Future Energy Landscape Workshop

Wednesday 15th May 2024, Alton

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 also about the types and scale of renewable energy projects that might be acceptable to local people.

Workshop summary

Attendance: 37 people registered, 22 people attended on the night – including representatives from the Town Council, two East Hampshire District Councillors. We aim to have a minimum of 20 people to ensure it is a viable workshop.

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 Alton)

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)

- Greenfields Allotments and open land
- Wey Chalk Stream
- Neatham Down
- Jubilee Fields

- Windmill Hill
- Holybourne Down
- Anstey Park
- Flood Meadows
- Kings Pond
- Ackender Woods
- Eggar's Solar Panels
- Trips on the Watercress line
- Alton College

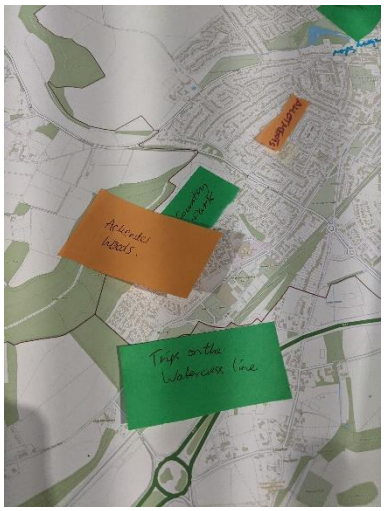


Fig.1 & 2: Post its showing areas of connection in the town

Negative places identified (red post its)

- Sewage Treatment Centre
- A31 - not bicycle friendly
- Telegraph poles and poor soil by Copt Hill
- Recycling Centre – for how long will we have this service?

Infrastructure identified – Alton Substation on Mill Lane, pylons running over the A31 around Froyle and south westerly below Alton. Solar Farm to south Alton.

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

Fig.3: Group discussion

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:

- 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

**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 Alton was split into three zones to make it simpler for people to locate different parts of the landscape.

Fig.4: Map of Alton 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 Alton's consumption and the impact that it has on the areas carbon emissions.

[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.

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	6 medium turbines *Generation: this would provide enough electricity for 3,225 homes in Alton.* *Alton has 8,680 homes.*	Zone 2 – 6 medium near Holybourne Down 	Acceptability score - 5 Very supportive of wind, free and green. Discussed myths of noise and birds. Decided not to generate more as felt inappropriate due to lack of sites. Need to preserve footpaths for walkers and access. Looked at options of small, medium and large turbines and decided on medium as if small it would have meant 16 turbines for the same generation **Barriers** Planning Public opinion and residents resistance Finance
b) Solar Farm (12 acres)	18 solar farms *Generation: would generate enough for 10,000 homes.* *Alton has 8,680 homes.*	Zone 1: 3 solar arrays East of New Odiham Road & 4 solar arrays North of Kiln Lane Zone 2: 7 solar arrays Zone 3: 4 solar arrays near A31 Approx 216 acres. Note average farm size in UK is 170 acres 	Acceptability score - 5 Type of land used for solar should be considered. Only on lower grade land. Rooftops should be considered first. And solar on new developments. The group decided they could go further but at the cost of agricultural land and sensitivity. Would impact landowners, farmers receive income and community receive income. **Barriers** Food security with agricultural land being used Grid connection Planning permission and NIMBYISM

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 Alton *Generation: heat for 100 homes and power for 285 homes*	If installed, should be in Zone 1 and in new development areas.	Acceptability Score - 1-2 Not positive for Alton needs. Effect on landscape not high Takes up lots of space to serve only a few hundred homes. Most of land use would be for growing crops for digestor. If just using waste then group were more comfortable with it. Perception of smell and local impact. **Barriers** Concerns about the impact on environment/monoculture and soil degradation. 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 and heat only useful in winter.
d) Domestic Solar PV	75% of suitable houses to have roof mounted solar *Generation: 75% of domestic rooftops would provide enough power for 5,780 homes, almost three quarters of the demand in Alton*		Acceptability Score – 4.5- 5 Positive thoughts on the technology Economies have changed. Put where possible / sensitively develop on listed Focus on industrial e.g. stations/ other domestic → subsidy required **Barriers** Subsidy required as huge costs for households Make it easier for households - they need persuasion – what would be the carrot?

