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FLEXIS Work Package 17: Social Acceptability and Responsible Development of Energy Systems

Minewater heating in Caerau: Thoughts from local residents

Interim Report

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Work Stream 2: System Change and Everyday Life.

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Overview of the Planned Scheme

Bridgend County Borough Council (BCBC) is leading a scheme to investigate whether disused mine workings at Caerau colliery could be used as a heat source for local residents. The scheme is part of the Energy Technology Institute ‘Smart Systems and Heat’ programme, which is being delivered by the Energy Systems Catapult (ESC). BCBC put out a tender for groups with appropriate expertise to run the project in conjunction with them. A consortium, led by Cardiff University and including Swansea and Cardiff Metropolitan Universities, as well as private companies, was successful in winning the bid.

The Llynfi Valley scheme (in Caerau) is one of two proposed district heating (hereafter DH) schemes being investigated by BCBC, the other focussing on Bridgend town centre. Water in the disused mine workings represents a potential geothermal energy source as it has an average temperature of 10 to 14 degrees Celsius. Heat will be extracted from the minewater and transported to residents’ properties using a network of pipes and their existing radiator system. It is still to be decided whether the scheme would use a central heat pump or whether individual properties would have their own heat pump. As the heat would be ‘low grade’, alterations to the existing housing stock in order to improve heat retention are likely to be required.

Test drilling took place in September lasting around four weeks. The results from this, along with other elements of the feasibility study (tests on existing housing stock and resident feedback via a citizen panel) will inform the development of the scheme. Construction of the scheme is due to begin mid-2019. As part of the scheme, the ESC is looking to install smart energy management platforms (Home Energy Systems Gateway - HESG) in residents’ homes.

Portrait of Caerau

(Figures from Building Communities Trust Caerau Community Profile. Figures based on LSOA Lower Super Output Areas)

- Caerau has a population of around 4000, with a higher than average (amongst Bridgend communities) proportion of young people
- The area has 1850 homes, 67% of which are privately owned
- 40% of people have no access to a car (almost twice the Welsh average)
- 48% of children live in poverty (more than twice the Welsh average)

- The Health of younger people is much worse than in Wales as whole with around 30% of people under 65 suffering from a long term illness (twice Welsh average)
- Half of people under 65 have no qualifications – twice the number for Wales as a whole
- Around half of all working age people are not in work or looking for work (the Welsh average is about a third)

Some local residents draw a distinction between Caerau itself and other areas of Caerau ward (such as Nantyyffyllon). Only a section of the area will be eligible to connect to the minewater scheme in the initial phase of development.

Figure 1 – map of proposed area for minewater project



Caerau colliery (site of proposed minewater development) was in operation from 1889 to 1977. Workers were transferred to Coegnant (closed 1981) and St Johns/Cwm du (closed 1985). There were several local industrial estates employing residents but many of these also closed down, meaning that there are limited local employment opportunities. There are currently plans for a Centre Parcs type development nearby, which may provide job prospects, but residents are sceptical of this actually coming to fruition.

Our participant Pamela gives an overview of Caerau:

Caerau itself is in the lowest ten percent of postcodes and in the lower groupings for wards and things for most of the deprivation, it comes sixth I think at the moment. ... But, all of Caerau which is six areas altogether plus Nanty[ffyllon]

areas, are all within the worst 20% in Wales. That said, they don't score badly in terms of housing, they don't score badly in terms of environment ok because of the mountains around and because of a lot of work has been done on the housing stock, in particular the local authority or housing association owned housing, has been done up. But they do score very low on things like income, education in adults, things like car ownership is low, you know so people rely on public transport a lot as well. It scores quite poorly on things like health, in particular, numbers of adults with what might be called life affecting illnesses, not necessarily life-limiting but things like chest infections, asthma and that kind of thing they score fairly highly for, unfortunately, so they're having projects in that area in a couple of recent years to try to improve people's health. School wise, Caerau Primary is one of the biggest primary schools in Wales, it's almost 480 pupils I think this year, this term, over 50% on free school meals and it was over 50% I think on various other registers including needing special support in the classrooms and so on so it has got a high percentage of support staff in school as well. It attracts pupils in from outside the catchment area because its facilities are good and but that also means some problem families that you know have been taken in because of that but you know but that's a good thing really. There isn't an awful lot of industry, there are some small estates, particularly the one they call Spelter which is down in Nanty which is building supplies and rubber and various things like that. People travel out of here to work, they travel to Bridgend, a lot down to the industrial estates in Brackla and Bridgend, some to Cardiff and people tend to go away to university and not come back, they don't feel there is enough for them to come back to I think so we tend to be sort of top-heavy age wise, bottom-heavy age wise, but not a lot in the middle.

Despite the association with multiple challenges and disadvantages, many participants felt that there was a good sense of community in the area, particularly amongst the older generation. Those who had lived in the area all their lives had fond memories of growing up in what they described as a thriving town, with lots of local shops and businesses and the mines providing employment. People identified lack of work (since the closure of mines and local industrial estates) and drug use as reasons for the area deteriorating. There was also discussion of current problems with littering and vandalism. Residents were largely positive about the sense of community in the area and there were a number of active community groups. Those who had moved into the area had generally done so because housing was relatively cheap and they liked the local landscape. When asked about issues relating to energy in the area, some residents were not sure whether fuel poverty was an issue, although assumed that it might be experienced by those who they had seen topping up prepayment meters. Others had more direct experience to suggest that fuel poverty was a pressing problem, and most people felt that their energy bills were too high. These issues had prompted an interest in the minewater scheme.

