Future Energy Landscapes Workshop

Chilbolton: Thursday 26th February 2026

This report summarises what happened and what residents of Chilbolton, and those visiting from Wherwell, Broughton and other neighbouring parishes, said during the Future Energy Landscapes workshop in February 2026. It cannot be assumed to be representative of the full range of opinions in the local community but is an accurate record of this important conversation.

Please read through this report and provide your views via our short survey HAVE YOUR SAY About Chilbolton Future Energy Landscapes Workshop – Fill in form

Workshop Background

The Centre for Sustainable Energy (CSE) developed the Future Energy Landscape workshop to enable communities to have informed conversations about their understanding and feelings about renewable energy technologies. Using data[1] and research into what technologies might be applicable to the area the workshop supports a hypothetical conversation about what scale and types of projects might be acceptable to local people and what impact would those technologies have on their local energy needs.

The workshop was funded by the South Downs National Park Authority (SDNPA). The objective was to ensure communities (in or near the SDNP) are part of creating a local vision for sustainable energy enabling them to play a part in shaping ambitious plans as we transition away from fossil fuels.

Why the Future Energy Landscapes workshop?

- Transforming the way that we generate and use energy is key to tackling the climate emergency.
- Generating more energy from renewable sources, so we produce less carbon is key to a transition away from fossil fuels.
- Communities need to be better informed about low carbon renewable energy technologies.
- Local people need to be consulted about the energy transition towards renewable technologies and supported to have informed discussions about the different solutions.

[1] See **Appendix 1** for details of the data, research and assumptions that have been used to build this workshop.

- Community energy should be recognised as an essential component of our energy transition, so local communities benefit from renewable energy generation.

Workshop summary

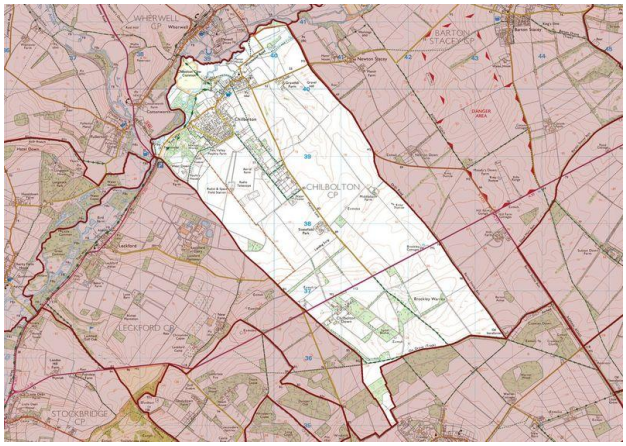
Workshop purpose: To explore the question '***How might Chilbolton power its community using locally generated renewable energy?'***

Workshop boundary: These workshops usually use the civic Parish boundary to pinpoint the discussion around an area that is familiar and frequented by the participants. It is an arbitrary boundary, but it is useful to focus the conversation on how acceptable people would find renewable technology in their local landscape.

Chilbolton: is a historic Hampshire village and parish in Test Valley, famously located on the River Test. It is known for its scenic Common, 12th century St Mary-the-Less church and scientific work of the Chilbolton Observatory. A peaceful rural community with a strong sense of history and nature.

Workshop process:

1. **Connect to the landscape,** considering areas that are important
2. **Learn together** about different types of renewable energy
3. Have an **informed discussion** about how we feel about the technologies.
4. Discuss if and **where different technologies might be acceptable** in the local landscape.
5. Use graphs and data, to understand how much electricity and heat the different combinations of technologies would **generate,** the impact on current local energy needs and related carbon emissions.



What was said?

After marking up maps and spending time sharing local stories about the local landscape and people's connection to it, the group watched short videos about the different renewable technologies that were locally feasible. In groups we then started a detailed discussion about the following technologies:

a) Solar Farms
b) Wind Power group
c) Domestic solar group
d) Domestic heat pumps group

Each group worked through the following questions:

- How do they feel about the technology overall?
- How much of the technology would they be happy to see in their landscape? (i.e. quantity of rooftops with solar or the no. of a particular sized wind turbine)
- Where might this technology be located?
- How does it impact the landscape? Who would this effect most?
- Is this a realistic suggestion and what might the barriers be to implementation?

Impact of different renewable energy technologies

Each table fed back their reflections about the specific technology, and where they felt, and on what scale, the technology might be located, if at all, in the boundary of the parish

The group's suggestions on the amount of each technology were inputted into the CESAR tool [2]. The CESAR tool, with simple graphs, shows how much energy is used by the local

Chilbolton in Numbers

- 1,000 Residents
- 450 Homes

[2] The Community Energy Saving and Renewables (CESAR) tool was developed by the Centre for Sustainable Energy and is designed to help workshop participants think about how they would provide some or all their energy needs from renewable energy and to see the different amounts of heat or power generated by the different renewable technologies in their local context.

community, how much carbon that generation produces and how this might change by using renewable energy technologies to generate local power.

- 2,250 MWh elec. per year
- 1,670 tonnes CO_2 / year

The ideas of the different groups and what the CESAR tool illustrated were then offered for further comment and discussion to the wider group.

