Future Energy Landscape Workshop

Wednesday 8th May 2024, Petersfield

This note summarises what happened and what was said on the day by residents but cannot be assumed to be representative of the full range of opinion in the local community. The workshop should therefore be seen as the start rather than the end of the conversation. **Please read through this report and provide your views via our 5-minute survey here.**

It is important to note that the workshop was to enable a conversation about change and possibilities, barriers such as planning and grid capacity were intentionally left outside of the room. These workshops are using the Parish boundary to pinpoint the discussion around an area which 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.

Workshop Context

The Centre of Sustainable Energy has developed a workshop-based approach to involve local communities in considering what their local energy needs are, what aspects of their local community and landscape are particularly important to them, and what mix of renewable technologies might be appropriate and acceptable to local people.

With support from South Downs National Park Authority and East Hampshire District Council, Energise South Downs are leading this workshop in ten communities to discover the types and scale of renewable energy that could meet the needs of local people within their areas. Drawing on data and research the workshops explore what might be feasible and create space for an informed, balanced conversation about what communities feel is acceptable. See appendix 2 for details of the data, research and assumptions that have been used to build this workshop.

The aim of the workshops, follow up reports and surveys are to demonstrate that it is possible to develop a local vision for sustainable energy that is acceptable to the local community, and to use this as a springboard for project and policy development.

Why the Future Energy Landscape workshop?

- Transforming the way that we generate and use energy is key to reducing carbon emissions and tackling the climate emergency.
- Generating more energy from renewable sources like wind or sun, so we produce less carbon is critical to a transition away from fossil fuels.

- Developing these energy systems can lower our energy bills, reduce carbon emissions and increase energy security.
- Communities need to be engaged in an informed discussion about the different renewable energy solutions and about the types and scale of renewable energy projects that might be acceptable to local people.

Workshop summary

Attendance: 45 people registered, 30 people attended on the night – including representatives from the Town Council; Town Mayor, the Climate Officer and a Town Councillor. Two East Hampshire District Councillors and a staff member from South Downs National Park Authority also attended. At least 23 of the participants lived within Petersfield and others from surrounding areas.

Workshop purpose: To explore renewable energy in our area and build a consensus on the type, size and potential location of renewable technologies that might be acceptable.

Process:

1) Map the local landscape, considering areas which are special or not and where energy infrastructure already exists.
2) Consider types of renewable energy that might be acceptable within the area from a selection of feasible options.
3) Choose locations where these technologies might be located, and the barriers to implementing them.
4) Understand the contribution each renewable technology or a combination of them, can make to the energy demands of the location (in this instance Petersfield)

What happened?

1) Mapping the landscape

Participants were first invited to reflect on our local area and gather around a large map. Using post-it notes people illustrated their relationship with the area and plotted where energy infrastructure is already part of our local landscape.

Positive / Cherished Places (orange and green post its)

- Footpath to Buriton

- The Heath
- Physic Garden
- Verges full of flowers
- Rotherlands LNR, Goodyer Meadows and Merrits Meadow NR
- Tilmore Brook
- Town Square
- Love Lane
- Swift Streets and Hedgehogs highways
- Community Garden and gardening at the station
- Solar panels on the church roof (can't be seen from the street)

Fig.1 & 2: Post its showing areas of connection in the town

Negative places identified (red post its)

- Industrial Estate, could be enhanced with more plants/trees
- Penns Place
- Improve cycleways
- McDonalds
- Aldi (where is the green roof?)
- Central Car Park
- A3, largest carbon emitter in East Hampshire

2) & 3) Renewable energy technologies – where and how?

After watching short videos about the different renewable technologies available the group was invited to break into 5 different technology groups. Each group took on the discussion of how a particular renewable technology might be deployed to meet the community's energy needs. Each group discussed the scale of a potential development* and their comfort with the technology asking:

Fig.3: Group discussion

- 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 affect most?
- Is this a realistic suggestion and what might the barriers be to implementation?

- How much does it reduce our energy demand?