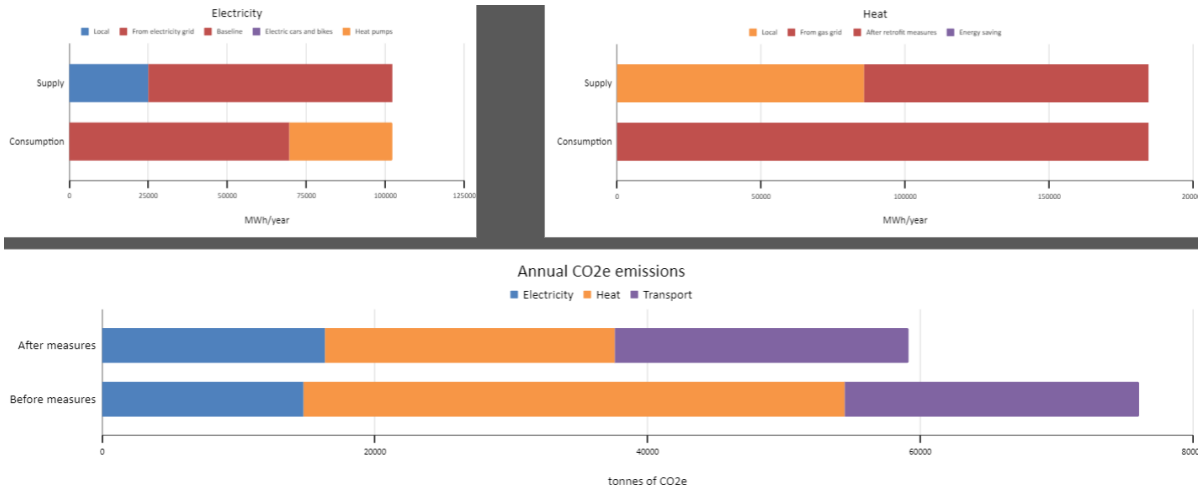
Renewable technology	Scale & generation	Location (& further comments)	Discussion notes
e) Air Source (ASHP) and Ground Source Heat Pumps (GSHP)	70% of homes fitted with ASHP 10% of homes fitted with GSHP, best if designed with mini district schemes in flats/care homes etc. *This would meet almost half of Alton's heat demands, significantly reducing CO2 emissions, but increasing electricity demand.*		Acceptability Score - 5. Mature tech, works, great option for domestic and commercial. Efficient, already examples all over Alton. Should be installed on key civic and community buildings and should be pushing council to do so. GSHP are very efficient. ASHP are now not noisy. **Barriers** Plan is technically feasible but requires political will. Perceptions of noise and unsightliness. GSHP needs access for borehole drilling. Internal and external space needed.

Scenarios

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

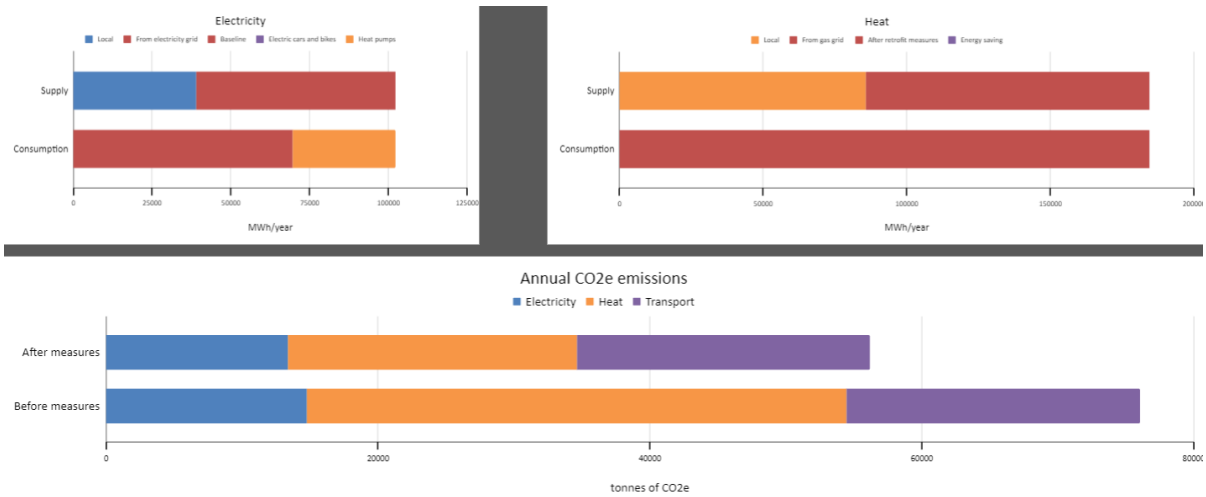
1) **Domestic Solar PV on 75% of rooftops in Alton, 70% fitted with Air Source Heat Pumps (ASHP) and 10% fitted with Ground Source Heat Pumps (GSHP)**

Investing in heat pumps on 80% of properties means the demand on electricity increases as the heat pumps need electricity to run. Electrifying the heating system means a higher demand on electricity but CO2 emissions from the heat demand drop significantly. Just the domestic solar panels produce one quarter of the electricity needs of Alton. Even with the increased electricity demand from electrifying our heating systems, we can still meet the demand with a combination of renewable technology.