Solar Farms

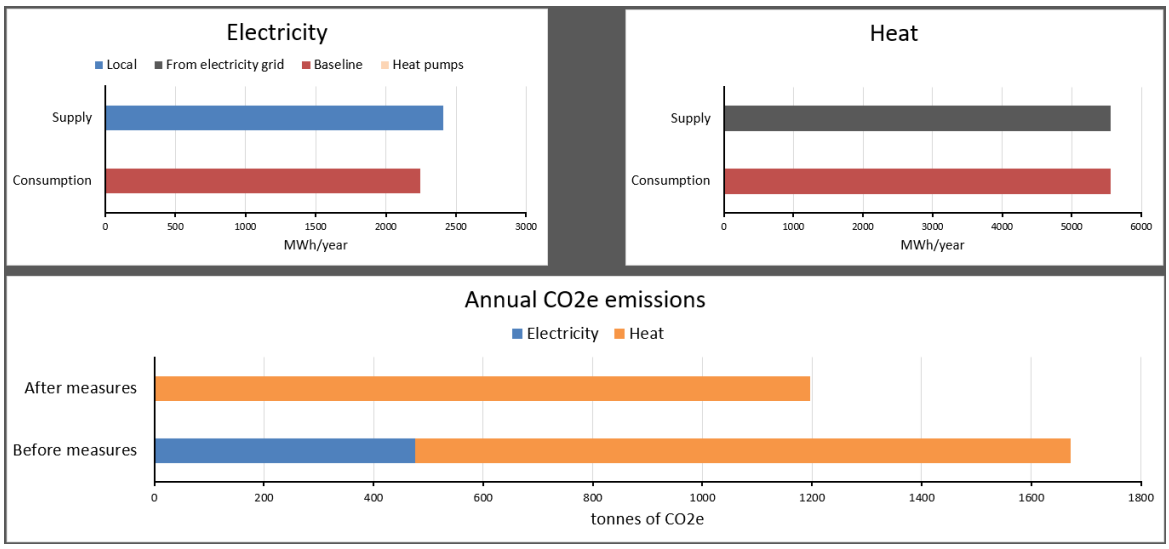
The first group explored the idea of installing 6-acre ground-mounted solar farms, each with a generating capacity of 2.5 MW. The exercise emphasised that this was a hypothetical discussion about feelings and preferences, not constrained by planning policy or grid limitations.

The group expressed generally positive views toward solar farms. The recorded acceptability score ranged between 3 and 4 out of 5, reflecting a broadly supportive attitude with some variation in enthusiasm.

The table's discussion concluded that the nominal number proposed for this technology of one 6-acre solar farm would be acceptable to meet current annual electricity use within the parish, though a second could be needed in the future to accommodate increased electricity demand from heat pumps and electric vehicles.

Several sites were proposed including Martins Lane, Betts Farm, Stonefield Park, Chilbolton Down Farm, Ivey Lane. Participants felt it was important minimise the visual impact on the village and reduce effects on valued landscape views, for example using tree cover. They also noted a desire to avoid high-grade agricultural land, although further investigation into land classification would be necessary.

The CESAR tool showed that one 6-acre (2.5 MW) solar farm would generate slightly more electricity over a year than Chilbolton currently uses. On the tool's electricity chart (see below), the annual generation line from a single solar farm exceeded total present consumption. This would result in zero operational carbon emissions generated for electricity once the system is in place and after embodied carbon has been balanced during its first 1–2 years of operation.



Impact of 1 x 6-acre Solar Farms on the local electricity supply

When the solar-farm proposal was shared with the full workshop, most people agreed that the suggested locations seemed sensible and likely to be acceptable. Several participants raised additional reflections and questions:

- There was discussion about the financial viability for landowners. Participants asked whether renting land for a solar farm would be more attractive than continuing agricultural use. The facilitator explained that in many cases it is viable and that some landowners already view solar farms as an appealing income source.
- One participant emphasised the need to avoid productive farmland. Another noted that the land quality near the suggested site was currently unknown and would require assessment.
- Several people reflected on the broader question of whether Chilbolton should contribute to national renewable generation. The group acknowledged that communities historically relied on energy being produced elsewhere (such as coal-fired power stations), but a more decentralised energy system means rural parishes may now be expected to host some generation locally.
- A question was raised about whether the model accounted for seasonal differences in solar production. This prompted discussion about the need for a mix of technologies—particularly wind—to balance Solar's winter shortfall.
- While battery storage was not part of the workshop exercise, some participants asked whether storing solar energy or directing it for local use was possible. The facilitator explained that storage for large solar farms is currently limited and that regulations restricting local electricity use are under review. There has been a campaign for the last three or four years for the Local Electricity Bill https://bills.parliament.uk/bills/3039 which would allow a link between local generation and local use. It has been resisted by this government despite cross-party support.

Wind Power

The second group explored 3 sizes of wind turbines as a form of large-scale electricity generation capable of producing significant amounts of renewable power. Large turbines (2.5MW, 140m from base to blade tip), medium turbines (1.0MW, 100m), and small turbines (500kW, 65m). Each size represented different levels of visual impact, output, and feasibility.