Renewable technology groups were as follows:

Large scale renewables:

a) Wind Power
b) Solar Farm (12 Acres)
c) Anaerobic Digester with a District Heating Network

Domestic renewables:
d) Domestic Solar PV
e) Ground source & air source heat pumps

Italic note: *The workshop preparation had already identified how much of any one technology could be deployed in each area based on the space available and groups were given a maximum amount of technology that would fit. See Appendix 1 for the information that each table received about their technology.*

Each group then fed back their reflections about the technology, and where they might be located. The open land in Petersfield was split into three zones to make it simpler for people to locate different parts of the landscape.

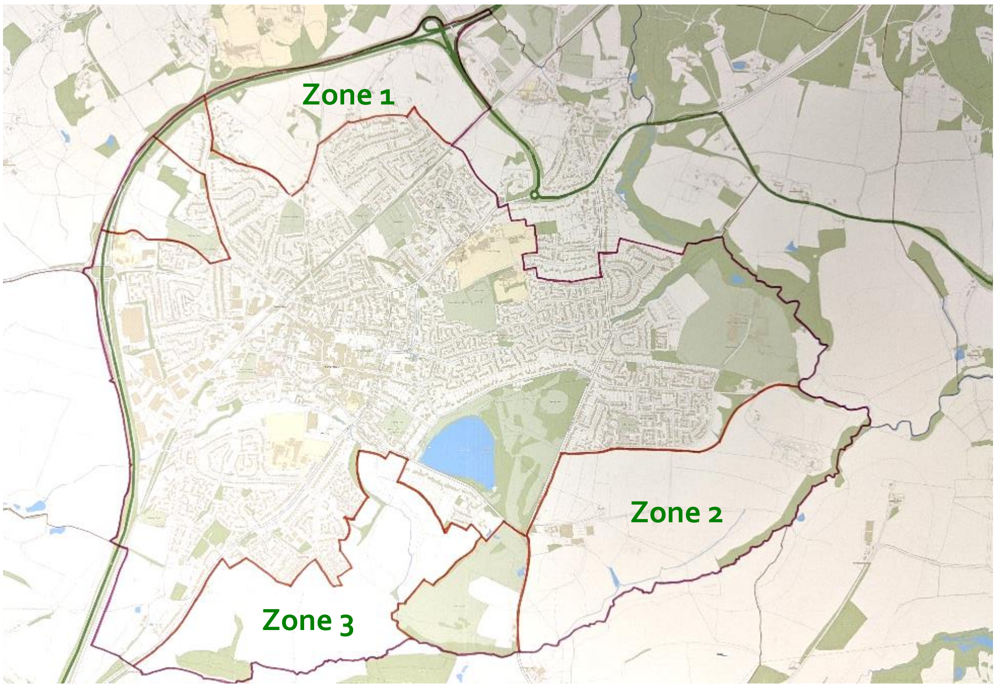


Fig.4: Map of Petersfield with Zones labelled

The group's suggestions on the amount of each technology were inputted into the CESAR tool [1] which showed how much energy or heat would be generated. It showed the participants the generation in relation to Petersfield's consumption and the impact that it has on the areas carbon emissions.

The groups suggested the following scale (and locations) for each technology and the results from the CESAR tool (the amount of heat / power generated) are also shown.

Renewable technology	**Scale & generation**	**Location (& further comments)**	**Discussion notes**
a) Wind Farm	5 small, 4 large turbines *Generation: this would provide enough electricity for all of Petersfield 6,700 homes*	Zone 1 – 5 small Zone 2 – 2 large Zone 3 – 2 large	Acceptability score - 5 Very supportive of wind. Visually very pleasing. Maxed out the potential. Wind shadowing considered. Distance required from housing considered. Very positive impact. **Barriers** Planning Public opinion Grid connectivity
b) Solar Farm (12 acres)	23 solar farms *Generation: would generate enough for 12,700 homes, nearly twice the amount needed for all Petersfield homes*	Zone 3 – 20 solar farms Zone 1 – 1 solar farm next to Long Lane Created a new Zone, Zone 4 for 2 more solar arrays along railway near Causeway	Acceptability - 4-5 Supportive of solar. Should be looking at rooftops first. Mixed portfolio of renewable technology would be better than all eggs in one basket. Should produce as much as possible and export it. Field of solar is less of a monoculture than a field of crop so could increase biodiversity significantly. Need to consider the whole picture, where made and the supply chain. **Barriers** SDNPA might not like this in views from the National Park. Having lots together might have more of a visual impact.

