# Workshop Summary

## Renewable Energy in Congresbury and Puxton

## 23rd January

## Hewish & Puxton Village Hall, Maysgreen Lane, Hewish, BS24 6RW

# Summary

North Somerset Council is committed to becoming carbon neutral by 2030 and would like to increase local renewable energy generation and include more supportive renewable energy policies within its emerging local plan. A public workshop was held on 23rd January 2022, exploring whether renewable energy deployment could be increased in Congresbury and Puxton, and exploring what might be acceptable to local residents. The workshop was facilitated by the Centre for Sustainable Energy. Two staff members were there from North Somerset Council as observers.

Twelve residents attended the workshop, of whom ten stayed for the full duration of the event.

This note summarises 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. A 6-week public consultation is being held to capture wider public opinion, and then a report will be prepared for the council summarising the overall outcomes and giving recommendations for how the Councils planning policies for renewable energy might address the aspirations and concerns of residents. The forthcoming local plan consultation will then give residents further opportunities to influence emerging policy.

It should also be added that the workshop outputs are high level suggestions of what *might* be acceptable, but any policies (and any future planning applications) would require further detailed

scrutiny to ensure that what is envisaged would be feasible, and not give rise to unacceptable harm, either to the amenity and outlook of residents, to landscape or biodiversity.

# Community Energy Plan

Workshop participants commented that the following types and scales of renewable electricity technology might be acceptable:

## Renewable Electricity

- **Wind Turbines, solar and electricity storage -** The installation of medium size wind turbines with a tip height of 80 -100 metres (up to 1 megawatt in output) to be accommodated to the north of West Hewish, adjacent to the motorway. If found to be feasible, workshop participants supported the installation of up to 15 turbines of this scale in this approximate location. Pre-conditions for the wind turbines being supported were that they should be community owned, with profits being returned to the community.
- Participants also supported the development of solar farms and the installation of commercial battery storage in this location.


**Figure 1 - possible location for medium scale wind turbines, solar and battery storage, adjacent to M5 motorway**

- The group considered but ruled out the possible installation of a single large 2.5 megawatt turbines (measuring approximately 130 metres in height) between Dolemoor Lane and Crookwell Ryne, due to concerns over its visual impact.

- The groups suggestions regarding suitable locations and scales for onshore wind were informed by mapping of the technical potential for small (500 KW), medium size (1 MW) and

large commercial scale turbines (2.5 MW). Excerpts from this mapping are attached in the body of the report below.

- **Solar -** The significant expansion of the four existing solar farms (which total approximately 29 megawatts of installed capacity) with the potential to approximately treble their size.
- In total participants suggested that ground mounted solar deployment could potentially rise by up to a further 70 megawatts of installed capacity.

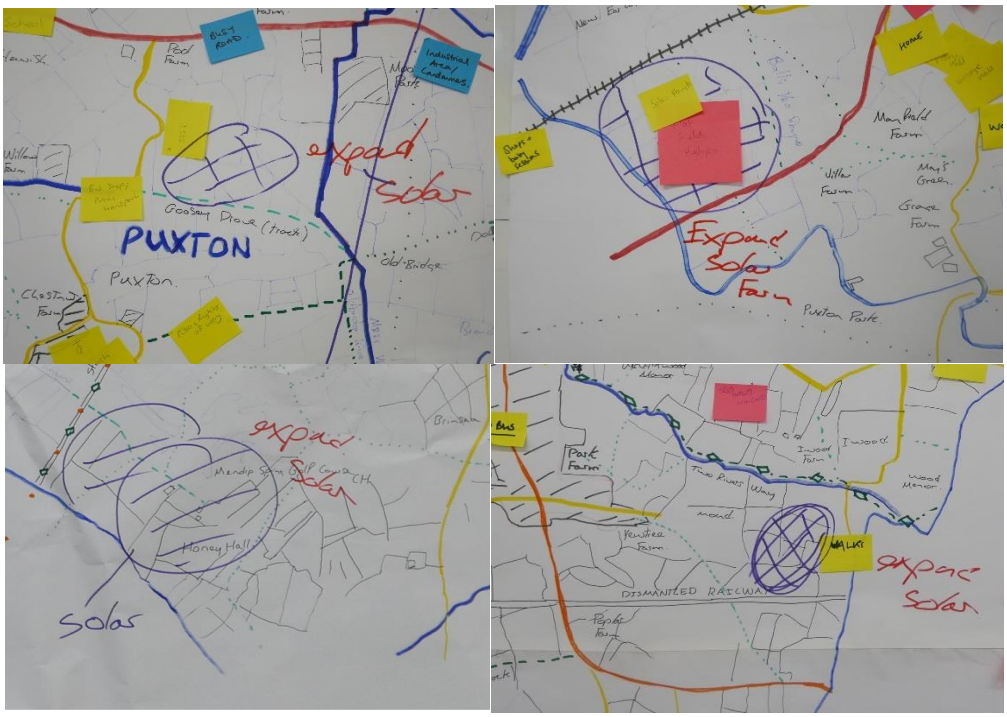



**Figure 2 - the existing solar farms at (clockwise) New Orchard Farm (5 MW), The Grange (8. MW), Congresbury Solar Farm (7.1 MW), Twin Elm / Iwood Lane Solar farm (9 MW in total).**