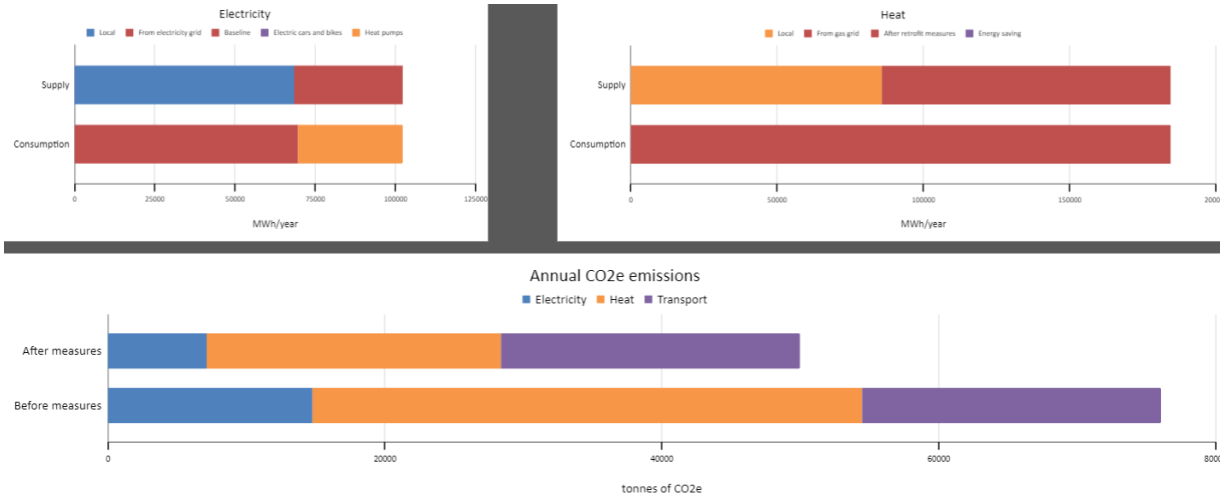
2) **Domestic solar PV, heat pumps and 6 medium wind turbines**

In this scenario, the 6 medium wind turbines combined with 75% of domestic rooftops having Solar PV and 80% heat pumps, would produce approx. one third of Alton's electricity supply. It also reduces the CO2 emissions from the heat demand by half.



3) Domestic solar PV, heat pumps and 18 Solar Farms

In this scenario renewables produce nearly 70% of the electricity needed and significantly reduce the CO2 emissions from the heat demand as 80% of properties have a heat pump. This combination would contribute 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. The conversation covered the barriers to implementing these technologies, but also looked at key sites where they could be deployed, and the group found it interesting to see the different scenarios mapped out.

Onshore wind was very well received by the whole group and discussions around the benefits of small, medium and large turbines discussed. They opted for the medium turbines as that meant they didn't need so many and 6 mediums felt realistic, compared to 16 small. The visual impact of wind turbines was seen as a positive. The location of these was deemed to be best on Holybourne Down as it was the only feasible site with prevailing wind and height (this was asserted by someone whose meteorologist son had looked at the area in some detail regarding suitability of wind power.)

The use of Solar Farms was also favoured by the group, with a detailed discussion about where they could be located. Solar farms are already part of the landscape around them, and they would strongly welcome more. The group decided to install 18 solar farms which would produce more energy than Alton currently needs domestically. The group felt they could go further but at the cost of agricultural land and sensitivity.

Installation of domestic solar PV was strongly supported and the grouped opted to cover 75% of buildings in solar. This measure alone would contribute nearly one

quarter of all the towns electricity demand. They felt this option was very low impact and wouldn't affect anyone, other than the homeowners and landlords, positively due to reduced bills.

The group opted to install 80% of houses with heat pumps to reduce their heat demand from fossil fuels. There were heat pump owners in the room who were able to dispel some myths around noise and efficiency. The barriers to domestic retrofit were discussed, including the upfront cost to the homeowners and how to incentivise homeowners and landlords to install them. The group felt subsidies and political will would be required to achieve the goals and to make it possible for homeowners to make the changes.

There wasn't support for an Anaerobic Digester in Alton 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. Some of the room felt strongly that growing crops in a monoculture to 'feed' the AD didn't make sense and would come with other risks in terms of soil degradation and fertiliser use.

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.

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

Alton carbon emissions
Total produced each year from electricity and heat
54,500 tonnes
8,700 homes
19,400 people

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

Alton carbon emissions
Total produced each year from electricity and heat
54,500 tonnes
8,700 homes
19,400 people

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

Alton carbon emissions
Total produced each year from electricity and heat
54,500 tonnes
8,700 homes
19,400 people

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)

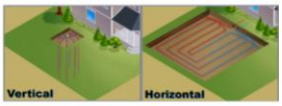
Indicative numbers:
- 4 kW installation
- Powers approx. 0.9 homes over a year
- Approx. 0.8 tonne annual CO_2e saving

Alton carbon emissions = 54,500 tonnes
Total produced each year from electricity and heat
8,700 homes
19,400 people

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



Alton carbon emissions
Total produced each year from electricity and heat
54,500 tonnes
8,700 homes
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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 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.

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.

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

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