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Heat Policy Team,
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OREF's Clean Growth – Transforming Heating consultation response

Thank you for the opportunity to comment upon the 'Clean Growth – Transforming Heating. Overview of current evidence' document.

The Orkney Renewable Energy Forum (OREF) was set up nearly 20 years ago to encourage the preferential use of renewables and to improve energy efficiency. As a membership organisation it represents energy generators, users, suppliers, the public sector and third sector.

Overall OREF believes that the long-awaited attention to heat as a subject area in this document is extremely helpful, but there are some significant areas that require strengthening.

OREF is keen to engage with this topic as it is of great interest to the community. OREF notes {Pg 37}[1] the desire for a '*wide range of perspectives'* and we believe ours may well be an outlier and therefore contribute to that width of perspectives.

As a county we produce more electricity than we use and have done every year since 2013. We have a high uptake of EVs (highest in Scotland) and 1/9th of all the UKs domestic wind turbines are in the county. 1/10 on the population are making their own power and we already operate a smart grid. We also have no gas and it is believed we have some of the highest levels of fuel poverty due to fuel unit costs, our long heating season and high wind chill on sub-standard buildings.

We are therefore the very definition of an engaged community and would like to fully engage with the Department on this important piece of work.

The principal concerns that comes through as a result of this document are as detailed below:

[1] Paragraphs or pages are shown in { } brackets throughout and quotes of the document are in italics.

1. A failure to recognise 'cold' as a form of heat. By failing to recognise that the creation of cold gives rise to waste heat a major gap in thinking is created. Coupling of processes that demand heat and cold provides an opportunity for significant efficiency. This must be given higher prominence.

2. The primary need to reduce heat demand through insultation seems to underplayed. This seems to be spectacularly shown in 3.9 where the document says:

> '*Direct heating systems such as storage heaters can also be used to convert electricity to heat….. whilst they are less efficient than heat pumps, they can be applied across most of the UK's building stock without the need for the energy efficiency upgrades which may be required with heat pumps.'*

This is a facile statement and wrong[2]. Energy efficiency upgrades are essential to minimise the need for energy at all.

One should never be considering putting in storage heaters into under-insulated spaces just to provide heat and only consider heat pumps if you have insulated. The prime task is to reduce demand to as close to zero as possible and then provide the residual need efficiently.

If this statement is an accurate assessment of the approach of the Department to energy efficiency then it is extremely worrying.

The failure to prioritise efficiency then plays out through other aspects and is manifest on page 22 {Fig 2.8} showing the seasonal demand for electricity and gas. This oft shown graph may be accurate but is misleading. It purports to show how it will be difficult to deliver the scale of energy delivered by gas from renewables. This fails to recognise that:

> a. our lamentable energy efficiency means the peaks of gas use are higher than they need to be. If we lost less energy we could reduce the magnitude of the peaks and ~50% should be achievable, and
>
> b. we could deliver much of the heat presently delivered by gas more efficiently by using heat pumps. Air to water heat pumps would knock demand down to 1/3 of what was needed after the efficiency measures. i.e 1/6th of present demand.

That then becomes much more achievable. It is not clear from the document that this has been grasped. OREF would point out that this same sort of thinking seems to pervade {4.24} where the document warns that '*However , a major shift from gas to electric heating <u>would</u>[3] result in proportionally very significant increases in total demand for electricity and requirements for peak generation capacity*.' This is only the case if there is no attempt at smart control, no attempt at either heat or electrical storage and no improvement to

[2] Repeated in {4.96} '*Heat pumps… require…good levels of insulation'*

[3] OREF underlining

insulation. This is therefore a highly questionable assumption and OREF challenges it strongly.

In effect this false premise is given even more inappropriate credibility when effectively repeated in {4.76}, {4.118}, {4.122 a}, {4.131} where there is a warning that using direct heating will demand massive expansion of the electricity generating system. Since this is an unwise and unlikely outcome, it barely warrants expressing in this report.

Note: There is a repeated error in {3.5} and {4.68} when it states a Coefficient of Performance of 2.5 for heat pumps. OREF members have pumps with CoP of >3 and the local council has a sea-source unit with a CoP of >6. It is unclear where the 2.5 comes from, and OREF would be willing to provide data through long term study to help 'ground truth' the Department's assumptions.