- **Anaerobic Digestion -** 1 x 500 kilowatt Anaerobic Digestor if sufficient feedstock could be found. No location was discussed.
- **Rooftop solar photovoltaic (PV) panels** - Up to 200 domestic rooftop solar PV panel installations (4 kilowatts each installation)

## Renewable heat

Workshop participants commented that the following types and scales of renewable heat generation might feasibly be installed out by local homeowners in the next five years:

- Domestic (rooftop) solar thermal panels: 100 homes
- Domestic air source heat pumps: 100 homes
- Domestic ground source heat pumps: 25 homes

## Energy Saving Measures

Workshop participants also thought the following energy saving improvements might feasibly be carried out by local homeowners in the next five years:

Low-cost improvements (£200 – draught proofing):

- Old houses (pre 1930): 300 homes
- 20th century houses (1930 – 1990): 300 homes
- Modern houses (post 1990): 300 homes

High-Cost (ranging from an average of £5,700 - £12,800 and including a mix of draught proofing, loft insulation, triple glazing, floor insulation, cavity wall insulation and external wall insulation)

- Old houses (pre 1930): 300 homes
- 20th century houses (1930 – 1990): 300 homes
- Modern houses (post 1990): 300 homes

Very High-Cost (£82,200 – retrofit to EnerPHit standards – nearly zero carbon)

- 30 homes

## Sustainable transport

Workshop participants suggested the following takeup of electric cars and bikes might be feasible in the next five years:

- Electric car uptake: 328 cars
- Electric bikes uptake: 200 e-bikes

## Overall impact

## Renewable electricity generation

As a result of the existing solar farms within the area (comprising 29 MW of installed capacity), the parishes of Congresbury and Puxton already generate roughly twice as much electricity from renewable sources than is consumed by the households within the two parishes.

The suggested additional renewable energy developments would result in the two parishes generating approximately 8 times as much renewable electricity as is consumed locally. The parishes would be a significant net exporter of renewable electricity, helping other areas to reduce their reliance on fossil fuels.

## Renewable Heat Generation and Energy Saving

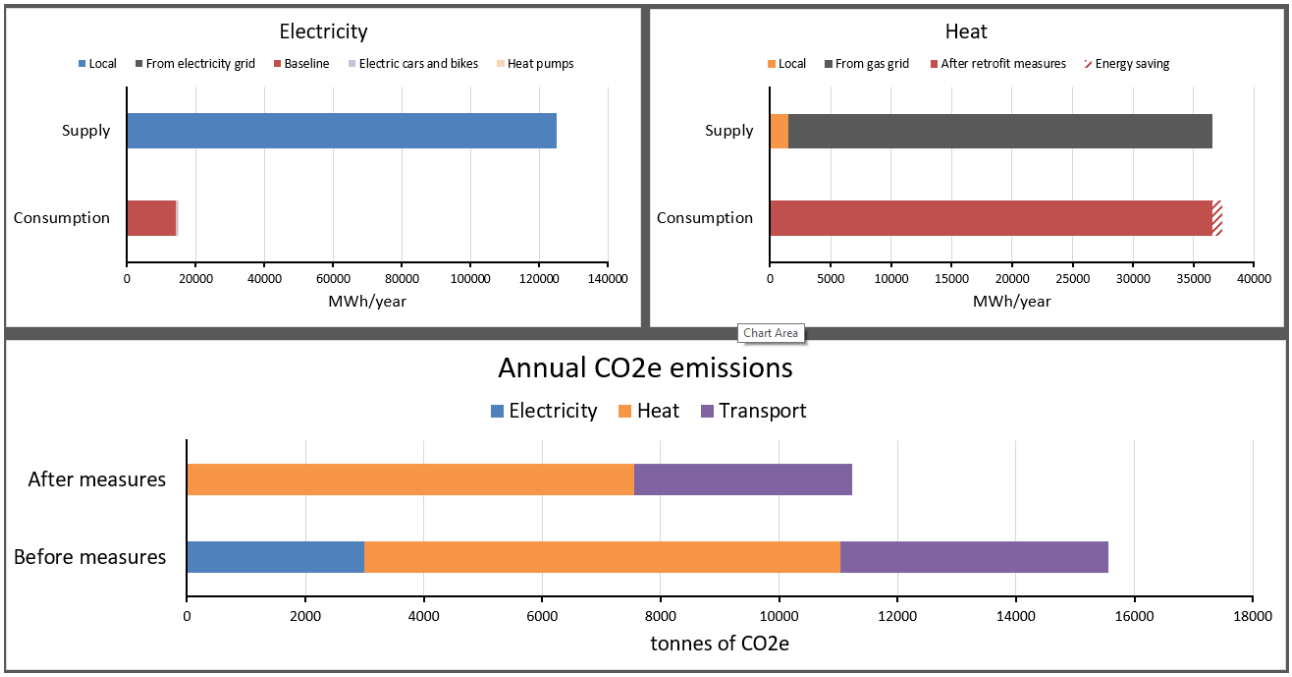
The suggested renewable heat technologies would provide 4% of Congresbury and Puxton's annual heat demand, reducing emissions by 482 tonnes of carbon (CO2e). The suggested level of energy efficiency improvements would reduce heat consumption with the two parishes by 2%.
Together these changes would reduce carbon emissions from heating by approximately 6 %.

