Future Energy Landscape Workshop

Wednesday 26th June 2024, Horndean

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. Horndean Parish sits partially within the South Downs National Park with 10% of the Parish living in the park and approximately 50% of its area is in the park. (see Appendix 3)

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: 24 people registered, 12 people attended on the night – including the East Hants Strategy Manager for Sustainable Growth, two District Councillors and a Parish Councillor

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.

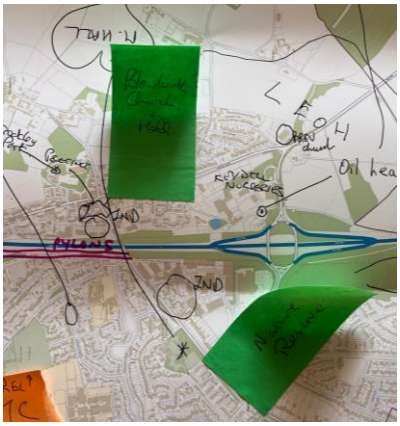
Process:

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 Liss)

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)

- Monarch's way
- Hazelton Common Nature reserve
- Jub Park
- Catherington Lith Nature Reserve
- South Downs National Park
- Merchistoun Hall
- Dog walking in SDNPA
- Scout Hut
- Crockly Park

Negative places identified (red post its)

- the Precinct and surrounding area
- Oil rigs

Energy Infrastructure:

- Lovedean substation
- Solar farm in west of the Parish
- Pylons as per drawing

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:

- 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 Horndean was split into two zones to make it simpler for people to locate different parts of the landscape.

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 Horndeans' consumption and the impact that it has on the area's 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 Power	A cluster of 4 medium turbines (70 metre high) in Zone 1 and 3 in Zone 2* *Generation: 8 medium sized turbines would generate over a third of the energy needed by Horndean, equivalent of almost 4,300 homes.*	Along the high ground in both the West and East of the Parish (see the map below)	**Acceptability score:** 4 - Liked turbines - beautiful and functional - Broadly positive about the technology - Preferred clusters vs individual ones that stuck out - Would rather see turbines than solar farms - Large ones are for the ocean so only small ones / medium sized ones - Concerns about wider landscape disruption - how much is dug up for the wiring and cables etc.? - Short and longer term impacts for the installation - Drainage survey needed **the group originally allocated 13 medium wind turbines but this was based on a 500kw output. In the CESAR tool a medium turbine has an output of 1MW so we reduced the number of turbines.*
b) Solar Farm (12 acres)	7 x 12 acres of solar in discrete locations *Generation: These could generate over 30% of*	Northern end of the motorway, on the eastern side, and the others down towards Denmead / Waterlooville way, on the boundary of the Parish (see the map below)	**Acceptability score:** 5 In the right place - good and can increase biodiversity / graze animals

[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.

	Horndean's electricity whilst reducing CO2 emissions by a third.		
c) Anaerobic Digester with district heating scheme	Not efficient use of crops and landscape		**Acceptability score:** no score - Liked the concept but only as a way of generating power from waste products/systems (animal waste / household waste) - Given that the efficiency per acre appeared to be about 5% that of a solar farm, growing crops just to throw into rot to generate this seemed very inefficient. - The plant itself, yes, but actually growing things to go into it, not so good. - Loads of people with food waste - Could use methane from the nodding donkey oil fields - Could include as a clause for new builds - that they have a district heating scheme - Local farm land is low grad because of the chalk but don't grow crops for AD use
d) Domestic Solar PV	40% (out of possible 75%)of houses, approx. 2,400 homes with solar PV *Generation: This would generate a fifth of the electricity needs of Horndean Parish.*		Long pay back Potential damage to roof tops Expense is off putting - not affordable Jubilee hall has 36 panels with a 10 year pay back Portsmouth scheme difficult with agreement and ownership

e) Air Source and Ground Source Heat Pumps	Agreed to 50% of homes having ASHP and 25% having a GSHP *Generation: This would meet just under half the heat supply needed, reducing the total CO2 emissions even though demand for electricity does increase with heat pumps. (see conclusion)*		Acceptability score: **4** - Neighbours complain about the noise - Aesthetics - where? - Education aside / ugly - Incentivise / education - Efficient technology / don't have to rip out the current system / not noisy - Ground source good - bore holes more consistent - ASHP cheaper to install compared to ground source and have most incentives - You can sometimes use the same infrastructure in your house when they are fitted

