How efficiently it uses energy
- How much of that energy comes from renewable energy sources
- The reuse of any waste heat that it produces
- Its usage of freshwater

GE thanked **RB** for what had been an excellent presentation, interspersed with questions and comments from the floor. It was decided to postpone a more structured Q&A session until after the following presentation.

3b. Grand Union Community Energy (GUCE) - opportunities and challenges

In introducing Sarah Burgess and John Ingleby of GUCE to address the floor on this topic, **GE** said that he found the common theme behind their topic and the preceding one, namely the benefits of community based solutions vs. go-it-alone most heartening, having himself recently experienced two home visits resulting from 'phone calls by "your local energy advisor" that had turned into hard-sell sessions pushing their companies' products providing respectively extra foam insulation and heat pumps, neither of which he had felt confident enough about to accept.

During the set up for **SB**'s talk with slides available at

<https://docs.google.com/presentation/d/1I5cmij29r7nmdmPzCQp1rvq7LCDYQnhG/edit?usp=sharing&oid=105651129749275763170&rtpof=true&sd=true> **JJ** outlined the history and origins of GUCE, a non profit community energy cooperative. In 2022, GUCE had been successful in obtaining an RCEF (Rural Community Energy Fund) grant of £40k to study the feasibility of an energy network to provide heating for some 35 homes at Tooveys Mill on the Grand Union Canal in Kings Langley. GUCE selected consultants Bioregional, a "purpose-led sustainability consultancy", FairHeat, an "award-winning specialist energy consultancy" and ICAX Ltd., "specialists in the design of renewable and heat pump solutions" (*Quotes from respective websites*)

SB outlined GUCE's goal and mission as a community benefit society, with projects including solar panels for the Rudolf Steiner school, the RCEF-funded feasibility study (October 22 - March 23) into renewable energy in Kings Langley and participation in Three Rivers District Council's Fast Followers

Project that encompassed Transition Streets and Community Energy options for local building such as Schools and Leisure Centres.

The advantages of community energy were:

- Local ownership of renewable energy
- Government recognition as a key way for Local Authorities to hit Net Zero Targets
- Opportunities to work with local residents on demand reduction
- Availability of local volunteers to help run the enterprise.

The above-mentioned feasibility study included:

- Feasibility of energy extraction from the canal to heat homes
- Mapping the energy usage and age of homes in Kings Langley
- A survey of residents' energy usage
- Comparison of peak usage load with what the canal could provide
- A review of flow and temperature records for the canal

It was found that the canal has dried out once in its history and that, though it was still a possible energy source, using it was not economically sensible. Instead, use of boreholes at the former Ovaltine Factory site became the preferred option. Choosing this, it was estimated that a District Heat Network with one energy centre using a ground source heat pump could heat almost all of the Dacorum side of Kings Langley.

The comparative benefits and disadvantages of installing heat pumps in individual dwellings vs. communal were amplified thus:

Individual Benefits: Earlier results in terms of cost savings and individual contributions towards carbon saving. The cost savings were likely to increase when, as was likely, electricity prices were decoupled from gas prices.

Individual Disadvantages: Expensive up-front (say £12K) and risk of poor installation.

Communal Benefits: Early availability of low-carbon heating, and zero carbon within ten years. Medium likelihood of heating cost savings. Saving 8% on electricity where as is likely that is also supplied from the communal source. Potentially zero up-front cost for initial scheme customers. More control over energy at the local level.

Communal Disadvantages: Community support required. Up-front cost for later joiners in the scheme are likely to be more than for a gas boiler but less than for an individual heat pump.

Also resulting from the RCEF-funded feasibility study, schematics for two possible configurations were displayed, together with relative project capital and individual connection costs and carbon-saving estimates:

A centralised community energy centre - with district heating network (Option 1a), and

Decentralised heat pumps "with private wire"/"behind a micro-grid" (*Presumably Option 1b*)

The local opinion survey found that;

- 86% were interested or very interested in exploring the community option further
- 95% Voted for the centralised community option with 5% opting for the decentralised ASHP with community micro grid option
- Low carbon of energy, community ownership, low cost of energy, and reliability were the top four reasons for their choice.

The next steps for the project would be:

- A Technical and Economical Feasibility Study
- Obtaining Heat Networks Delivery Unit (HNDU) funding
- Obtaining Connecting Europe Facility (CEF) funding
- (More) Community Engagement

A further report in presentation format is available at: www.heatingkingslangley.guce.org.uk

GE thanked **SB** and **JI** then passed the chair to **SW** who asked attendees in turn to summarise and/or to add to their earlier questions and comments. Making the first contribution to this, he said that DEF's past experience with the West Hemel housing development LA3 for 1100 homes showed that developers were not prepared to incorporate energy saving/carbon reduction measures into new builds unless required by law to do so. *See minutes of the DEF Meeting 11th May 2017 with the DBC Case Officer for LA3 and developer representatives in attendance.*

SB agreed that such measures should be mandatory.

NT asked what could be done to make carbon reduction initiatives more politically attractive.

SB said that the Government had already allocated funds towards achieving the national Net Zero target.

PH fully supported community initiatives for carbon reduction. The UK (albeit with a scheme at Eigg in Scotland) was lagging behind countries such as Germany.

SB said there were also local initiatives in Wales

GE said there was a microgrid scheme in the Ogwen Valley in Gwynedd, where residents can join an energy club which uses locally generated hydro-electricity. As a result, they get electricity for 8p a unit at certain times of day instead of typically 34p a unit.

CR enquired as to the timescale of the next phase of feasibility study.

SB said she would find out and let DEF know.

MR said that the public perception of carbon reduction was too negative. Public comments posted on the Daily Telegraph website in response to a news item on the subject displayed high levels of ignorance about heat pumps.

SB contrasted this with the generally favourable response to the Kings Langley local opinion survey she had described which had adopted a different method of finding out what people thought.

RJ highlighted the recently completed village heat network and low temperature approach of the Kensa Group based in Truro, Cornwall (from their Website "involved in the manufacture and installation of ground source heat pumps and the ownership of associated underground infrastructure." Their pumps are "shipped with the return water temperature setpoint set at 30° C, which is ideal for underfloor systems mounted in screed." See <https://www.kensaheatpumps.com/district-heating/>

M A-G spoke in favour of Anaerobic Digesters and the utilisation of waste heat.

JB Suggested that the new crematorium at Bunkers Park could be used for heat recovery, if it could be done with due regard to the sensitivities of the bereaved. In general more could be achieved sooner and at less cost through better insulation than by relatively new technology.

GE said that this latter aligned with DBC's policy in regard to heat/energy savings of "Fabric First" (see Minutes of DEF meeting 18/11/2021)

4. Any other Business

None.

Remaining Dates for 2023:

Steering Group: (Tuesday) 3rd Oct.

Main: (Thursday) 16th Nov.