## Sustainable Transport

The suggested uptake of electric vehicles and bikes would reduce transport carbon emissions by approximately 19%.

## Overall impact on carbon emissions

Overall the workshop outputs if taken forward would reduce the carbon emissions from the two parishes by approximately 28% (4000 tonnes CO2e).



# Summary of workshop sessions

## 1. Landscape and land management

Following a brief opening session dealing with the framework for the day and introductions, workshop participants were asked to create a map reflecting their relationship to the local area. Once drawn, each participant then added coloured post-it notes to their personal maps: yellow for positive places or services in the local area, blue for those with negative associations and pink for those which had been important which have now been lost. Finally, these post-it notes were added onto one large communal map of the two parishes.

Every personal map differed in size, geography and important features according to the life stage, habits and interests of its creator. Nevertheless, there were common themes, enabling an overall sense of the 'neighbourhood' of the people in the room and areas that were particularly cherished or valued.

Overall, it was clear that people had a strong attachment to the place and enjoy living there. There was a strong sense of identity and community, and people had a positive identification with many places in the area.

Participants valued the landscape and wild space, with frequent mention of walking routes, which have become more important during the pandemic. They also discussed the value of "untidy" hedgerows for wildlife and nature.

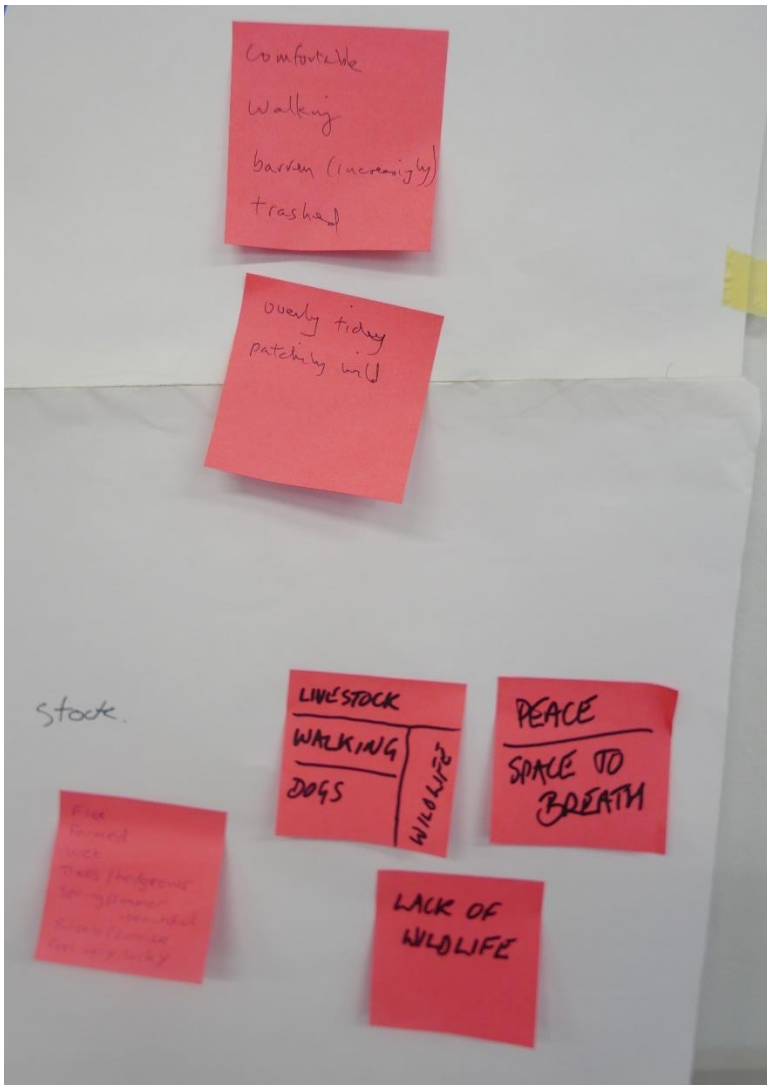
Participants stressed that the Strawberry Line was a cherished local asset with a special character that was important to the identity of the wider area, in part due to the wide, unkempt hedgerows which flank it. Although  some participants raised concerns that it was becoming too busy at times, with cyclists going really fast along it. Congresbury was seen as being the social heart of the area and the centre for service provision.