Methodological Note

Research was undertaken in Caerau as part of social science work on the FLEXIS project¹, in particular, our work stream 'System Change and Everyday Life'. This report outlines the issues that the Caerau residents we spoke to raised in relation to the proposed minewater heating development. Some interviews were conducted prior to the test drilling, with the remainder during or just after the drilling process, and residents had varied understanding of the proposed scheme before the interview. Most participants lived within the test area, but some were outside. It was explained at the start of the interview that the researcher was not a technical expert and would only provide a basic explanation of the proposed scheme. Participants were offered the contact details of colleagues at Bridgend Council and the Cardiff University School of Engineering if they had any more technical queries.

Various efforts were made to recruit participants, including;

- Exhibition/information sessions in three community venues
- Emails/letters sent to those who had attended the minewater exhibitions
- Leaflets through doors of all properties in the test area
- Visits to local community organisations
- Facebook adverts shared by local organisations

18 interviews were conducted involving 23 participants aged between their early 20s and mid-70s. Eight participants were retired, five were employed and ten were unemployed. Thirteen had lived in Caerau for their entire lives. Most were home owners but six privately rented and four were in social housing. The first ten interviews were conducted prior to the test drilling, whilst the following eight were conducted during or soon after. Several participants had a connection to the mines, either through having worked there themselves or having a family member who did so. This report is not intended to be representative of all Caerau residents, but details a number of issues that were raised by our participants that are likely to be pertinent to other members of the wider community. The primary aim of this report is to elucidate residents' initial views of the minewater scheme, as one element of our work which seeks to consider the local implications and social acceptability of various aspects of energy system change as a whole. The report will also be used to inform colleagues at Bridgend Council and Cardiff University who are involved in developing the technical and public engagement aspects of the minewater scheme. Further analytical work will be undertaken on the date for future academic publications.

¹ See <http://www.flexis.wales/>

We intend to return for further interviews with residents after a period of approximately one year, during which time technical developments are likely to have progressed. This report therefore details some findings from the first wave of data collection of what is planned as a qualitative longitudinal interview study. The aim of undertaking longitudinal interviews is to consider continuities and changes in participants' lived experiences in and through time. These in-depth interviews allow for exploration of deeper issues relating to identity and technical changes undertaken in response to the energy trilemma

Interviews were broadly organised into three main sections:

1. Discussion of Caerau and residents' homes within it
2. Discussion of the planned minewater developments
3. Discussion of current everyday energy use, including how this may be different to previous generations/may change in the future

In this report we focus on data from the second section of the interviews and set out six themes that encompass the main topics of discussion; money, community, security, landscape, practicalities and the longer-term. We use quotes from participants throughout to illustrate points, all names are pseudonyms with the exception of Fiona (the interviewer).

Money

Perhaps unsurprisingly, financial concerns were at the forefront of most people's minds when discussing the scheme. The majority of people said that their main interest in signing up would be to reduce their energy bills, which many felt had risen substantially in recent years.

I think that the cost would be the main incentive, with anywhere and anything.
(Joan)

I think the biggest [issue for the future] will be heating which is really why my interest is in this project because of the future needs of ours, wouldn't it be nice if we could get free on-tap, well not free but you know cheap on-tap heating is what my thinking is. So but yeah if they do their feasibility and it doesn't turn out to be cheaper then I don't know, I still think it should be done but my selfish need for it probably wouldn't be you know as much because I'd be looking to save money really. (Doug)

Yeah. I think it would depend on, on how much, if any, initial outlay was. And obviously if it's going to cost us more than the gas we're already using, then, it wouldn't make sense for us, you know? I mean, mm, it, it sounds like a good,

green solution, to the problem, but I think with neither of us working at the moment, um, I think it would have to be really economically sound as well. Um, because we can't afford to be green without being economical. (Jenna)

That's over the wall in the mornings, that's when we moan about our electric and gas bills, and, do you know what I mean? ... It's like oh the winter's coming, the gas is going to go up. That's all we have now. (Dawn)

I don't think it will go down very well if there's no money saving with it, I think it's going to be all to do with the money and whether you can save people a bit of money and I think that would be the only way you will get people to swap. (Jay)

These quotes suggest that participants saw the scheme as beneficial for longer-term futures (an issue we return to later) but it would need to make a short-term financial impact for them to be convinced to sign up. Some people in the community thought that the minewater scheme would provide them with free energy, which led to concerns that, because money was such an issue, residents would sign up to a scheme providing them with reduced cost energy without properly considering the potential risks of the project.

Many people made connections between the minewater scheme and the local wind turbines. There were mixed views about the turbines, but there was some resentment that an energy source so close to the community was not producing any tangible benefits directly for the community. Subsequently, it was seen as important that the minewater project did make this direct link. It was also seen as difficult to justify why the scheme could potentially cost people more when it was a local source rather than imported from outside the UK.