Wind Turbine possible locations

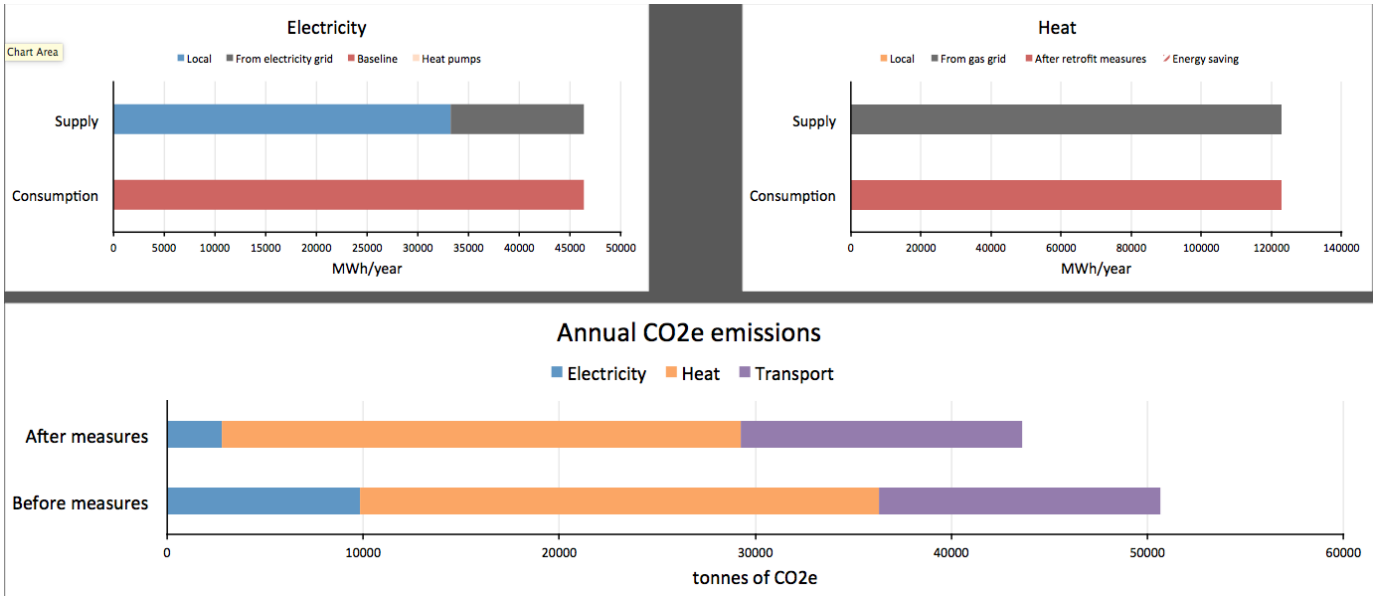
Solar Farm possible locations

Scenarios

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

1) Wind and Solar Power

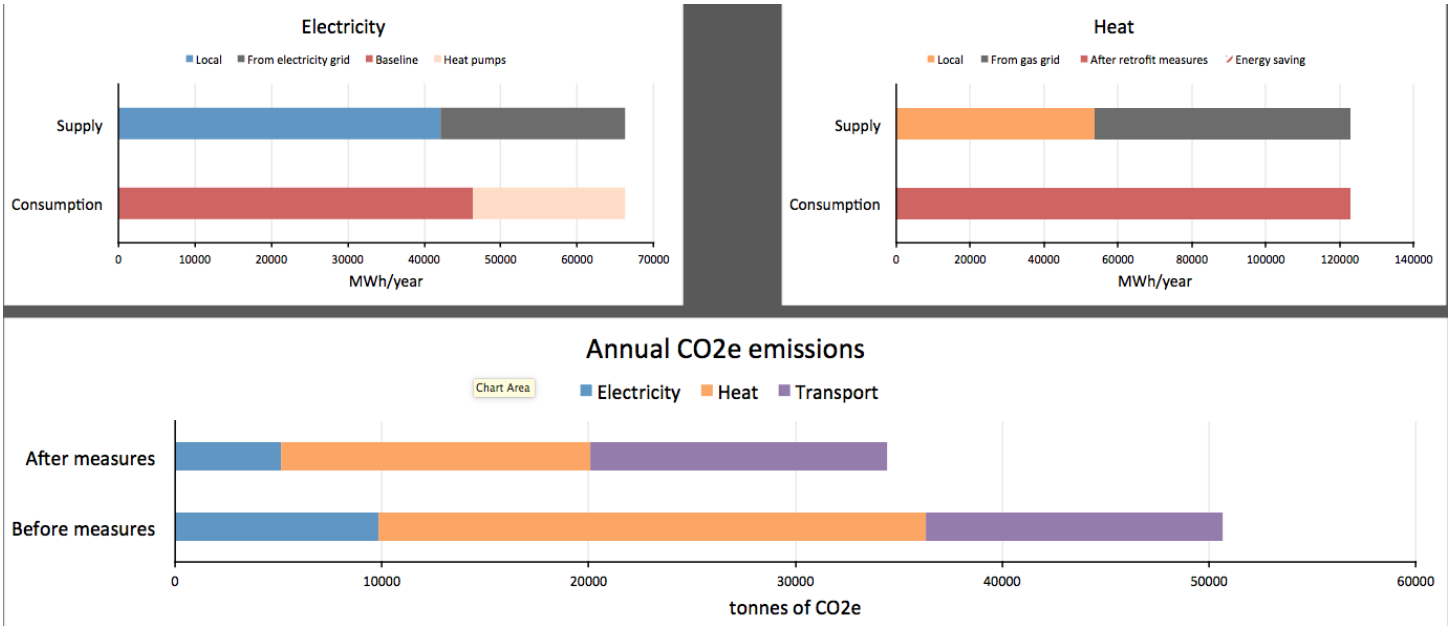
There was broad support for both these two main renewable technologies that require land and discussions centred on where they would be most appropriately placed. We combined the suggestion of 7 medium wind turbines and 7 x 12 acre solar panel farms as the groups had identified locations that meant these allocations could be in the landscape together. This sensitive placing of solar farms in discrete areas and a couple of clusters of 70m high medium wind turbines on high ground would produce two thirds of the electricity currently used in Horndean and so reduce the carbon emissions produced by fossil fuel generated electricity by around 70% or 7,000 tonnes.



2) Solar Farms, Wind Power and the domestic technologies

We next combined the two main renewable technologies (as above) and the two domestic renewable technologies, accepting that 50% of houses would get an air source heat pump and 25% would get an ground source heat pump. In addition we added that 40% of the houses would have solar PV. This combination saw over 50% of the electricity needed locally being supplied and almost half of the heat demand being met. Heat pumps do need electricity to run so while the demand for heat has gone down, the demand for electricity has gone up with the heat pumps but not by the same

quantity, because heat pumps are more efficient than fossil fuel boilers. CO2 emissions from electricity were halved and CO2 emissions from heating went down by a third.



Conclusion

Though the turnout in Horndean was smaller than at previous workshops (we were competing with the football and sunshine) the group were really able to discuss how they felt about the different technologies and understand the different trade offs.