Apart from the Strawberry Line, participants did not stress particular parts of the landscape which were especially sensitive to change, but gave the impression that due to the extensive network of footpaths, the whole of the landscape was used and valued by people living locally for recreation. Participants did however comment that the area to the west of Puxton, flanking the motorway was less sensitive to change.


Concerns were also raised that some public footpaths around Congresbury Moor had become overgrown through lack of use and were no longer so walkable.

Using large pink post-it notes, participants were tasked with describing their local landscape and countryside with descriptive words (e.g. wild, beautiful, ugly); activities that they associate with the landscape (e.g. farming, hill walking) and; emotions (e.g. how they feel when they're out in the local countryside). The post-it notes were then attached to the communal map.

Participants valued the peace and tranquility of the area and the agricultural landscape, but there was an overall sense that the area had become busier in general, with more tensions between rural and suburban uses, and concerns about intensification of farming, and the loss of small farms. Some participants raised concerns that agricultural land was being over-managed (too tidy), that the landscape was no longer so wild, that wildlife had been lost and that once-quiet lanes were now heavily trafficked. Participants also discussed tree loss as a result of Dutch elm disease in the past, and the likely effect of Ash Dieback in the future, on the character of the landscape.




Participants discussed their aspirations for land to be rewilded, or at least allowed to become "untidy" and offer greater habitat for wildlife and carbon sequestration. They also reflected on the contradictions between their own inclinations to "tidy" their own land and aspirations to support greater wildlife.

## 2. Personal and Domestic Energy Use

Participants were asked to briefly consider their personal energy usage. It was noted that outside of Congresbury, many residents in the wider area are not on the gas network and use oil, solid fuel or electrical heating which are often more expensive. Several participants had ground source heat pumps and / or solar photovoltaic panels on their roof, but this was not necessarily reflective of the uptake of these technologies by the wider community.

## 3. Energy in the landscape – the present

Participants were asked to identify existing energy infrastructure in the area and to discuss how they felt about it. They identified four large existing solar farms and the location of these was roughly marked on the map. They also identified the high voltage line passing through the area to Hinkley Point.

On balance participants were positive about the existing solar farms in the area. They did not find them to be particularly harmful in terms of their visual and landscape impacts and observed that their visual impact could be quite effectively screened using planting. (It was noted that participants found it hard to identify their location on the map with any precision, again suggesting that the solar farms had integrated into the landscape reasonably well, with relatively little impact in relation to their energy output, or potentially that participants were not immediate neighbours of the solar farms.) These four solar farms (comprising 29 MW of installed capacity) already generate more electricity than the residents of the two parishes consume in total.

They did however comment that the construction of one solar farm had led the Strawberry Line to be closed for a significant period, and one participant commented that the grid infrastructure to connect solar farms often had as much impact as the solar farms themselves.

Participants raised no particular concern about the Hinkley High Voltage line, which was seen as vital infrastructure.

## 4. Energy in the landscape – the Future

Each participant was asked how they feel the relationship between the energy and the local landscape might change over the next 10 or 20 years.

The group broadly felt positively about an increased development of renewable energy infrastructure within the local area. The two key areas for growth in terms of electricity provision were identified as solar and wind.

The group felt comfortable that the four existing solar farms could be expanded and potentially tripled in size without giving rise to unacceptable harm.

The group also felt relatively positive about the potential to accommodate medium size onshore wind turbines (up to 1 MW in output) of about 80 – 100 metres in height in the less sensitive part of the area next to the motorway.

One participant suggested the installation of a single large 2.5 megawatt turbines (measuring approximately 130 metres in height) Dolemoor Lane and Crookwell Ryne, but this was ruled out by the group.

Most agreed that there was scope for increased domestic solar panel coverage with likely uptake by 200 properties over the next 5 years, as well as the potential for solar panels on industrial rooftops.

Participants stressed the importance of new buildings to maximise the incorporation of rooftop solar and be zero carbon.

With regards to the decarbonisation (this means using heat that does not come from fossil fuels) of heat, the installation of domestic alternatives to gas boilers such as rooftop solar thermal and air source heat pumps were seen as uncontroversial however, issues around the practicalities and costs to homeowners and the local council / housing associations were raised.