3. The belief that processes to reduce energy demand and encourage innovation are presently sufficient is flawed. Local experience shows obstructive regulation preventing innovation. A case in point is the inability to use whole life costings to show that money would be better invested in insulation than in renewables on the roof of new builds. This issue is as a direct result of out of date information being used by regulators and the inflexibility of the Building Control process. OREF members have significant experience in these labyrinthine regulations and would be happy to share them in more detail if this would be helpful.

   OREF also believes the report is overly self-congratulatory in that {6.7} seems comfortable that housing stock is moving towards and EPC of 'C'. This is wholly inadequate, a point reinforced in the Committee on Climate Change's report showing how our housing is going to let us down in our attempts to de-carbonise. They quote that 12% of houses built in 2018 were of C grade and 7% were D or below. All new housing should be at least A; to allow 1/5th of <u>new</u> housing to be so poor is ridiculous and the loopholes identified must be closed by urgent Government action.

   Local experience of attempting to get heat networks to be installed has been poor. The incumbent supply system does not welcome disruption and the regulatory hurdles to a new approach remain unnecessarily high. OREF would strongly suggest that the experience of Dave Pearson of Star Renewables be sought in this respect.

   OREF also challenges the phrasing {3.31} *that heat networks ….. need to grow from a relatively small base if we are to meet our carbon targets in a cost effective way*. At present there are precious few such systems and 'relatively small' is a gross over-estimate. Other countries have taken more aggressive approaches to such networks and seen great success. The UK's activities have been risible in comparison, so have never really shown what

they could achieve. By over stating the scale of the present activities it leads towards less than accurate assessments that they have achieved little. This mis understanding should not be perpetuated.

4. OREF notes that there are to be 3 million buildings to be added by 2037 {2.15} and that there is to be a 50% reduction in energy needed in these properties {6.13}. Whilst superficially encouraging this means that the pre-existing 28 million properties will only be struggling towards a 'C'. So the saving in 6.13 will only be 50% on the 10% of buildings it affects. i..e. a 5% overall improvement. Whilst this is welcome; it is wholly inadequate.

5. OREF is concerned that a narrative is developing that suggests that swapping hydrogen for natural gas is a solution to decarbonising heat. OREF firmly believes that gas is presently being squandered through the low efficiency referred to earlier. Efficiency must be tackled first. Furthermore the siren voices of the incumbent gas suppliers suggesting that they can easily convert from one poorly utilised gas resource to the same one with added complexity (CCS) is dangerous. The Department needs to be more critical of the poorly made case for CCS as a transition approach.

   The idea of using SMR derived hydrogen as a 'drop in' fuel and being able to keep the general heating processes unchanged is superficially inviting, but seriously flawed.

   The main thrust for sufficient heat has to remain the same; use as little heat as possible. Efficiency must be king.

   Notwithstanding the antipathy towards CCS, OREF strongly supports the creation of hydrogen from electrolysis and welcomes the comment {Pg 10} that '*Key immediate priorities for investigation and testing….improving understanding and accelerating development of low carbon hydrogen production*.' provided that low carbon becomes zero carbon.

6. The report seems almost silent on the storage of heat. Storing heat is comparatively simple even using just water. Phase-change materials such as SunAmp provide easier energy storage solutions than holding the energy electrically.

   {4.75} suggests only one scenario for using gas at times of high electricity demand. However this would be a more cogent strategy if the opportunity to use stored heat was also referenced. Dispersed heat batteries can significantly reduce peak electrical heating demand, and centralised ones can work well with district heating. OREF would urge that the philosophy behind the utilisation of storage is brought up to date in the final documents.

7. There is a general fear pervading the document that consumers will not like change. This seems to be overly cautious. OREF has members who have produced low energy housing and were unable to find examples where tenants and owners did not like the new levels of comfort and warmth afforded by the new property. Opposition is therefore unlikely. In addition OREF would also draw attention to BEIS' own WAVE public opinion survey series which clearly shows public support for renewables in the 80% mark.

   So whilst OREF recognises there will be some 'media noise' associated with a systematic roll out of insulation/district heating and energy efficiency, it strongly suggests that the report is overly pessimistic in the impact it will have on the wider population.