[1] 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.

Renewable technology	Scale & generation	Location (& further comments)	Discussion notes
c) Anaerobic Digester with district heating scheme	Not recommended by the group due to the small number of houses that would benefit from the heat and power, and it not being a suitable solution for Petersfield *Generation: heat for 100 homes and power for 285 homes*	If installed, should be near A3, industrial estate.	Acceptability Score - 1-2 Not positive for Petersfield needs. Although some positives, the negatives outweigh them. Reliable form of energy generation. Good use of food waste. Landscape visual impact is minimal. **Barriers** Concerns about the impact on environment/monoculture. Use of fields to grow crops for the digester was deemed to be a waste of space, as could be used for food production. Question of benefits of scale. Produces little power. Transport emissions to get waste to AD plant.
d) Domestic Solar PV	60% (could be 70% if barriers removed) *Generation: 60% of domestic rooftops would provide enough power for half the homes in Petersfield*		Acceptability Score - 4 Comfortable generally. Can detract from amenity value of some historic buildings, not on listed, heritage, conservation areas. Some people might think they are unsightly. **Barriers** Planning permission required on listed buildings is expensive. Orientation (S optimum, E/W OK). Lack of accredited installers. Concerns about supply chain.
e) Air Source and Ground Source Heat Pumps	50% of homes fitted with ASHP 25% of homes fitted with GSHP *This would meet half of Petersfield's heat demands, significantly reducing CO2 emissions, but increasing electricity demand.*		Acceptability Score - 5. "Everyone should have one" Positive impact on carbon footprint. Perceived noise but only hearsay. Confusion about how to use them- guidance needed. Lots of individual systems, would it be better to consider places for collective use e.g. taro, whole streets. **Barriers** High up-front cost. Not suitable on all properties, need a suitable external wall. Infrastructure of homes may need changing.

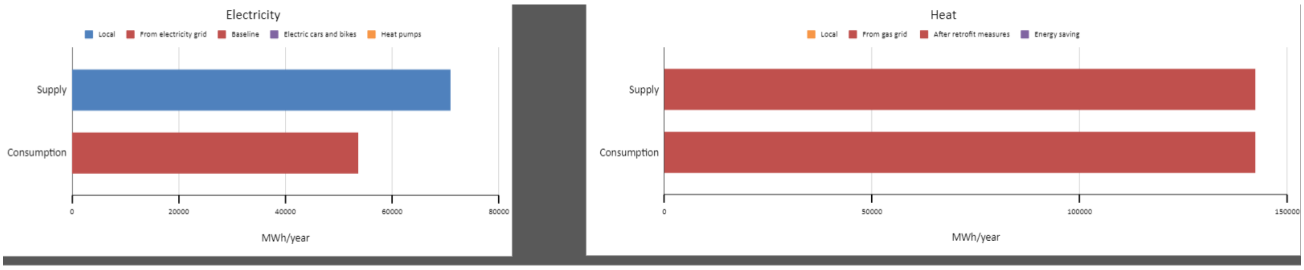
Please note – Although the Wind and the Solar Farm groups maxed out their generation, ESD are not suggesting this would actually be viable. The workshop aims to gauge the feeling of renewables in the local landscape, on people's doorsteps and create a nuanced conversation about land use. This workshop results show that there is a wide acceptance of and enthusiasm for renewable generation locally.