## 5. Community Energy Plan

Starting from nothing, participants were asked to suggest types and scales of renewable energy (represented by different cards) which might be acceptable, choosing from a menu of what might be technically suitable within the area. The group was also shown the council's technical mapping of suitable areas for onshore wind and solar, see appendix A

Favoured technologies were placed on a table, and then the group discussed whether each individual suggestion was acceptable to the group. Thus the workshop outputs were agreed by the group as a whole.


As technologies were selected, they were entered into a spreadsheet , designed to let them see the impact of their choices in terms of energy output / saved and carbon savings. This was then used to devise a hypothetical community energy plan. As technologies were selected a large map on the wall was annotated with locations where specific technologies might be acceptable.

The key infrastructure proposals adopted in the Community Energy Plan for Congresbury and Puxton were:

## Renewable electricity

- 15 medium-scale wind of between 80 – 100 metres in height, up to 1 megawatt installations, producing up to 27,962 megwatt hours of renewable electricity a year, the equivalent of powering 7800 homes. This would cost approximately £15.4 million. Located on flood plain land surrounding the M5. Pre-conditions for the wind turbines being supported were that they should be community owned, with profits being returned to the community. Participants also raised concerns about the need to address potential damage to underground peat as a carbon sink.
- Domestic solar photovoltaic panels: 200 installations, producing 771 megawatt hours of renewable electricity a year, the equivalent of powering 215 homes. This would cost approximately costing £1040,000. These would be likely to be delivered on new homes through planning policy requirements on developers.
- Ground-mounted solar photovoltaic panels: 40 installations, producing 96360 megawatt hours of renewable electricity, the equivalent of powering 26,857 homes. This would cost approximately £50 million. These would be part of an expansion of the four existing solar farms in the area and in new development on fields adjacent to the M5.

## Renewable heat

- Solar thermal domestic: 100 installations, producing 150 megawatt hours of renewable heat, the equivalent of heating 14 homes and costing £400,000.
- Air source heat pumps: 100 installations, producing 1076 megawatt hours of renewable heat, heating 100 homes and costing £9,00,000.
- Ground source heat pumps: 25 installations, producing 269 megawatt hours of renewable heat, heating 25 homes, costing £357,00

## Energy Saving Measures

- Old houses (pre 1930)/high cost[1]: 25 installations, saving 261 megawatt hours of energy, costing £320,121.
- 20th century houses (1930 – 1990)/high cost: 25 installations, saving 98 megawatt hours of energy, costing £176,479.
- Modern houses (post 1990)/high cost: 25 installations, saving 40 megawatt hours of energy, costing £143,589.
- Old houses (pre 1930)/low cost: 300 installations, saving 96 megawatt hours of energy, costing £60,0020th century houses (1930 – 1990)/low cost: 300 installations, saving 38 megawatt hours of energy, costing £60,000

[1] Installing a condensing boiler and loft insulation

- Modern houses (post 1990)/low cost: 300 installations, saving 40 megawatt hours of energy, costing £60,00.