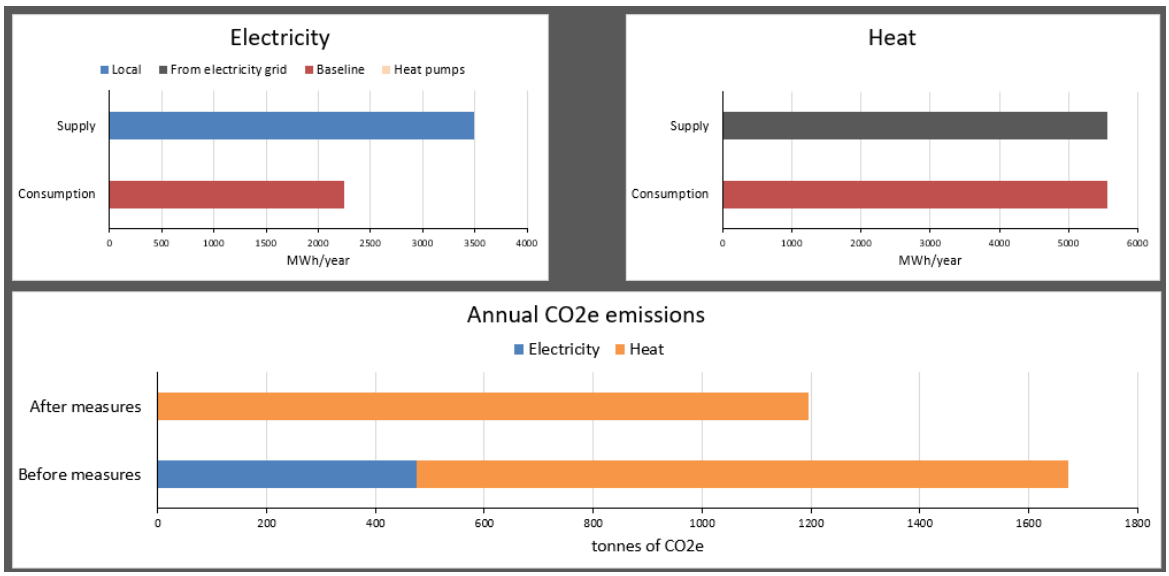
Although it was noted that wind turbines are almost certainly not feasible within Chilbolton parish because of the presence of the Chilbolton Observatory just south of the village, the group was still asked to explore the technology in principle. This allowed participants to understand the scale of potential energy generation.

The group expressed a generally positive attitude toward wind turbines in principle. Acceptability scores varied depending on turbine size: small turbines were rated at around 4 out of 5, while large turbines had noticeably lower support. The preference for smaller turbines was primarily due to concerns about visual impact, especially in a landscape with several sensitive viewpoints. Wind power is seen as an important complement to solar power due to its ability to generate electricity throughout the year and at night.

Based on the notional maximums provided (3 small, 2 medium, 1 large), the group proposed three small wind turbines - influenced by their lower visual impact and the belief that these were the most realistic option given the restrictions created by the radio telescope. The preferred location was south of the A30, where the land rises gently and might allow turbines to be placed just beyond the visual prominence of the hill. The group acknowledged the complexity of siting turbines in relation to airstrips, flight paths, and the observatory, and noted that feasibility would require further technical assessment. They also discussed the possibility of placing turbines outside the parish boundary if local constraints proved too restrictive.

When the CESAR modelling tool was used to demonstrate the possible impact of three small turbines, the resulting generation line showed that together they would produce around 50% more electricity than Chilbolton's current annual electricity consumption.

The CESAR tool also showed that because the turbines exceeded current usage, carbon emissions from electricity would fall to zero, aside from small amounts of embodied carbon associated with construction. The group found it useful to compare the land area needed for turbines with that required for solar farms: although turbines occupy less ground space, they have a greater visual presence.



Impact of 3 x small (60m) Wind Turbine on local electricity supply

The wider group shared their responses to this table's suggestion and discussed the following points:

- The wider group questioned whether local wind speeds were strong enough and whether turbines could be placed on higher ground. It was explained that it would have to be tested but that nearby areas, such as Broughton, have already shown viable conditions, suggesting the region has potential.

- Participants discussed how visible wind turbines would be, noting that smaller models felt more acceptable than tall, large-scale ones. Some suggested that grouping turbines together in one area might reduce how many viewpoints they dominate. The group also heard that clustering is a recognised approach in wind-farm design, though options around Chilbolton would still be limited by landscape sensitivity and the observatory's protection zone.

- Noise was raised as a concern, and the group was told that standard siting guidelines—typically placing turbines at least 500 metres from homes—are designed to prevent disturbance. Bird impacts were also discussed, noting that turbines in the UK do kill between 100 -200 thousand per year. However, to give a sense of scale the numbers are far lower than those caused by domestic cats each year which is estimated 40 million. The conversation also highlighted that traditional fossil-fuel power stations can cause significant, but less visible, wildlife harm, offering helpful context for comparing impacts. For example, there was a gas fired station near Fawley which was estimated to kill 200,000 fish a year on the cooling grilles

- Many participants were surprised that Test Valley has almost no wind turbines. The group learned that this is largely due to national planning rules introduced in 2016, which made new onshore wind projects extremely difficult to approve. Although

recent policy changes have begun to relax these restrictions, the effects of the previous rules continue to shape what can currently be delivered locally.

- People reflected on how wind power complements solar, particularly during winter and at night when solar output is low. The group agreed that a blended energy mix makes sense. They also noted that although turbines are visually prominent, they require very little land at ground level, allowing other uses to continue underneath. Energy storage was mentioned as an important future component, though not part of this workshop's modelling.