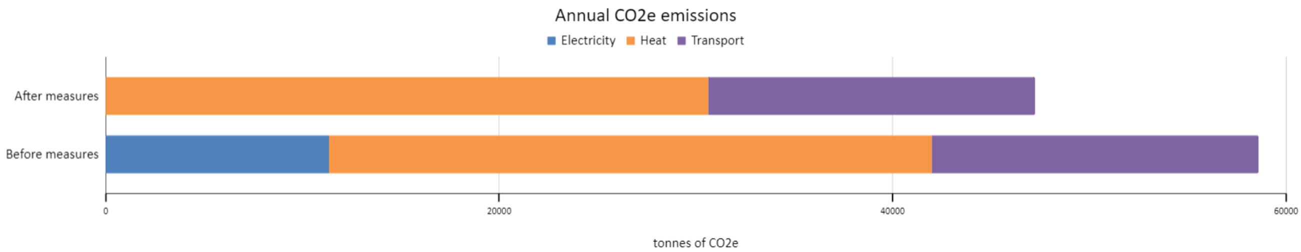
Scenarios

After the group's feedback they were then able to model different combinations of the technologies to see the effects on Petersfield's supply, consumption and CO2 emissions.

1) **Domestic Solar PV on 60% of rooftops in Petersfield, and 23 Solar Farms (each 12 acres)**

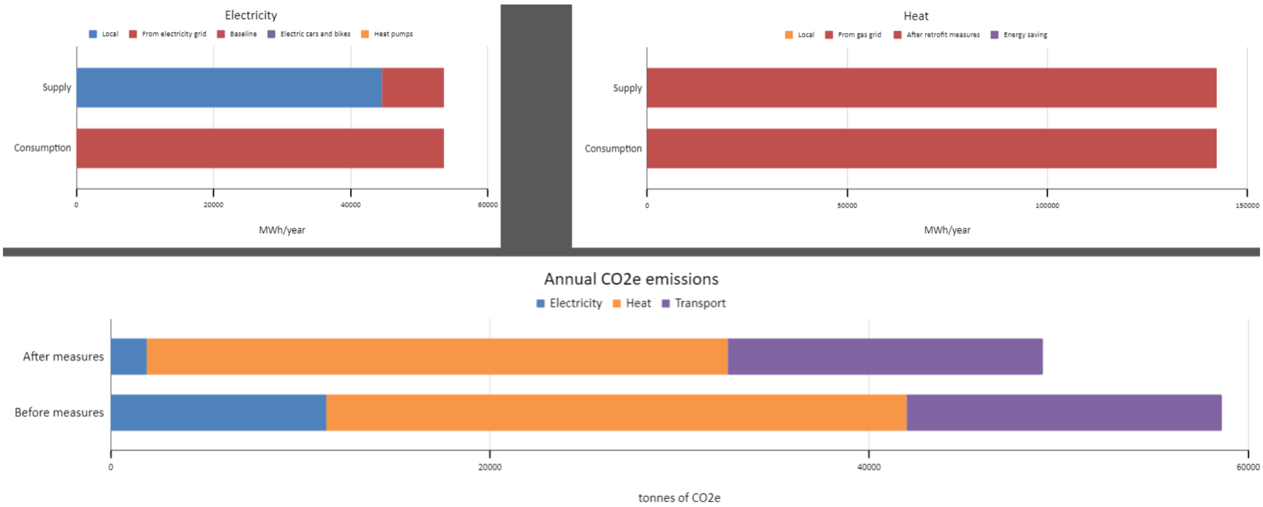
Petersfield's renewable energy generation would be higher than its consumption meaning some energy could be exported, generating an income for the community. It has removed all CO2 emissions from electricity. Note, the heat demand is still high, and produces a large amount of CO2 emissions.