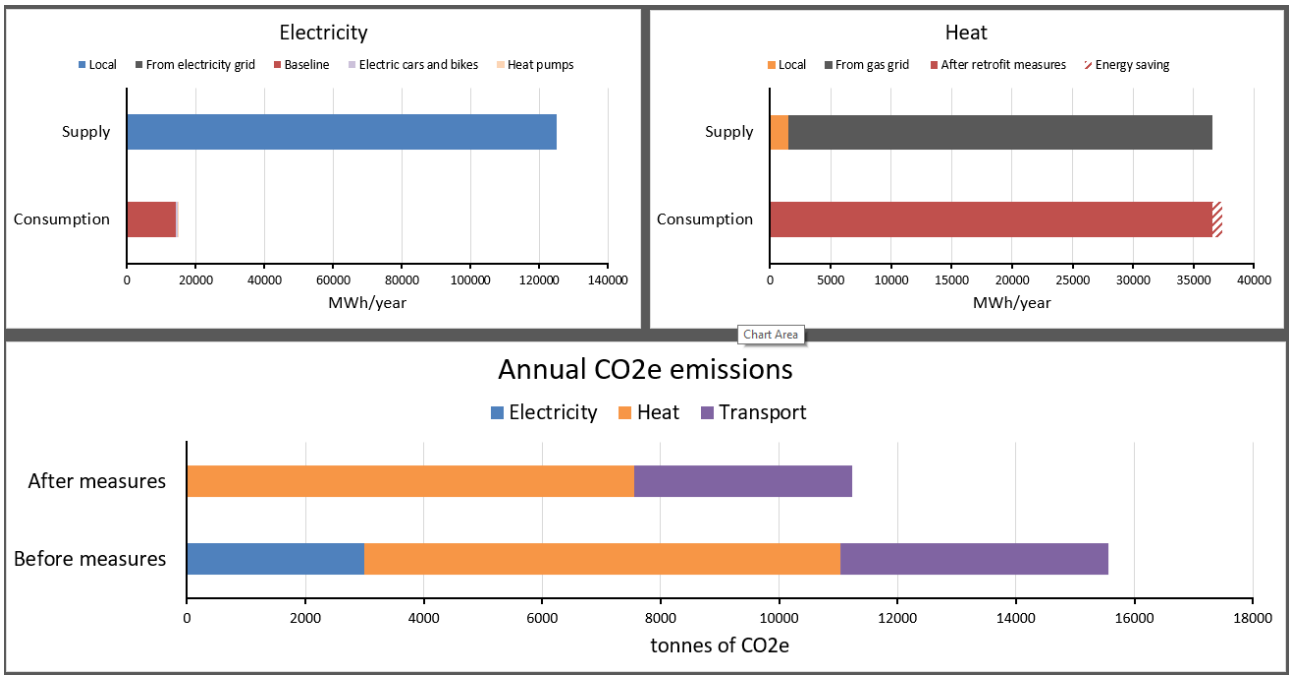
## Electric transport

- Electric car uptake: 328 cars
- Electric bikes uptake: 200 e-bikes

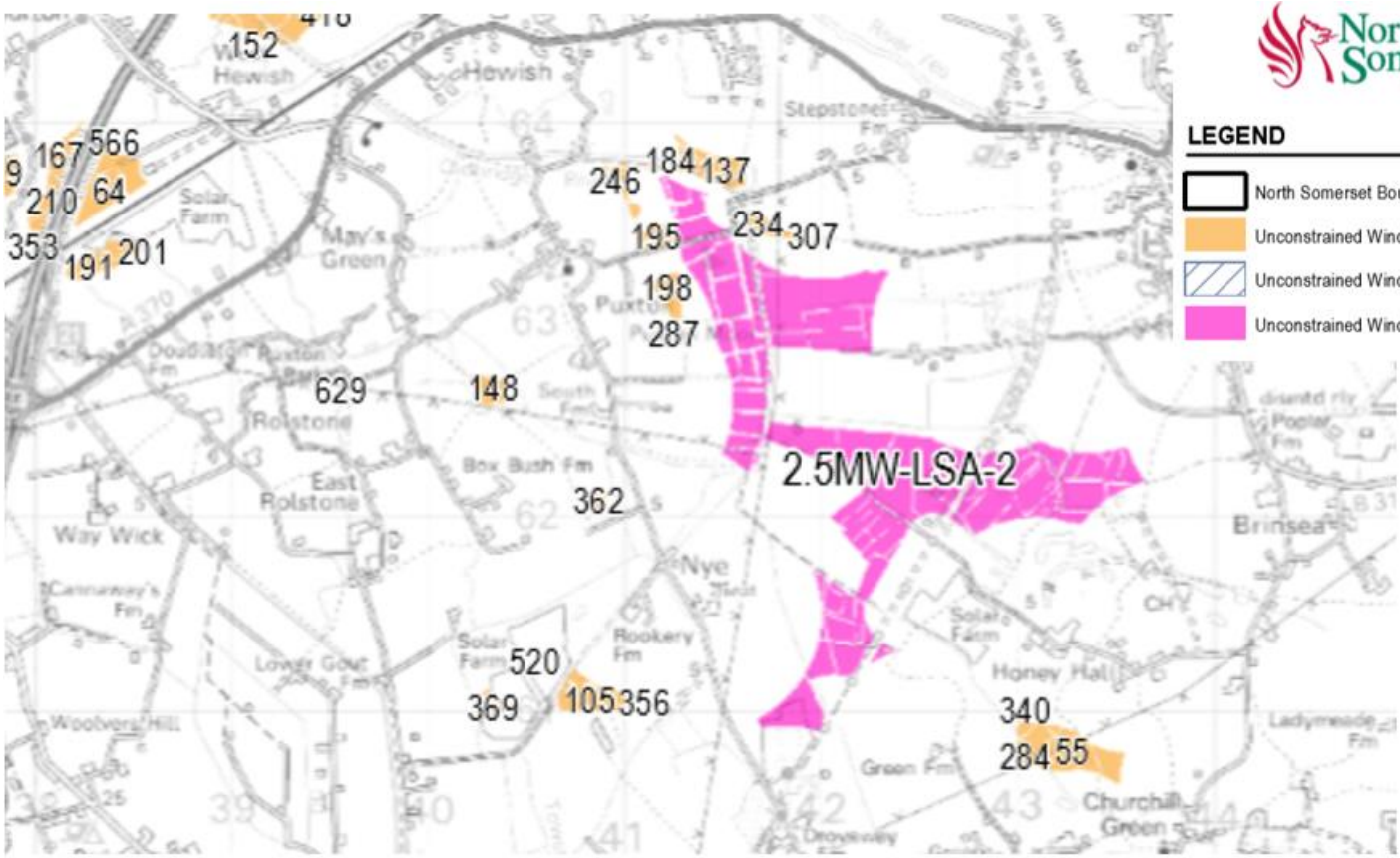
## Overall impact

In sum, the proposed changes would:

- Provide 823% of Congresbury and Puxton's annual electricity demand (125093 megawatt hours of 15197 megawatt hours) from renewable sources
- Provide 4% of Congresbury and Puxton's annual heat demand (1495 of 36592 megawatt hours) from renewable sources
- The suggested level of energy efficiency improvements would reduce heat consumption with the two parishes by 2%.
- Reduce transport emissions by 19%
- Reduce the total carbon emissions from the two parishes by approximately 28% (4000 tonnes CO2e).
- Cost roughly £56 m

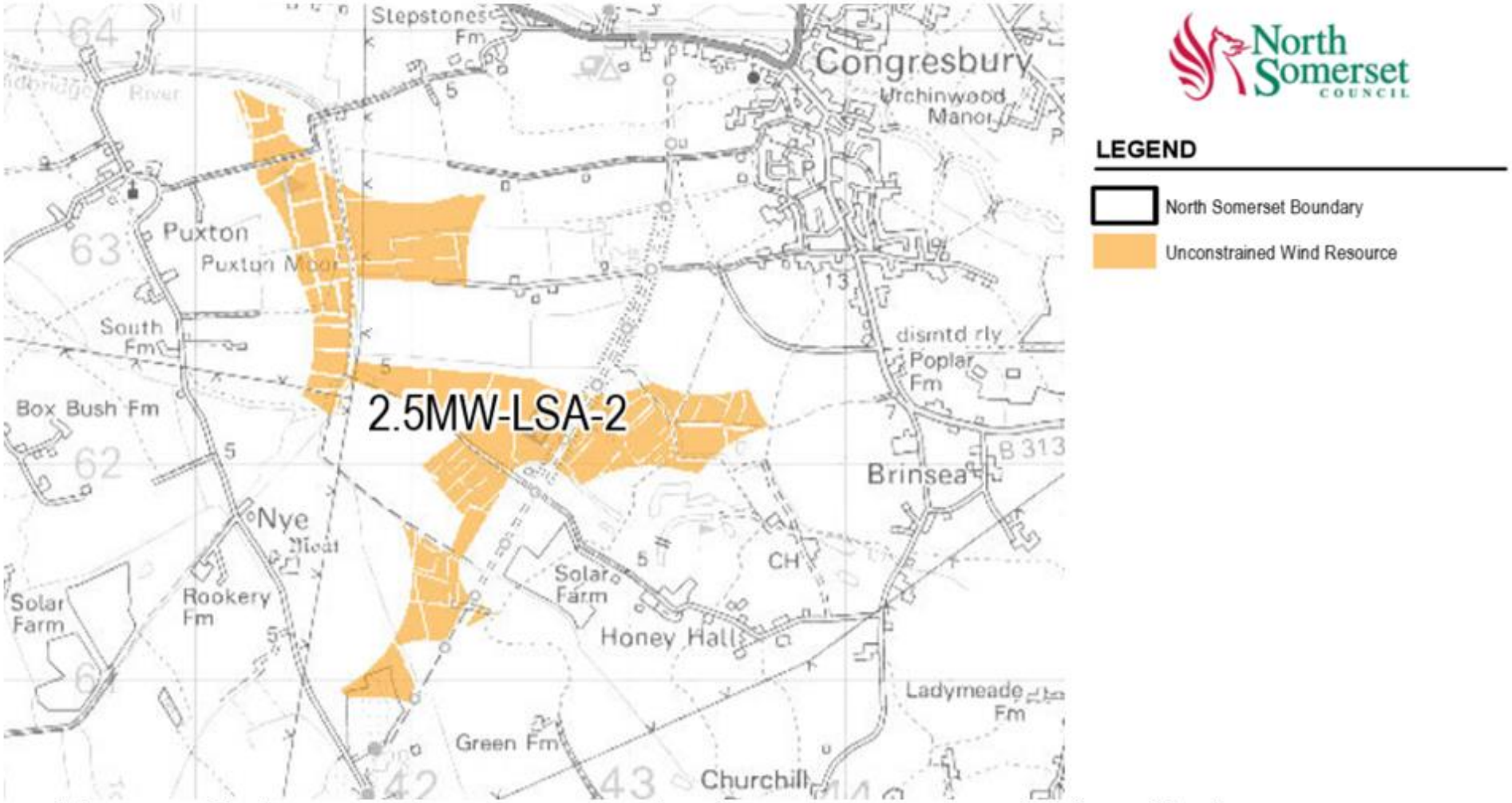


6. Appendix A – Potentially suitable areas for onshore wind. Technical assessment. Except from RERAS study




Combined Wind Search – 0.5 MW, 1 MW and 2.5 MW
FIGURE W7-NS

The numbers on the map represent potentially suitable locations for 1 MW turbines