- Some participants were curious about small domestic turbines, but it was clarified that these generally are 3 times the price of domestic solar for the same output, can perform poorly because of wind turbulence near buildings and shading from trees, meaning they rarely offer a practical alternative to rooftop solar.

Domestic Solar

The next table discussed solar photovoltaic panels installed on the roofs of houses. Rooftop installations are generally more expensive than solar farms due to the need for scaffolding, individual installations, and wiring, whereas ground-mounted systems benefit from economies of scale. Nonetheless, domestic solar can still make a significant contribution to electricity generation and the more solar panels that can be placed on rooftops, the less need there is for ground-mounted solar farms or wind turbines elsewhere.

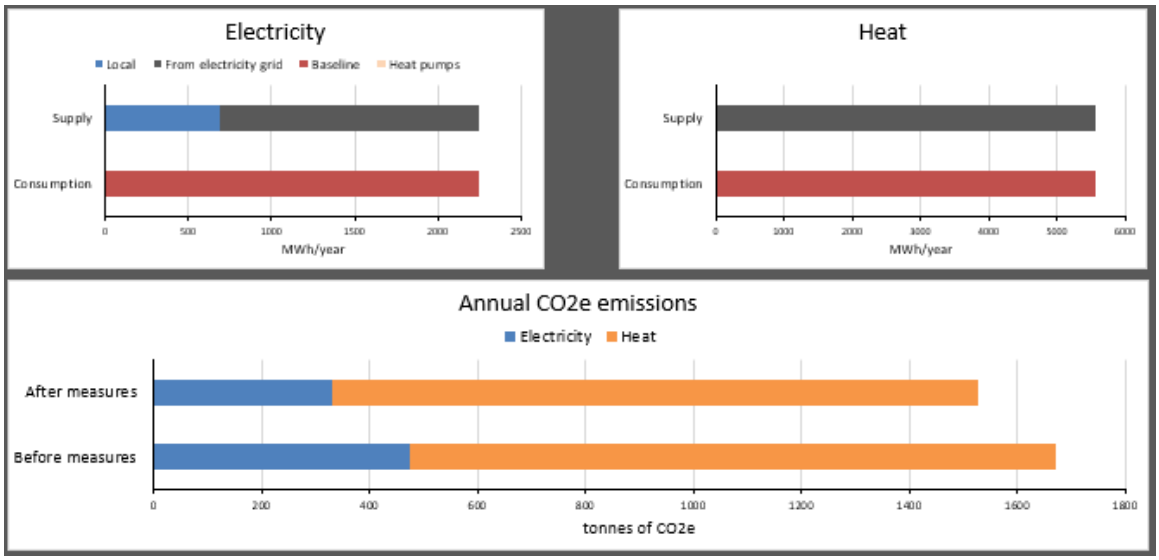
The group felt overall very positive about domestic solar rating it five out of five in terms of acceptability. It is seen as familiar and well-established, and participants felt it would not greatly affect most people visually. The table discussed how realistic the nominal 75% uptake figure proposed for the parish would be in practice.

Participants felt this was too high and opted for a more cautious estimate and proposed that around 40% of homes was a more realistic and achievable level. This is given the parish is a conservation area with installations tightly controlled. This also reflected financial constraints, roof suitability and motivation to have them.

The group also considered other potential locations for rooftop solar, including larger non-domestic buildings such as Stonefield Park, Hunt Forest Group buildings, Black Chalk buildings, Mushroom Farm and other agricultural structures, plus community buildings such as Wherwell School. These buildings could generate electricity either for their own use or potentially export surplus energy.

When the scenario of 40% of homes with solar panels was entered into the modelling tool, the resulting electricity chart showed that domestic solar would supply around a quarter of Chilbolton's current electricity use. Although this would not meet all demand

and would generate less electricity than a solar farm, the group felt this was still a significant and meaningful contribution and an important part of a wider energy mix.



Impact of 40% of local homes having 10-12 solar panels

The wider group shared their responses to this table's suggestion and discussed the following points:

- A typical solar panel is about one metre by two metres, and a normal domestic system would usually involve ten to twelve panels. Not all houses would be suitable, depending on roof orientation and other factors. East-, west-, and south-facing roofs were seen as the most effective, but it was also noted that panels are increasingly being installed on north-facing roofs. Once scaffolding costs have been paid, the panels themselves are relatively inexpensive, and north-facing panels can still generate around 50% of the output of south-facing ones due to ambient light. Modern panels now often produce up to 450 watts per panel, with some exceeding 500 watts. Panels typically last around 25 years and still produce 80–90% of their original output toward the end of their lifespan.

- Shading was identified as a significant constraint in Chilbolton, given the large number of mature trees and the presence of tree protection orders. Participants agreed that trees would not be removed simply to allow solar installations.

- Social housing raised additional challenges, particularly where the organisation paying for the panels is not benefiting from reduced electricity bills. However, it was noted that some councils are beginning to find ways to address this.

- The group also discussed financial support mechanisms, including the recent announcement of interest-free loans for solar installations, which were seen as improving affordability. There was strong support for the idea that all new-build

homes should automatically include solar panels, alongside other low-carbon technologies.