I think people would look at it and think it should be cheaper because it's coming out of the ground and isn't involving oil or anything like that. I think the financial, I would think the people that I have spoken at the minute see this as a way of making savings, because energy bills are so high. I don't think they are seeing that their fuel bills are reducing drastically now the wind turbines are working. They're only testing the one at the minute that is actually functioning properly, the one only started a few weeks ago so they see things changing but they're not seeing their bills reducing and I think that's the main driver to people at the minute. (Pamela)

In contrast to those who would not sign up to the scheme unless it would offer financial savings, others said that they would still consider it if their bills would be the same price because they saw other benefits to the scheme. A small number said that they would even be prepared to pay a bit more for energy from a local, renewable source.

I would probably, if I could, through our energy suppliers if they could guarantee all of our energy was coming through more renewable sources I would happily pay more than we're paying because... I would pay more if I knew it was coming from renewable sources all the time. I'm not sure how many other people would (Mark)

However, even those who were prepared to pay more felt that the majority of others in the area would be unlikely to feel the same, as concern about current fuel bills was at the forefront of people's minds.

But not if it's the same price, it don't matter if it's from the local area sort of thing, it's just the hassle of changing over and doing everything, you're better off staying the way you are. (Amanda)

As miners had been entitled to a coal allowance throughout their lifetime, several participants spoke about previous generations not having to worry about fuel costs because they had a free, local source of energy. This means that fuel poverty was seen as a more pressing issue for current Caerau residents than it had been in the past.

PAUL: Yeah, that's, that's what it is in a valley like this because from Croeserw, Caerau down to Maesteg, they used to go and get their own coal, you'd have women up there with carrier bags, all women, like we was talking the other day with our neighbour, his mother lives across the road from us, and they'd always be up there, and the house was always boiling, do you know what I mean? And they took all the fires out then, and it's like, all struggling now, you know what I mean? They miss it like.

DAWN: And it's not a rich place. It's not, Caerau's not a rich place. It's not going to have loads of rich people here, we're just getting through. We're just getting by, you know. So, you know, that's just, so I don't think, I think everybody would jump to it if it was, a lot less like.

Several participants queried whether any initial outlay would be required (e.g. drawing comparisons with having to purchase solar panels) and thought that nobody in the area would be able to sign up to the scheme if this was the case. There were some queries and scepticism about how the scheme would be paid for.

An, right, so it's costing us basically then, because we're rate payers and it's going to cost us ... Where are central government getting their money from? London? Where do London get their money from? It boils back to us. (Alec)

Residents' position as homeowners or renters has an impact on their ability to connect to the scheme. Some were concerned that this meant the most vulnerable would not end up benefitting.

CAROLE: I think it probably will pay better for those people who aren't probably going to go for it. It would be better for maybe those that are renting or what-not. And also, I think some elderly people they tend to heat the one room and not the whole house and I think it might be better to have the whole house heated, but it's whether those people will actually go for the change.

FIONA: **So what makes you think they wouldn't go for it?**

CAROLE: Because sometimes elderly people [laughs] they don't like change, they don't you know they're a bit afraid of something new and trying things. And also I think the tenants who it would definitely benefit more probably have to ask the permission of their landlord but they're the ones that don't seem to be bothered.

Those in social housing were more positive about landlords being interested in connecting than private renters were. Reassurances about how contracts would work for the property if occupancy changed would be required for people to sign up in these contexts.

An additional issue for those in rented housing in particular was the current use of prepayment meters. Although often seen as problematic as a more costly way to pay for energy, several of our participants spoke about valuing the meters for helping them to budget, for example, being able to buy £10 of gas and knowing this would last the week. Some expressed concerns about moving to a quarterly billing system as they felt they would be more likely to get into debt by becoming further removed from energy spending. For people on very low incomes this could be a significant concern.

DAWN: I think you get used to a routine now, so you know what you've got to put in to last you now, so I think, once now that I'm settled with it, I don't think I'd ever change back... because I know how much I've got to put in a week and I'm right then for the week. So I think it's getting into that routine with it then once we do that it's fine, like...

PAUL: Because like with ours now, if it runs out, it knocks off, we'd have not more gas or whatever, but with that it keeps on going, and it keeps adding the money up... So you get into difficulty then. So you'd have to change back then to prepayment.

DAWN: You can get back into debt can't you with that, like, I think.

- ❖ **Financial concerns are pressing for many in the community, which means some residents would be unlikely to sign up to the scheme unless they could see a reduction in their bills**

Community

The mines still played an important role in community identity, particularly amongst the older generation. There was some nostalgia about what the community was like in the mining heyday as a thriving local town (as discussed in the introduction) but many people described the difficult working conditions, and resultant health problems experienced by family members. Several of the men spoke about how their fathers had been adamant their children would not work in the mines and they had been encouraged to look for work elsewhere. The collieries were also described as ‘deep black scars’ spoiling the appearance of the area, creating pollution and causing health problems. Therefore, several people saw the mine closures as positive (at least retrospectively, if not at the time) in terms of improving the environment.

Using the mines as an energy source again drew some parallels with the situation when the mines were providing coal for the community, however, this could lead to misconceptions that the mines were being re-opened for coal (this was clarified during the interviews). Because Caerau had experienced the negatives that come with being a mining community (pollution, health problems) and subsequent mining closure (unemployment), everyone felt that the scheme would be beneficial in bringing the community some benefit from the mines.