Suitable areas for large scale 2.5 MW wind turbines – 130 metres high to blade tips

FIGURE W6-NS-2.5MW

Appendix B. Unconstrained areas for field based solar


Unconstrained areas for field based solar – RERAS study

**This map illustrates the sites which in technical terms could be developed for solar farms. However, these areas will need to be refined further through the Local Plan process, taking into account other considerations and constraints, as part of developing a strategy for renewable energy development.**

centre for sustainable energy

North Somerset Council

MCS Charitable Foundation

# Appendix C. completed spreadsheet of potentially suitable technologies

| Technologies | Number of Cards | Number of installations | MWh supplied/saved | | Equivalent homes powered/heated | Cost |
|---|---|---|---|---|---|---|
| | | | Electricity | Heat | | |
| Onshore wind - small (100 kW / hub height: 26m / rotor diameter: 22m) | 0 | 0 | 0 | N/A | 0 | £0 |
| Onshore wind - medium (1 MW / hub height: 70m / rotor diameter: 50m) - | 15 | 15 | 27962 | N/A | 7794 | £15,450,000 |
| Onshore wind - large (2.5 MW / hub height: 90m / rotor diameter: 82m) | 0 | 0 | 0 | N/A | 0 | £0 |
| Hydro (200 kW) | 0 | 0 | 0 | N/A | 0 | £0 |
| Hydro - micro (25 kW) | 0 | 0 | 0 | N/A | 0 | £0 |
| Solar PV - domestic (4 kW) | 2 | 200 | 771 | N/A | 215 | £1,040,000 |
| Solar farm (2.5 MW / 12 acres / 4.8 hectares) | 40 | 40 | 96360 | N/A | 26857 | £50,000,000 |
| Anaerobic digestion (500 kW / 250 acres) | 0 | 0 | 0 | N/A | 0 | £0 |
| CHP - Anaerobic digestion (100 homes district heating) | 0 | 0 | 0 | 0 | 0 | £0 |
| CHP - Geothermal, mine water (100 homes district heating) | 0 | 0 | 0 | 0 | 0 | £0 |
| Water source heat pump (100 homes district heating) | 0 | 0 | N/A | 0 | 0 | £0 |
| Solar thermal - domestic (100 homes) | 1 | 100 | N/A | 150 | 14 | £400,000 |
| Air source heat pump - domestic (100 homes) | 1 | 100 | N/A | 1076 | 100 | £900,000 |
| Ground source heat pump - domestic (100 homes) | 0.25 | 25 | N/A | 269 | 25 | £375,000 |
| Old home (pre 1930) - low cost (100 homes) | 3 | 300 | N/A | 96 | N/A | £60,000 |
| 20th century home (1930-1990) - low cost (100 homes) | 3 | 300 | N/A | 38 | N/A | £60,000 |
| Modern home (post 1990) - low cost (100 homes) | 3 | 300 | N/A | 40 | N/A | £60,000 |
| Old home (pre 1930) - high cost (100 homes) | 0.25 | 25 | N/A | 261 | N/A | £320,121 |
| 20th century home (1930-1990) - high cost (100 homes) | 0.25 | 25 | N/A | 98 | N/A | £176,479 |
| Modern home (post 1990) - high cost (100 homes) | 0.25 | 25 | N/A | 40 | N/A | £143,589 |
| EnerPHit (10 homes) | 3 | 30 | N/A | 173 | N/A | £2,484,000 |
| | | | | | | |
| Electric car uptake (5% cars are EV's) | 3 | 328 | N/A | N/A | N/A | N/A |
| Behaviour change (5 % reduction in annual mileage per car) | 0 | N/A | N/A | N/A | N/A | N/A |
| Electric bikes (50 eBikes for community use) | 4 | 200 | N/A | N/A | N/A | £200,000 |

| Extra information | |
|---|---|
| Total cost | |
| £56,669,189 | |
| | |
| Total equivalent homes powered | 34866 |
| Total homes in community area | 1618 |
| | |
| **After the 'Energy transition exercise'** | |
| Annual local electricity supply [MWh] | |
| 125093 | |
| Annual local electricity consumption [MWh] | |
| 15197 | |
| Annual local heat supply [MWh] | |
| 1495 | |
| Annual local heat consumption [MWh] | |
| 36592 | |
| | |
| Smart Export Guarantee (SEG) tariff [p/kWh] | |
| 5 | |
| Potential annual SEG earnings | |
| £6,254,640 | |
| | |
| Community battery storage for domestic solar PV | |
| Energy capacity [kWh] | 2076 |
| Cost | £934,226 |