Heat pumps

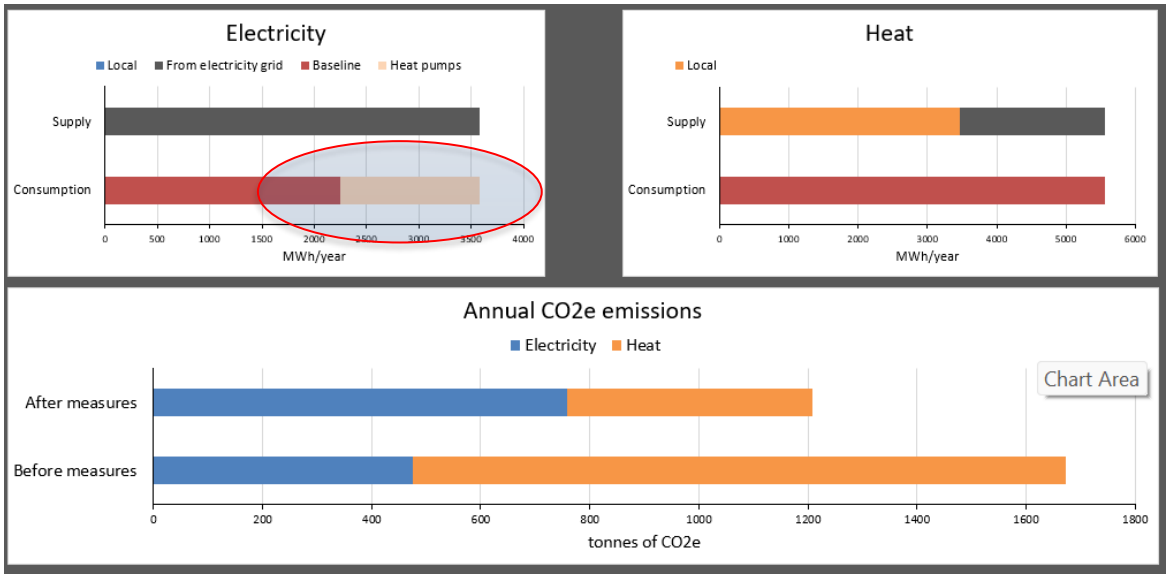
The final table at the workshop focused on heat pumps, which are low-carbon heating technologies that use electricity to extract heat from the air or ground and transfer it into homes. The group discussed both air-source heat pumps and ground-source heat pumps, noting that while the technology is sometimes misunderstood, it is already well established and widely used in other countries.

Many people around the table were already familiar with heat pumps, and several participants either had one installed or were planning to install one. In terms of acceptability, the group rated heat pumps between four and five out of five. The visual impact was generally considered minimal, though it was noted that external units can look unattractive if placed at the front of buildings, particularly in conservation areas. It was clarified that in conservation areas, heat pumps are permitted development provided the external unit is not placed at the front of the property.

The table discussed how many homes might realistically be suitable for heat pumps. A starting assumption suggested that around 75% of homes could technically have an air-source heat pump, with around 10% suitable for ground-source systems. However, the group did not settle on a precise figure. They agreed that, in principle, almost all houses could be fitted with a heat pump but highlighted that practicality and running costs would strongly influence uptake. Many homes could be adapted over time, particularly when boilers reach the end of their life, but some properties—especially those that are poorly insulated, listed, or difficult to adapt—could face higher costs or challenges.

The group discussed the importance of insulation and building fabric. There was a common misconception that homes need to be extremely well insulated to use heat pumps. It was explained that while good insulation helps reduce running costs, most homes can technically operate a heat pump if the system is properly designed. The main concern raised was affordability and the potential for higher electricity bills in poorly insulated properties, particularly while electricity remains significantly more expensive than oil or LPG.

The CESAR tool demonstrated that if 75% of homes in the parish were to have a heat pump this would significantly reduce oil and LPG usage, cutting carbon emissions from heating by roughly half. At the same time, electricity demand would increase (see area of graph within red circle), as heat pumps run on electricity. However, the group discussed that heat pumps are highly efficient, typically producing around three units of heat for every unit of electricity used, meaning overall energy consumption falls even as electricity use rises. This makes heat pumps central to discussions about moving away from fossil-fuel heating.



Impact of 75% of local homes having a heat pump

The wider group discussion explored several additional points.

- Heat pumps are incredibly energy efficient using much less electricity than a gas boiler for the same level of heat. However, because electricity pricing is governed by the price of gas – the running of heat pumps is approximately equivalent to the cost the gas boiler. This will be addressed by new government policy aiming to reduce the current 20-30% of electricity produced by gas nationally to 5% (National Energy System Operator)

- There was interest in combining heat pumps with other technologies, including solar panels, home batteries, and smart tariffs, to reduce running costs. Some participants discussed pairing heat pumps with off-peak electricity tariffs to improve affordability. The difficulty of predicting future electricity prices was noted, but there was general agreement that as the electricity grid continues to decarbonise, heat pumps will become increasingly attractive.

- Communal or district heating, where heat pumps or shared heat sources serve groups of homes rather than individual properties. Examples from other countries, such as Denmark and parts of Eastern Europe, were mentioned, where district heating networks are common. While these systems can be efficient, it was acknowledged that retrofitting them in places like Chilbolton would be complex due to the need to dig up roads and install new pipe networks.