Because if my, if my father was here, he'd say, I've worked all my life down the coalmines, I've put a lot of, lot of energy and effort into it, so why can't the community receive some benefits, other than from getting the coal out. It's lying idle there at the moment. Is it not? There's nothing been done there, so why not use something that's not going to cost that much to provide heat for the area. (Alec)

So I think that's the reason that people know because this is still an area that would think of having been a mining area... So I would think they would look at that and think the families over two centuries have given their all to working in the pits and their lives sometimes to working in the pits, get something back. I mean that's the feeling I have got from people was if it's there, use it. (Pamela)

It's something, because it's in our, in our genes, isn't it, like our grandparents went down there, I think it should be used in respect for them as well, so that's using it for something, isn't it? Obviously they're not going to put people back

down the mines, because it's not, it's not, no health and safety or nothing down there, so obviously it's not going to work, but this, I think it's brilliant. (Dawn)

I think it's good, a lot of the men up here worked down the mines for years and now they're just all blocked off so using them again it's like bringing old things back to Caerau, it's like years ago that was people's livelihood the mines so although they're not going down there to get coal again the fact of it being open is like bringing something old back, that's my opinion anyway ... the mines are just sitting there doing nothing or they could be useful and possibly helping people out. So I don't know I just think it's a good thing. (Leanne)

Everyone saw one of the main benefits of the scheme as using a resource that was otherwise lying idle. This was seen as positive by being efficient/avoiding waste. In some cases this led to participants drawing parallels with fracking (which itself gave rise to a range of opinions) as using an untapped local energy source, although all the participants understood that the minewater scheme was not the same as fracking.

Because the mine workings were already there, it was not seen as controversial to use the site for energy in a way that establishing a completely new site might give rise to concern. Although some residents close to the site were concerned about potential impact to their properties, for example caused by subsidence, and who would be responsible for rectifying this. Despite several participants knowing of accidents and fatalities in the collieries, there had been no large scale accidents that meant it had associations as a site of tragedy (such as Aberfan or Black Vein). It was felt that it would not be possible to establish a minewater heating scheme in such communities because the mines had such negative associations.

Beyond potential benefits for the individual householder, we were keen to explore whether participants saw positive outcomes for the community. One of the important things was by being the first community to have this technology they would be seen as pioneering, helping to 'put Caerau on the map'.

I want mine water, the only one in the country, warming my house. I mean you've got the bragging rights haven't you? ... Oh it would be, well its headlines innit? For a small mining community in Llynfi Valley in South Wales have just tapped into something we didn't that was there, and it's working. (Len)

Yeah, yeah, there's always a sort of um, what's the, what's the local, what's the local slang, cred. We got, yeah, we're the first. It's good. (Alec)

However, the reverse perspective to being seen as pioneering was that by being the first ones to have the scheme, Caerau residents would effectively be guinea pigs for an experimental technology.

Because, by the time, if you build one here and you test it, then it'll probably be less efficient than if you build one, then the next five come along, because they'll learn from their mistakes, so whether or not then it means they then have to dig everything back up and redo what the new ones are doing, it's like with anything isn't it with technology. You get the first ones always a bug. You always find out all the bugs ... So there's pros and cons to being the first. I think. (Debbie)

Some residents felt that as a deprived area, Caerau often had things done to it and there were not the same sanctions or restrictions that would be applied in other areas of the UK. This led back to the notion that the community should have direct benefit from the scheme and not be exploited as a test bed for others to benefit instead. This was emphasised on a number of occasions (again parallels were drawn with the wind turbines).

The scheme was seen as being a way to potentially improve the reputation of the area, which some residents felt could lead to increased investment in the community more generally. The main benefit that this was seen to offer would be increased employment opportunities, which the minewater scheme itself was seen as unlikely to provide. Most residents felt that the installation and maintenance of the minewater heating technologies would need to be done by specialists and would be unlikely to bring any direct employment opportunities to Caerau. Because the area is currently seen to have a poor reputation, some residents raised concerns about technical equipment being stolen or vandalised².

The first thing I just thought of was because Caerau is generally known for crime, that's the only concern that I would have is that it would [laughs] things would be nicked. (Serena)

Yeah, I think, yeah, I think it could be really good. Um, and it could, it could start to dispel this, this rumour about um, Caerau being really rough, as long as, you know, the, um, because I think Noddfa chapel, I think they created a BMX track somewhere, and I think that got broken into, and destroyed, so, I think if they build, you know a giant water pump, and somebody scribbles twat on the side of it or something, I don't think it's going to help Caerau much at all (laughter). (Jenna)

² Around the time of the interviews there had been several incidents of vandalism at the BMX track and Caerau Market garden, which were publicised on social media

Another potential concern at community level was that not all Caerau residents would be eligible to connect to the scheme. Initially, only households within the designated area (see figure 1 on page 3) would be able to connect. Some participants thought that this may create tensions within the community, particularly in relation to the Caerau Park social housing estate, which is outside the test area. However, most people felt that these spatial boundaries would not cause tension as people could understand why these restrictions would be in place. Participants were more concerned that if there was any sign-up fee/initial outlay then this would create a wealth divide, which would be much more likely to lead to resentment.

Several participants saw a generational divide in the community, with younger people depicted as those most likely to benefit from the scheme, but also those who may be least aware or interested. Conversely, older people were described as being more likely to take pride in the area and see the scheme as an extension of that, but less likely to benefit due to being concerned about disruption or long-term commitment (issues we return to later).