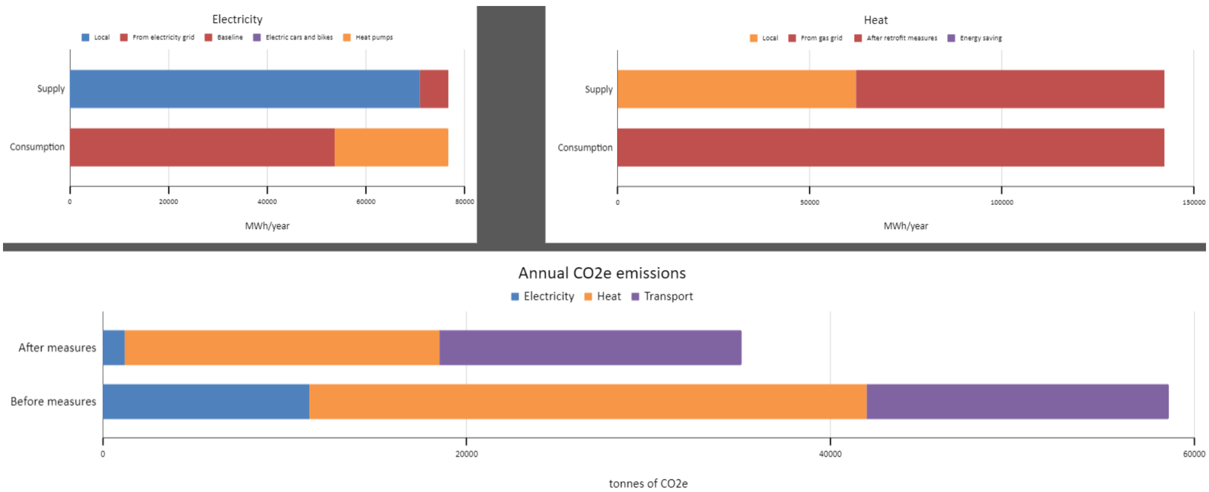
2) Domestic Solar PV on 60% of rooftops in Petersfield, and 5 small and 4 large wind turbines

In this scenario, the 9 wind turbines combined with 60% of domestic rooftops having Solar PV, would produce approx. three quarters of Petersfield's electricity supply. It doesn't reduce the CO2 emissions from the heat demand, but nearly reduces all CO2 emissions from electricity.



3) Heat pumps added (50% of homes with an ASHP and 25% of homes with GSHP) to Domestic Solar PV on 60% of rooftops in Petersfield, 23 Solar Farms

In this scenario electricity demand increases due to electrifying the heating system so the solar farms fall just short of meeting Petersfield's required supply, but CO2 emissions from heating drop significantly. Even with the increased electricity demand from electrifying our heating systems, we can still meet the demand with renewables. This combination would lead to a decarbonised heating system as well as decarbonised electricity supply.



Conclusion

There was overwhelming support in the room for renewable technologies in the local landscapes. Groups were keen to go over and above meeting their community supply and chose to maximise the generation of renewables, with the aim of exporting any excess energy for community benefit.

Onshore wind was very well received by the whole group and the realisation of how much energy it could create for the amount of land needed was noted as a benefit of this technology. The visual impact of wind turbines was seen as a positive, being described as "beautiful", "angels" and a "pleasure to see".

The use of Solar Farms was also favoured by the group, with a detailed discussion about how solar farms could increase biodiversity compared to a monoculture of an arable crop.

Installation of domestic solar PV and heat pumps was largely supported, but the barriers to implementation were discussed, including the upfront cost to the homeowners and the lack of accredited installers.

There wasn't support for an Anaerobic Digester in Petersfield as the amount of land required for the output of heat and electricity was too high to be an acceptable use of land to the group.

At the end of the workshop the participants acknowledged the important role that retrofitting has in reducing the overall demand, meaning less energy generation is needed. Simple measures like draft proofing, insulation and double or triple glazed windows to improve the energy efficiency of the lowest performing houses would reduce the overall demand significantly.

The workshop participants spent two hours imagining how renewables might meet our local populations energy needs. They shared what they wanted to protect in their landscape whilst exploring what might be possible if various combinations of renewable technologies were deployed. This was a hypothetical conversation based on data and research to open possibilities and enable people to learn together about what the different technologies are, a little about how they work and to feel part of an important conversation happening nationally about how we must transition away from fossil fuels.