- Ground-source heat pumps were discussed in more detail. They are more efficient than air-source systems and quieter, but also more expensive due to the need for groundworks or boreholes. These systems were seen as most suitable for larger

properties or homes with sufficient land. Horizontal ground loops require more space, while boreholes are more compact but costlier.

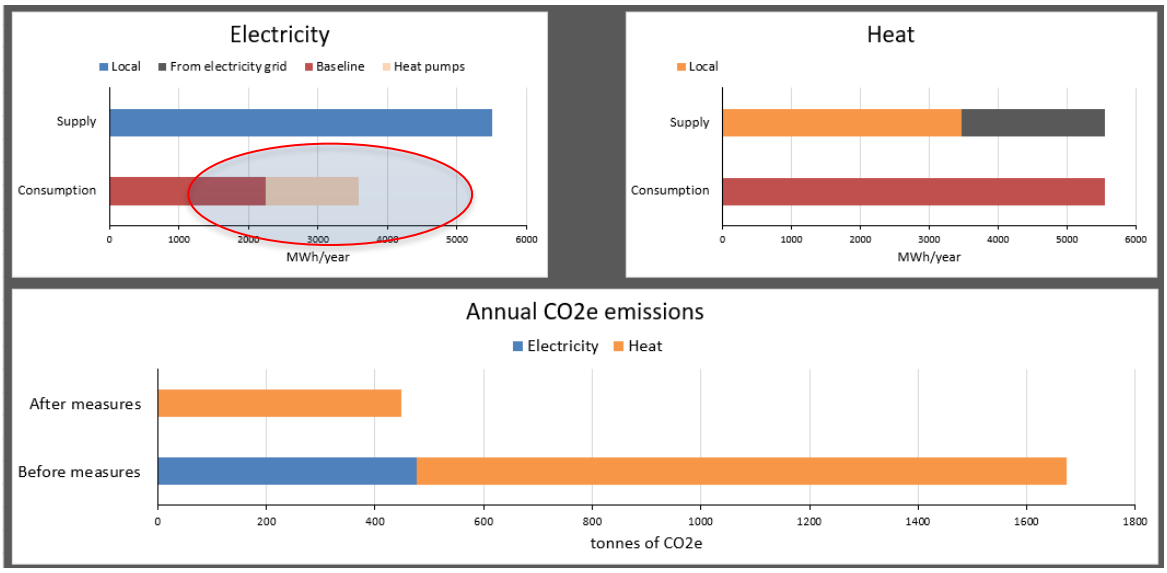
- Some participants asked about air-to-air heat pumps, commonly known as air-conditioning units. These systems can provide both heating and cooling and avoid the need for radiators, making them potentially suitable for certain properties.

- Finally, the group discussed the role of policy and timing. Most people are likely to install a heat pump when their existing boiler fails, rather than switching early. As gas boilers typically last 10–15 years, this means uptake is likely to happen gradually. Concerns were raised about the current cost difference between electricity and gas or oil, which affects running costs. It was noted that electricity prices are still closely linked to gas prices under the current market system, but that this is expected to change as gas plays a smaller role in power generation.

Technologies in combination

None of the individual technologies hold the complete answer so the CESAR tool was used to see what might be generated if we were to combine the technologies.

For this we can input into the CESAR tool the number of technologies suggested by each group that were acceptable in the local area to see what the impact would be on supply and demand.



Chilbolton Future Energy Landscape

The above chart represents the combination of the maximum technologies discussed at the workshop (though we ran out of time so this was not demonstrated at the workshop). Wind turbines were excluded due to the near certainty that they would be not feasible due to the presence of the Chilbolton Observatory.

- 2 x 6-acre solar farms
- 40% of homes with 10-12 solar panels
- 75% of homes with heat pumps

As the figures were entered, the model showed that electricity demand would rise because of the heat pumps, but overall generation would still exceed consumption. In fact, the community would generate around 50% more electricity than it used. Carbon emissions would fall to less than one third of current levels, although some emissions would remain from homes still using fossil fuel- heating.