- ❖ **It is important to residents that the scheme provides direct benefit to the community and helps to improve the reputation of the area**
- ❖ **The scheme needs to avoid causing division within the community, which could potentially lead to resentment and vandalism**

Security and safety

As discussed, participants were overwhelmingly positive about having a local energy source. Some explicitly articulated concerns about the current vulnerability of a UK energy system reliant on imported oil and gas, or on European owned nuclear power stations.

I think you're going to have to go that way anyway because eventually for whatever reason gas, coal all that sort of stuff won't be available so the sooner the changes are made I think the sooner everybody will get used to it. ... I think it will have to eventually yes so the sooner we start looking at the ways of doing it I think you know the more we'll be prepared for when it does you know if Russia turns off the gas pipe like they keep saying they're going to, you know we'll have to do something else. (Doug)

We've still got big, big, er, power stations working throughout the country, haven't we? And these atomic ones. I don't like those. Er, too dangerous. Too dangerous to have in the country I think. And they're all owned by France. By

different countries. We don't even own, not one kilowatt of it, and we're being charged for it. I get quite upset, (Terry)

Having a local energy supply was also seen as a more sustainable and 'environmentally friendly' option, as well as potentially making people more aware of where their energy comes from, which was seen as beneficial.

Well that just, I don't know it just seems so much nicer the fact that it's just down there. It's like you feel a bit more connected don't you rather than it just coming from somewhere that you're not really sure about or you don't really know, you just don't know ... You don't know where it's come from, you just take it for granted don't you? You're like oh well we just have power, our lights are on. Like you don't really think I wonder where that has come from. (Serena)

As the scheme would be replacing gas central heating, this led to conversations about gas and how participants currently feel about their existing energy supply. Some participants discussed the possibility of having a heat pump instead of a gas boiler but felt that this would be unappealing. Gas boilers were seen as an investment, with people who had recently upgraded theirs seen as unlikely to want to change their heating system for a new and uncertain technology.

Especially people who own their own houses, well there's a lot of people around here who have new boilers going from the old ones where you've got to warm your water for half hour to the new upgrades, well I couldn't imagine them wanting to get rid of that ... my father have just had a new boiler and I just couldn't imagine him getting rid of that, and he spent a lot of money on it. (Jay)

I mean until we know the hard facts on everything then you know, myself personally I wouldn't want to dip my foot in the water until I knew. It's a step, because you're stepping out of your comfort zone, you're using gas, you know...like there's people saying, 'I know where I am with my gas' but then you've got to look at it from another point of view and say, well, sometimes you've got to make that jump to know that you're going to benefit from it. Sticking to what you know isn't always one hundred percent, you've got to jump sometimes. Yeah, if you jump and it goes wrong, you can go back but yeah, it's something new isn't it. (Jessica)

Whilst some praised the convenience of gas and expressed that the minewater scheme would need to match this, several people raised concerns about gas being unsafe and were interested in the minewater scheme because it was seen to offer a safer alternative.

Lack of gas. I always sort of think when you've got any sort of gas there's a slight risk ... I'm not expecting it to be free, I don't think they're going to come and, you know there is always going to be a cost. But if it was in any way comparable I'd go the all-electric route rather than having a gas boiler sitting there because there is, doesn't matter what you say, there is always a risk with gas and then as I said I always put it on my thing every year, service the boiler, but it takes me several weeks to get around to arranging it and to be in at the right time and things like that so. (Carole)

However some raised concerns about safety in establishing the scheme in relation to gas, suggesting that methane could be released during the test drilling process.

An important issue for participants was the reliability of their energy supply. Current gas and electricity provision was seen as very reliable and participants contrasted this with power cuts that had regularly been experienced in previous decades. It was therefore seen as vital that the minewater scheme provided a reliable energy supply as this is what people had come to expect.

As long as there is an alternative if it doesn't work one night when it all clicks into gas or electric or whatever. As long as the house's got a thermostat on it whereas an old dear or somebody my age needs to be 18 degrees and all of a sudden they're down to 10 because the only source is the water coming from the mine. You know just saying that it will happen and this is the future and then you can build a row of houses which are heated by the water coming from Caerau colliery, it's got to be tried, tested, absolutely guaranteed waterproof that it will not break down, ever. I mean ok we have power cuts, you can have electric power cuts and you can have gas cuts you know but it's rare. But if your entire heating system is reliant on an untried scientific experiment I'd be worried about that. (Len)

I don't know an awful lot about it but I would be concerned if something went wrong with the pump if it was only coming from there, would the whole valley go out? You know not just one house whereas with the gas now one house will go out, ok with electric it could be the street, but with the gas it's usually only one house will go out but if you're talking about a whole street being without any heating, cooking, anything, that's like [laughs], or the whole valley! (Joan)

Several participants were aware of the unsuccessful Wildmill district heating scheme in Bridgend and used this as an example to illustrate the importance of a reliable heating supply.

Because they had a project in Bridgend, a long long time ago, it's a bit of a legend now, called Wildmill and it's a pretty big estate just outside Bridgend and they had a central not generator what we'll call it, anyway there was, I don't know what the heating means was. But they were going to heat all these houses so these people would have literally free heating, but it never worked. It was always

conking out, it was always breaking down and people were cold, people's houses were warmer than other people's houses etcetera etcetera. (Len)

Related to this were concerns about maintenance of the system and who would be responsible for fixing (and paying) for it if anything went wrong. Because people would not know how to fix a problem with the minewater system in the same way they would with their gas central heating (i.e. calling a plumber) then they wanted reassurance about how this would be dealt with.