   OREF challenges the first Strategic Inference {Pg 65} that '*The transition to low carbon heating will result in significant change for consumers'*. Why? If done well then it could simply be a matter of an upgrade of their facilities and homes and may result in little or no actual change.

   This statement seems to over-play the impact; or atleast overplay it for 21st century citizens. In living memory we have already seen significant consumer change having gone from active fuelling (getting coal in and lighting an open fire) through active paying (putting shillings into a payment meter) to now ubiquitous heat and light paid for occasionally and by passive means (direct debit and thermostatic control). We have also seen a reduction in drafts and associated increase in house temperatures resulting in thinner clothing. OREF would therefore argue that the changes have already happened. And whilst there may be some disruption for the next wave of change through the installation of heat-mains and the redecoration associated with better insulation, these changes are pretty insignificant.[4]

   OREF is also concerned to ensure that this project should not confuse 'Easy for the consumer' with 'The right thing to do'. 'Easy for the consumer' is not the most important thing, getting the UKs dependence upon fossil fuels down is. The Department should therefore not be afraid to plan for the consumer's activity; it should definitely not be timorous in setting out what does need to be done for the national interest.

8. OREF challenges the 2nd bullet point in 'emissions reduction potential'. {Pg 41} in that it does not agree that electrical heating can only apply to a minority of buildings. Our experience is that it <u>can do all buildings</u> but may not be <u>affordable</u> unless the insulation is right.

   OREF also questions the words '*heavily reliant'* in the 3rd bullet point. Using SMR derived hydrogen to tackle carbon emissions is '<u>dependent</u>' on CCS

[4] OREF also notes {4.98} scale of planning underway at any time for housing moves; so producing an opportunity for significant refurbishment opportunity.

working. ‘Heavily reliant’ is underplaying the importance of the CCS side of the coin. Indeed elsewhere {3.14} you acknowledge that without CCS then SMR derived hydrogen results in an increased carbon footprint.

9. A more positive spin can also be put on decarbonisation. This represents massive business opportunities as new processes will be needed and new skills developed and sold. Statements such as {4.19} are a bit limp and fail to recognise this market opportunity. {4.56} is more positive and in line with OREF’s experience. {4.61} is helpful in that it makes clear that an increase in expenditure may well be entirely affordable. OREF would urge the Department to be more enthusiastic and visionary.

10. OREF also notes the perspective that electricity generation results in remote carbon emissions. As a community running on renewables for the last 5 years we can show that our electricity does not result in such emissions either at the point of use or elsewhere. The thinking behind {4.22} is therefore a bit out-dated.

11. Hydrogen. There are a series of false assertions in this area that are deeply worrying. Two of OREF’s members already produce hydrogen through electrolysis and therefore have insight:

    {4.33} says that ‘*small scale production of electrolysis is proven’*. Since there are sites running >100MW around the world it is disingenuous to suggest that it is only small scale that has been proven. Electrolysis may well suit small scale, dispersed operation, but it is wrong to infer it is not yet at scale.

    The same paragraph also hypothesises that heat demand will stay constant. Elsewhere the document is clear that demand needs to reduce and so it is reasonable to underpin the decisions with a reduction. The mere 14% of heat assumed to be supplied is therefore a gross underestimate in the light of the reducing demand.

    {4.38} mentions some scaremongering about H2 interaction with Ozone, but OREF notes this is not referenced. If this is a real issue then it should be referenced, or if unsubstantiated it should be dropped.

12. OREF notes a dangerous turn of phrase {4.123} and challenges whether ‘… t*he UK’s unique building stock and climate’* is actually helpful. This is a very ‘little islander’ UK centric view of the world and OREF urges this to be dropped. Our weather is not extreme, it is not very unusual, and our houses are pretty average according to many international measurements. By trying to paint our issues as unique there is a very real risk of being unwilling to learn from others around the world. This tendency to think we are special and have unique problems is deeply flawed and should be avoided.

In conclusion:

OREF welcomes the report and much of the content. It questions, however, some of the assumptions and looks forward to further engagement on this important topic. Orkney is blessed with renewables and an engaged population. It also has its challenges and has made mistakes as well as successfully finding solutions. OREF would be glad to put its access and experience to good effect through further engagement if that would be helpful.

Yours sincerely,

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On behalf of OREF