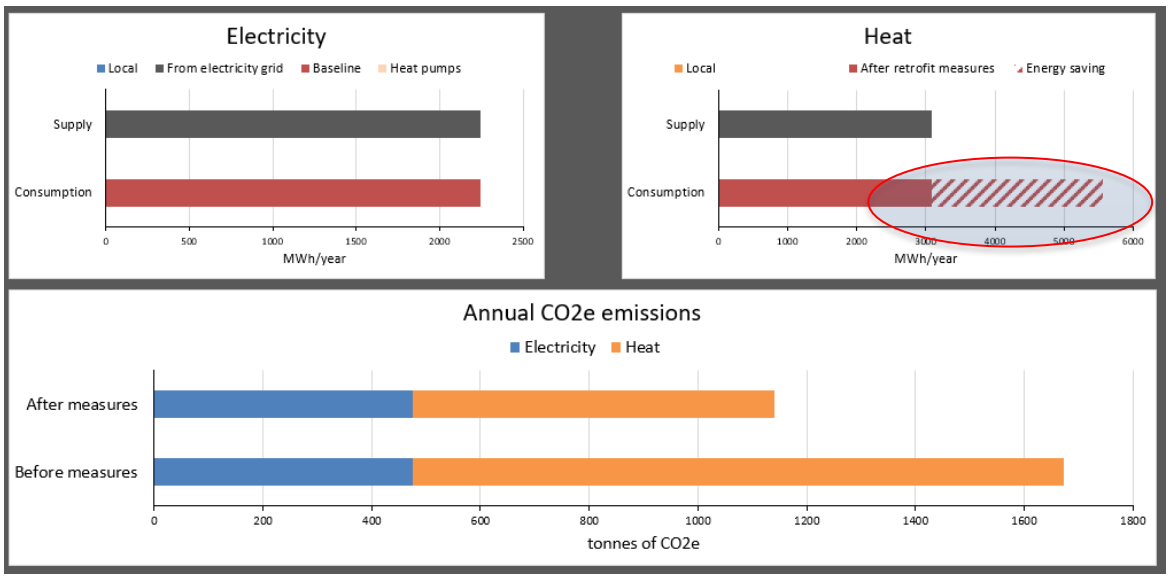
Retrofitting

Making homes more efficient—especially by cutting heat loss—means far less energy is needed to keep them warm, which in turn reduces electricity demand when switching to electric heating. Retrofitting varies in difficulty: some homes are simple to improve, while others require more complex work.

We outlined three broad home types

- Older pre-1930 houses, built with solid walls and natural ventilation, are draughty and harder to upgrade, though improvements are still possible. Around a 30% of parish homes fall into this group.
- Homes built between 1930 and 1990—have cavity walls but were constructed before modern insulation standards. Many have some insulation, but often not enough, and there is still significant potential to improve their efficiency. About 55% of local homes are in this category.
- Modern homes built after 1990, which follow strict insulation rules and often need very little heating at all. The remaining approximately 15% of homes fall into this category

The CESAR tool allows us to demonstrate the impact of retrofitting in Chilbolton. The below heat graph, with the dashed red bar (highlighted with a circle), demonstrates that retrofitting could cut heat demand by about a half. This would reduce carbon emissions and lower the amount of energy needed for heating.



Impact on the heat demand following a local retrofit programme

Participants were encouraged to explore the government's https://www.gov.uk/government/publications/warm-homes-plan and seek personalised advice, as many retrofit measures—like loft insulation, draught-proofing, and cavity wall insulation—are inexpensive and offer quick payback, while also improving comfort.

Conclusion and recommendations:

It was a great to have the local people of Chilbolton come together to share their thoughts about different renewable energy technologies and also learn from each other about how the different technologies work and what could be acceptable where they live.

This was a hypothetical conversation where we put to one side constraints such as planning, cost and grid capacity. These are very real practicalities, particularly in the South Downs National Park and would have to be considered to initiate a future community energy project.

The idea is to provoke local awareness and spark ideas about how we can all play our part in the energy transition. Here are a few suggestions from the workshop that the local community might take forward:

- Share this report and Chilbolton community survey more widely so that as many people in the local community can share their thoughts.
- Explore the government's https://www.gov.uk/government/publications/warm-homes-plan and seek personalised advice, as many retrofit measures—like loft insulation, draught-proofing, and cavity wall insulation—are inexpensive and offer quick payback, while also improving comfort.
- Support and champion the Local Electricity Bill by following Power for People.

There is no simple solution, but this workshop format demonstrates how people learning together in their local context can shape local action. Sometimes these community conversations open local possibilities about generation projects, but they also highlight what is critical and needs to be done at a national level through policy to help us all transition away from fossil fuels.

Additional Information – post workshop

- The heating data is estimated by using an average annual gas consumption for domestic buildings (nationally) multiplied by the number of domestic buildings multiplied by the average efficiency of a gas boiler. An assumption is made that the end-use heat requirements of boilers using other fuels (heating oil or LPG) is the same.
- The total heat demand is estimated to include approximately 20% non-domestic usage. Installing heat pumps in 75% of domestic properties reduces energy use for heat by 37% - this is because of greater efficiency of heat pumps but assumes that the non-domestic buildings continue to use fossil fuel boilers. The carbon emissions for heat are then reduced by 63%, because the heat pumps are still creating some emissions via grid electricity usage.

- Batteries: offer 2 key benefits. First, they provide resilience when the grid fails. One Chilbolton resident managed on a home battery for over 3 days during a prolonged outage a few years ago. Second, they allow shifting grid usage away from peak hours (4-7pm daily) thus enabling costs to be reduced when combined with an appropriate tariff, of which there are many. This shifting also means that nationally we need fewer power stations, wind turbines etc and, most importantly, fewer pylon lines across our country landscapes!

Appendix 1 - Tools, assumptions and research

Tools

Future Energy Landscapes: toolkit here

CESAR (Community Energy Saving Renewables) workbook: Showing renewable energy generation in relation to how much energy the community uses and the impact of renewables on carbon emission reduction.

Impact Tool: An estimator of a community's carbon footprint that works for parishes, wards, district councils and unitary authorities here.

Assumptions

Onshore wind and solar farms
Assessments of suitability of landscape for different technologies represent an upper bound estimate and do not take full account of the impacts associated with potentially limiting characteristics (proximity of roads, railways land type etc.) (LUC, 2018). Spacing of wind turbines is based on an allowance of five times the rotor diameter (LUC, 2018).