Yeah it would be interesting to see when maintenance costs and things like that because at the moment we get our boiler serviced every year and then if it brings down they'll come out and fix it you know? So that to me again is something that's a necessary so it will be interesting to see what sort of, well I don't know I'm assuming it will be like an annual charge for the maintenance of it or maybe they would just lump it all in with the cost. (Doug)

I would be concerned about having it for the simple fact that I have been let down so many times. Unless there was some sort of backup system that you keep your general heating source as a backup, even, because I haven't got a coal fire, so if that central heating broke down, you know, it's like a gas boiler really isn't it, you know. What would happen then? You'd have to rely on somebody else then to come and fix it where if, because I've got my own property, if the gas boiler breaks down, it's my responsibility and I know that it's going to get fixed because it's my responsibility but if somebody else had that responsibility of coming to pump hot water into my house and they've been left, you know, I've been let down in the past through this thermal, it's the reassurance really of it being fixed and there is no guarantee on anything these days, on jobs, on maintenance, or anything like that, it's solely on the individual, I think personally. (Angela)

Similarly, if there was any damage to properties due to the scheme – several people raised concerns about potential subsidence – residents wanted to know how this would be rectified and paid for.

- ❖ **The scheme needs to provide a reliable and convenient energy supply, with clarity on how it will be maintained. With these things in place it may be appealing to people as a safer and more secure alternative to gas**

Landscape

Residents described the local landscape as beautiful and scenic. Indeed, the outdoor environment was one of the main attractions for those who had moved to the area. There appears to have

been a lot of effort in recent years to improve the local environment e.g. by planting trees and establishing a walking route on the old Coegnant colliery site. It was therefore seen as important that the minewater scheme should not impact on the appearance of the area³ beyond the initial construction/set-up phase.

Will there constantly be an hole there now? Or are they going to I don't know, find a way to close it up and still, I don't know because if something is down there, I don't know. But like there's dogs running around by there, my dog is running around there, like if I go out on the field because the field where they're drilling is directly my house so if I go out on the field they'll run around and they'll run in the bushes and obviously if there's a hole there that's a bit panicky like. (Leanne)

Residents regularly walked their dogs in the Caerau colliery area (with reference to the washery in particular) and were concerned about being able to continue doing this as it was a key way of enjoying the local environment. It was also seen as an important area for local wildlife, which was seen as crucial to protect.

And how about the impact on wildlife and things, would that be you know, and are they going to like cordon off bits out there, because at the moment I take the dogs up the mountain, walk round the mountain and back down without any you know, I'm not trespassing ... Because there's loads of wild birds out there as well, I've seen a red kite out the back, which you don't see very often ... I'm quite interested and I know that you, you don't want them destroying furry things do you? (Debbie)

Whilst it was a frequently used area for walking, some participants also raised concerns about it not being particularly safe. Therefore they thought that potential improvements to the area as part of the minewater scheme would be beneficial.

And the thing is as well I think there is a lot of, because obviously there has been because of all the mining work like you walk up onto the mountain and it's got loads of signs like 'be aware like the ground can open up' and there are holes everywhere and you've got to be careful and I think putting it to use is, because it feels a bit like everything has just been shut down and kind of forgotten about and I think yeah, and if you can do stuff like this then definitely all for it. (Serena)

It would probably help the mines stay a bit safer, if the water is sitting down there and it's not monitored it can move around and that's when you get things like mine collapses and that but if they're actually using the energy from it they're

³ Some felt that the wind turbines had had a detrimental impact on the area's appearance, which is why they saw them as controversial

more likely to be monitoring what's going on down there, I'm sure that's got to be a positive really. (Mark)

Most people were willing to put up with some disruption at a community level, providing that it was short-term and that they would see the benefit of it at a later stage. Whilst digging up roads to install new pipework was seen as inconvenient, it was something that residents felt happened relatively frequently anyway and so would not be enough in itself to put people off the scheme, although it might lead to some complaints. Disruption at a household level was seen as more problematic.

PAMELA: I think they would have to be convinced that there was a benefit to signing up but also I would think they would have to see that there wouldn't be too much disruption involved in being included in the project. You know if you were to come along and say they've all got to have their boilers changed and they've all got to have this changed, I think people will start backing off but what I gather is that that's not the case.

FIONA: What about if it was more disruption at a community level rather than a household level you know someone else mentioned digging up roads to puts pipes in...

PAMELA: We are constantly digging up the roads here ... The roads here are in such poor condition, if you're going to improve the road after you've dug it up, put it back down and done it it's probably an improvement.

Several of the older residents felt that they were 'getting too old' to cope with domestic disruption, and therefore would be put off the scheme if it meant a lot of upheaval making changes to their property. During the interviews the researcher raised the need for houses linked to the scheme to be as efficient as possible, which could mean potential retrofitting work. Residents would be happy for changes to be made to their properties to improve efficiency (with the exception of internal cladding, which would make the room smaller) but felt that they had already made improvements in this vein and were not sure how much more could be done. The issue was different for those in rented properties who were unable to make improvements to their homes, but would like them to be more efficient.