The group discussing wind power thought that wind turbines were beautiful as well as functional but agreed that the large wind turbines should be only used in the sea for offshore generation. They also felt that individual turbines looked very ugly and that they should be placed in small clusters. When they began looking at possible locations two sites were identified as being on high ground so they agreed on small clusters to the west and east of the Parish. With 7 turbines they would supply enough electricity for over half of the homes in Horndean.

There was also support for large scale solar suggesting that there were instances where ground mounted solar might improve biodiversity. The group agreed that they needed to be in the right place and proposed seven 12 acre solar panel farms in brownfield sites, near the existing oil fields or near the motorway. This amount would meet a third of the electricity needs of the parish, enough electricity for over half of the homes of Horndean.

The third large scale renewable technology discussed that would be feasible in the Horndean area was anaerobic digestion. For the purposes of this workshop the group was discussing their comfort with using up 125 acres of local land to grow a crop that would be rotted for digestion. The group liked the concept but only as a way of dealing with waste either domestic food waste or farming waste. They were strongly opposed to growing crops for the process but it appealed as a way of dealing with food waste with a large number of homes locally, in the Parish and beyond. There was also a comment that the proposed Havant Thicket Reservoir could be used for a hydropower scheme.

There were more mixed feelings about the domestic use of solar and air source or ground source heat pumps with concerns about the costs and the length of the payback. With domestic solar there was a discussion about different local schemes that had resulted in confusion about roof ownership and alleged roof damage. There was agreement that the technology was good but due to local challenges with installers they agreed that in the future 40% of homes (2,400 homes) might have solar installed. If this were to happen under a quarter of the annual electricity needs of the parish could be met.