ENERGISE SOUTH DOWNS

Appendix 1 - Information on technologies provided to the groups to inform their discussions

Wind Power

Small turbine
500 kW installation
Powers 270 homes over a year
Hub height: 40m / Rotor diameter: 35m
250 tonnes annual CO_2e saving

Medium turbine
1000 kW installation
Powers 540 homes over a year
Hub height: 70m / Rotor diameter: 55m
500 tonnes annual CO_2e saving

Large turbine
2500 kW installation
Powers 1,350 homes over a year
Hub height: 100m / Rotor diameter: 80m
1,240 tonnes annual CO_2e saving

Petersfield carbon emissions
Total produced each year from electricity and heat
42,000 tonnes

Domestic solar photovoltaic (PV)

- Supplies electricity direct by connecting to your fuse board
- Solar panels are normally mounted on the roof
- South facing is optimum but west / east orientation also works
- Planning permission is a notification process which is generally accepted in the SNDPA
- Connection permission not required from power company
- MCS accredited installer needed
- Max permitted output 3.8kW (net) = 8-10 panels*

(* no. depends on make of panels)

Indicative numbers:
- 4 kW installation
- Powers approx. 0.9 homes over a year
- Approx. 0.8 tonne annual CO_2e saving

Petersfield carbon emissions
Total produced each year from electricity and heat
42,000 tonnes

Solar farm

- Solar farm has ground mounted PV panels, usually fixed, with an appropriate orientation and elevation.
- PV panels can be raised to allow livestock, usually sheep, to graze below.
- Solar farms well placed on low agricultural land or brownfield sites

Indicative numbers:
- 12 acres of land area required
- 2,500 kW of power
- Energy for 555 homes over a year
- 510 tonnes annual CO_2e saving

Petersfield carbon emissions
Total produced each year from electricity and heat
42,000 tonnes

Combined heat and power (CHP) with anaerobic digestion

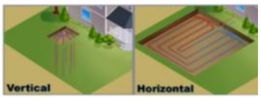
Anaerobic digestion uses biological process to 'digest' crops or animal or food waste to produce methane gas.
Your landscape is unlikely to change with this technology as the land could be taken up with crops.
The gas is used in an engine/turbine to generate electricity and recover heat.
Engines/turbines can be sensitive to quality of gas (fuel) used so supply should be of consistent quality.
One installation will generate 1 MWh of both heat and power providing heat for 100 homes and power for 285 homes
530 tonnes of annual CO_2e savings in total

Petersfield carbon emissions
Total produced each year from electricity and heat
42,000 tonnes

Air/Ground Source Heat Pumps

Air Source Heat Pump
7.5 kW installation
Provides all heating for efficient home
1 unit of electricity to power the heat pump = 2.6 units of heat generated
1.6 tonnes of annual CO_2e savings

Ground Source Heat Pump
6 kW installation
Provides all heating for efficient home
1 unit of electricity to power the heat pump = 2.9 units of heat generated
1.7 tonnes of annual CO_2e savings



Petersfield carbon emissions
Total produced each year from electricity and heat
42,000 tonnes

Appendix 2 - Tools, assumptions and research

Tools

Future Energy Landscapes: toolkit here

CESAR 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

LUC (2018), Renewable and Low Carbon Study for the East Hampshire District, p48

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

Ridett, E., and Anderson, B. (2023) An assessment of the wider Hampshire distribution network capacity and potential constraint points for renewable generation (v1.0) Southampton: University of Southampton.

Ridett, E., and Anderson, B. (2023) An updated assessment of the technical and economic potential for renewable electricity generation in the pan-Hampshire area (v2.0). Establishing a Robust Evidence for a Pan-Hampshire 2025-2050 Energy Strategy project report. Southampton: University of Southampton.

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

Petersfield Climate Action Network & Alton Climate Action Network (2023) East Hampshire District – Green House Gas Emissions Based on the DESNeZ 29 June 2023 data release