- ❖ **The outdoor environment is important to residents, who want to continue to access the space around the colliery for dog walking**
- ❖ **Disruption at a community level is less problematic than at a domestic level, particularly for older people**

Practicalities

The previous sections have touched on a number of practical issues that residents wanted reassurance about before deciding whether they would connect to the scheme (reliability, disruption etc). Fundamental to many of these was scepticism that the scheme was technically possible, or that it would be realised in the near future.

I think it sounds really complicated and I genuinely believe it might be more work than what it's actually worth, seems like it is, and are people going to save that much? So I don't know, I don't know if there is any point in it to be honest with you. (Jay)

It doesn't seem very realistic to me, to be honest with you. If it's warm underneath the ground, as soon as you take it out of the ground and into the pipeline, if those pipelines are not insulated really good obviously then the heat is getting lost. (Angela)

CHERYL: It's a new idea and I reckon there's a lot of dubious feelings about it.

BOB: Maybe we'll be in our graves before it comes out.

FIONA: What kind of sort of dubious thinking would there be about it?

CHERYL: How can it work you know and all that business you know how are they going to manage to get water up here and heat homes?
...

BOB: Yeah but it's ok saying it comes up very well, but when it comes up it's cold so they'll have to have a machine on top to warm it up again won't they?

CHERYL: No, you'll have a pump see and they'll use a pump.

BOB: Yeah, I know a pump but it's hot water coming up, by the time it comes to the surface it will be cold, that's what I am saying.

FIONA: That's what you kind of imagine; they'd have another issue?

BOB: Yeah then the hot water lovely coming out of a pit yeah but by the time you get to our house or their house.

CHERYL: No but they will have a pump see heating it.

BOB: I know, they'll have heating I know what you mean yeah but by the time it comes from the pump to us it will be cold again. I don't know, I'm just being negative.

These sorts of discussions, where residents expressed scepticism and confusion to the researcher or one another, highlighted that it was a difficult concept to understand, with residents stressing the importance of communicating what is going on. However, some suggested that people would not need a comprehensive understanding of how the scheme worked; just to know that their bills would be reduced would be sufficient to generate interest.

And the, so I don't really understand it, and I think it's quite a hard thing to grasp, because, if the, if the minewater is 13 degrees, I don't want my house being 13 degrees, I want it to be sort of 25 ... I found it quite tricky to understand. (Jenna)

I don't understand how my TV gives me little pictures on the box, but I just accept the fact that that's what it does. So do you think people would just accept that, this is going to heat, you're going to have hot water, and your heating will be at this temperature? (Debbie)

People's ability to understand the scheme also related to discussion about the smart control system that the Energy Systems Catapult hope to install in homes of residents who sign up to the minewater heating scheme. There were mixed views on this, with some residents enthusiastic about the greater control that they imagined such a system would give them (such as being able to operate heating remotely), whilst others could not see the benefits, saying such a control system would make things more complicated and use more energy.

I mean, if it's going to tell me you owe me that much, or it's going to say, you should knock it off now or leave it, I won't enjoy that. I'd rather, I want to be in charge. If I've got an on and off switch on it, that's, I'm happy with that. ... (Terry)

For those who did not like the idea of smart controls, this alone would not be sufficient to put them off connecting to the scheme. Younger people in particular were enthusiastic about the smart management system, describing it as 'cool' and feeling that it would appeal to other young people. Several residents thought that older people might struggle to understand the smart control system and, combining this with misconceptions about the minewater scheme, may be reluctant to use their heating system. For example, because everyone would be connected to the same heating network, there is the potential that some residents may think that the way they control their own property's heating will have an impact on the rest of the network and therefore be reluctant to alter their heating settings. Concerns about impact on one another were also raised in relation to the decision to have a central heat pump, or smaller heat pumps at individual properties. For example, some perceived that one heat pump would be more efficient, whilst others felt that multiple pumps would allow for greater variation in household heat use. This points to a number of uncertainties and misconceptions that continue to surround the scheme.

Interviews covered the prospect of having a long-term contract for the minewater scheme, so they would effectively be tied in to a heating supplier. Some people saw this as unproblematic, as

they would rarely switch energy supplier anyway. For others, a long-term contract raised concerns. In particular, renters felt that they would not be able to take on a contract themselves as they would not be able to move it to another house (i.e. in the same way that a Sky TV contract could be moved) and would therefore be reliant on their landlord taking it on, which they might not see the benefit in doing. There were also concerns that older people could pass away during the time of the contract and they were unsure of what a connection to the scheme would mean for relatives trying to sell their home.

- ❖ **The technicalities of the scheme are difficult to understand and this can lead to scepticism about it coming to fruition**
- ❖ **Residents need more information about whether a connection to the scheme would be seen as an asset (i.e. like solar panels) when selling the house, in order to sign up for a long-term contract**

Longer-term

In this final section, we explore some of the opportunities that residents saw the scheme potentially being able to provide beyond the current community and for future generations. Some residents felt that having a local heating scheme may help to change perceptions of renewable energy, which currently seemed to give rise to mixed views in the community.