The group had similar concerns with heat pumps though they recognised their efficiency and lack of impact on the landscape. With an ageing population it would be hard to make the case for widespread installation. They agreed on 50% of homes installing an air source heat pump and 25% having a ground source heat pump.

This could meet just under half the heat supply needed, reducing the total CO2 emissions of the Parish even though heat pumps do use electricity to run.

The workshop participants spent two hours imagining how renewables might meet their local populations energy needs. Those attending agreed that the conversation was an important one for communities to have and that it would have been good to have had wider participation but it was a start.

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

Horndean carbon emissions
Total produced each year from electricity and heat
38,000 tonnes
6,000 homes
13,500 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

Horndean carbon emissions
Total produced each year from electricity and heat
38,000 tonnes
6,000 homes
13,500 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

Horndean carbon emissions
Total produced each year from electricity and heat
38,000 tonnes
6,000 homes
13,500 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)

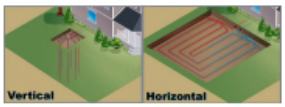
Indicative numbers:
- 4 kW installation
- Powers approx. 0.9 homes over a year
- Approx. 0.8 tonne annual CO_2e saving

Horndean carbon emissions
Total produced each year from electricity and heat
38,000 tonnes
6,000 homes
13,500 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



Horndean carbon emissions
Total produced each year from electricity and heat
38,000 tonnes
6,000 homes
13,500 people

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

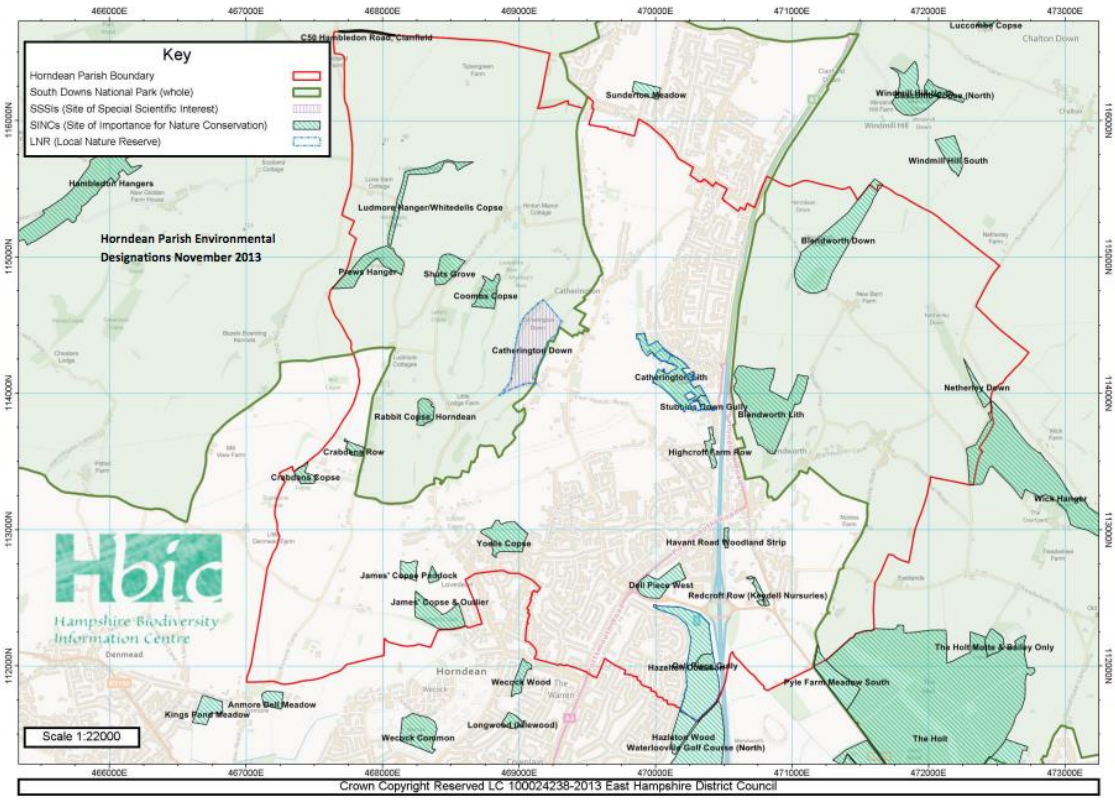
LUC (2018), Renewable and Low Carbon Study for the East Hampshire District, p48

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

Appendix 3 - Horndean Parish and the South Downs National Park coverage