Rooftop PV
Suitable rooftop is defined as one on which a minimum of a 1 kW solar PV system can be installed (8 m2 rooftop area required), with an orientation east through south to west and at an angle between 15° to 70° (Palmer et al., 2018).
Analysis suggests that in the City of Southampton district 67% of rooftops had one area that satisfied the criteria (Ridett and Anderson (2023), p19), while in the wider Winchester City area 78.8% had a rooftop surface that was deemed as suitable for a rooftop PV installation of at least 1 kW (Ridett and Anderson (2023), p20).
These figures are likely to represent an upper bound estimate of solar PV potential. For the purpose of the CESAR tool, an estimated potential of 75% suitability would provide a realistic upper bound estimate.

ASHP/GSHP
Based on assumption that dwellings need to be reasonably airtight and well insulated. Significant proportion of post 1990 houses plus an allowance for others that might have

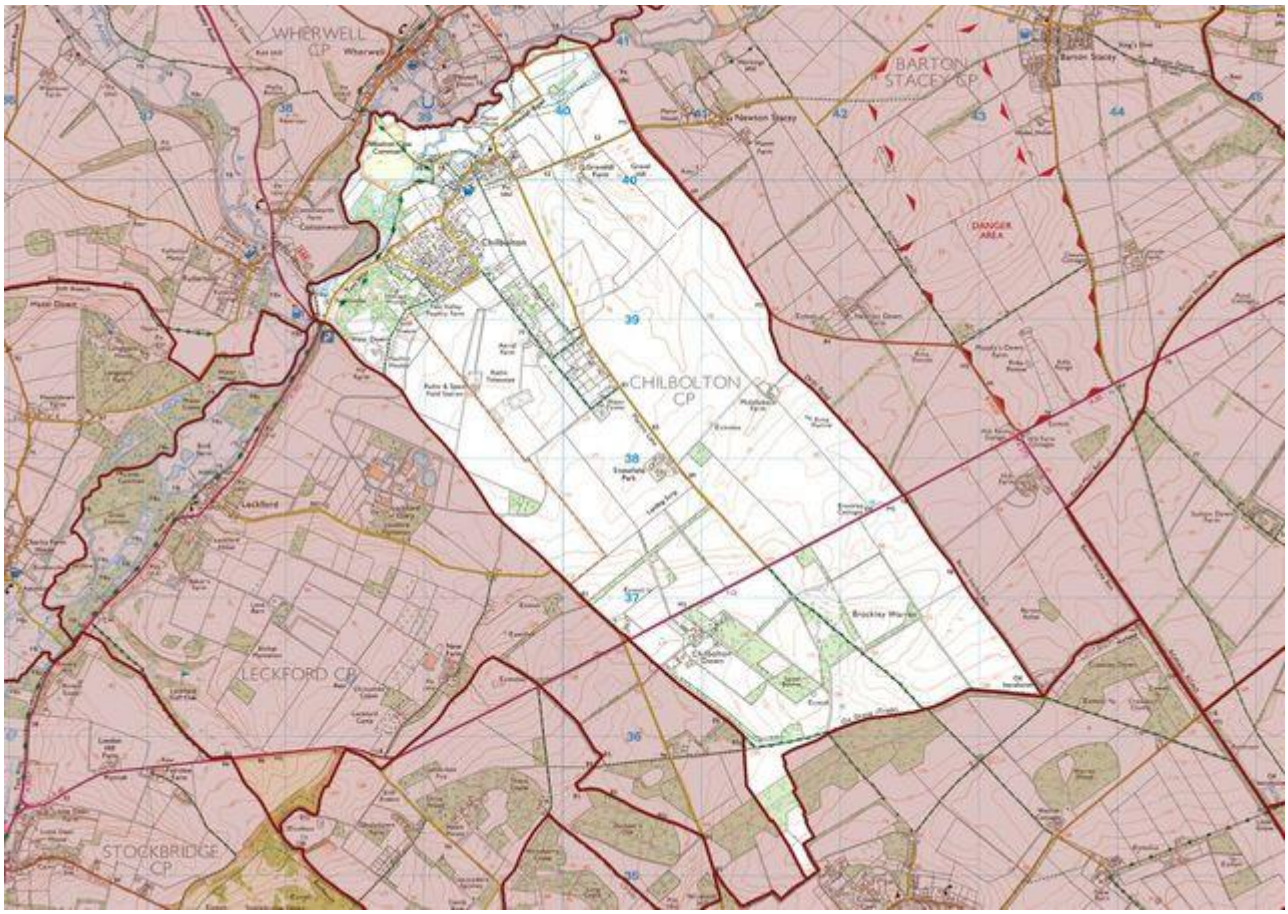
had deep retrofit we assumed 50% of homes could have an ASHP. We then considered that older homes in the centre of the towns / villages would have bigger gardens so assumed 25% would have room for GSHP.

Research

https://eprints.soton.ac.uk/490388/1/UoS-HCC-2023-WP1-Updated-Renewable-Electricity-Potential-Hampshire_v2.0_clean.pdf

https://www.scribd.com/document/787032740/Test-Valley-Renewable-and-Low-Carbon-Energy-Study-

Energy South2East – towards a low carbon economy LOCAL ENERGY STRATEGY

Palmer D., Koumpli E., Cole I., Gottschalg R. and Betts T. (2018). A GIS-based method for identification of wide area rooftop suitability for minimum size PV systems using LiDAR data and photogrammetry. Energies, 11(12): 3506

UK Government (2023) Figures for English Housing Survey headline report 2022 to 2023.