It could help change people's perceptions and say oh because of this renewable energy thing I'm getting cheaper heating they'll think of well perhaps renewable energy is not the devil, but they seem to think it is at the moment. (Mark)

Several people thought that it was important for school children to benefit, beyond the primary school being heated by the minewater scheme (which there are currently plans to do). The importance of educating children about the scheme and renewable energy more generally was stressed by several participants. In addition to benefitting the primary school within the test area, there were suggestions for an educational facility that other schools could visit to learn about the scheme.

What would be quite good as well, if they did build it, is to have some kind of educational facility there, um, so that they can get the local school children involved in ecology and, you know, outdoor, you know energy sort of saving, renewable energy and things like that ... I think if it, if it could have something like that alongside it, then they would be sort of killing two birds with one stone,

really. They'd be, you know, the community will benefit, the children will benefit from learning. (Debbie)

Whilst children were the main focus in learning about the scheme, some saw opportunities for local organisations to capitalise on the pioneering aspect of the project and help to train people to undertake similar projects elsewhere.

it would be really good if, if places like Caerau Development Trust and that were involved, to help train people to learn more about um, renewable energy, and so that, not only could Caerau be the first place in the UK, sort of, or one of the first places in the UK to have it, but we could start producing um, you know, um...the engineers of the future and stuff, and I think that it could be really uplifting, yeah. (Jenna)

This was another way that the scheme was seen as potentially being able to improve the reputation of the area.

Finally, some residents spoke about not necessarily expecting to directly benefit from the scheme themselves, but would consider connecting because they saw it as a positive step for future generations, who will have to make more use of renewable energy.

Oh yes, yes, it would. Um, I, it, it's a great idea, because I believe in renewable energy, simply because it affects the planet, the old um, coalmines and oil and the gas. I know it's going to run out eventually. Perhaps, not always, you know, in my life, my life will be gone by the time all this is about, but coming to my grandson's, and you know, and his sons, perhaps, or what have you. It's going to run out so we have to find something to replace, or renewables, yes. That's how I, it, it's a good idea, alright, when I talk about the cost ... I think, I, I could, um, pay more, for the short term, and as I say, it won't benefit me. But it'll benefit my grandson, and his children beyond that. So initially I, I would expect to pay a little more. But not, like too great deal, you know. (Alec)

I just think of my kids and my grandkids, and my grandkids' kids, because I think if something's got to change for them to keep on going, so this all what you're doing is some kind of change. (Dawn)

- ❖ **Beyond short-term advantages for the individual householder, residents were keen for the scheme to benefit future generations in a number of ways**

Summary

This report has outlined some of the main concerns and anticipated benefits that participants talked about in relation to the proposed minewater district heating scheme. Until the results of

the test drilling and feasibility study, many uncertainties about the scheme still remain and residents will need further information before they make definite decisions about signing up. Most participants were generally positive about the scheme and felt that there was positive feeling towards it in the community more generally, although it may be that those who were uncertain or against the scheme were less likely to want to participate in an interview to discuss it. Interviews that took place after the test drilling had commenced uncovered more negative opinions about the scheme, although several people commented that the drilling itself had not been as disruptive as anticipated. We reiterate that this report is not intended to be representative of all local residents' views, but to give an insight into the diverse concerns and benefits that residents have spoken about to date. The importance of communicating with local residents about the scheme was stressed by participants on a number of occasions, with a range of views on how this had been undertaken to-date and might best be undertaken in future. In general, designated meetings were seen as only reaching a small section of the community and information posted through the letterbox was thought likely to go unread. Communication via social media (particularly Facebook), local events and knocking on doors was thought likely to be more effective, although the latter runs the risk of being perceived as intrusive.

Residents saw one of the main benefits of the scheme as potential saving on heating bills, which seemed the primary way to generate interest in the scheme. Other major benefits included using a local energy source, which would otherwise go to waste, meaning that the mining site would give something back to the community. The main concerns about the scheme centred on reliability of the energy supply (including repairs and maintenance) and residents' ability to understand and control their heating in the same way that they currently do with gas.

Returning for further interviews after a period of approximately 12 months will enable us to explore whether residents' views change as the technical developments progress and they receive more information about the scheme. This is one element of our wider work to consider continuity and change in participants' lives through time, exploring deeper issues relating to identity and technical changes undertaken in response to the energy trilemma. In outlining some of the main issues raised by our participants at this early stage of scheme development this report is intended to provide initial insights for those involved in technical work and public engagement roles in relation to the minewater project. More extensive analytic work on broader aspects of the data will be undertaken by the team in due course to inform further publications.

Summary points

1. Financial concerns are pressing for many in the community, which means some residents would be unlikely to sign up to the scheme unless they could see a reduction in their bills
2. It is important to residents that the scheme provides direct benefit to the community and helps to improve the reputation of the area
3. The scheme needs to avoid dividing the community, which could lead to resentment and vandalism
4. The scheme needs to provide a reliable and convenient energy supply, with clarity on how it will be maintained, which may be appealing to people as a safer and more secure alternative to gas
5. The outdoor environment is important to residents, who want to continue to access the space
6. Disruption at a community level is less problematic than at a domestic level, particularly for older people
7. The technicalities of the scheme are difficult to understand and this can lead to scepticism about it coming to fruition
8. Residents need more information about whether a connection to the scheme would be seen as an asset (i.e. like solar panels) when selling the house, in order to sign up for a long-term contract
9. Beyond short-term advantages for the individual householder, residents were keen for the scheme to benefit future generations