



Dorset
Council

RENEWABLE ENERGY

Detailed Technical Paper



15 July 2021

RENEWABLE ENERGY GENERATION

1. CONTEXT

National Context

Most of the energy used in UK (about 80%) is still derived from fossil fuels¹, such as coal, oil, and gas, which release carbon dioxide (CO₂) when burnt. The remaining 20% comes from a combination of renewable energy, nuclear power, and bio-heat.

Fossil fuels are used either directly for transport in the form of petrol and diesel or for heating (mainly gas). A small proportion of gas is burnt to generate electricity (power) through gas fired power stations.

Electricity (power) currently only accounts for about a fifth of the total energy use in the UK.

Dorset Context

Dorset is one of the best counties in the UK for solar and has good resources for wind and biomass. Theoretically, it has enough available resource to be self-sufficient in energy, taking into account landscape and planning constraints.²

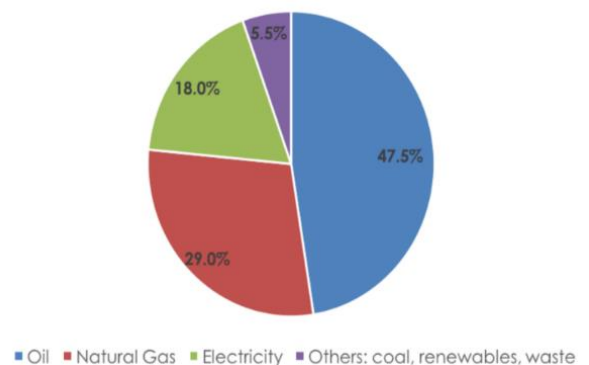
2. PROGRESS / CURRENT SITUATION

National

Renewable energy makes up an increasing proportion of the UK's total energy mix from wind, solar, and hydro. However, this is still dominated by fossil fuel use (largely fuel and heating). Renewable energy accounted for just 3% in 2018.

Over a third of electricity is now generated by renewable energy due to an increase in large-scale offshore wind and large-scale solar farms. In Summer 2019, the UK generated over 50% of its electricity from renewables for the first time.

Primary Energy Consumption by Fuel, 2015



¹ Digest of UK energy Statistics (DUKES) – July 2019

² Dorset Renewable Energy Resource Assessment 2012, Regen SW. -

This increase in renewable output, combined with a reduction in the combustion of coal, means that electricity supplied by the National Grid is now 47% less carbon intensive than it was in 2010. For this progress to continue towards zero emissions for electricity, the UK will be required to play their part in generating renewable energy in their area.

Overall, the energy demand in the UK has been declining slowly, largely due to improved energy efficiency and moves to a service-based industry³.

Dorset

From 2010 to 2016, renewable energy capacity in Dorset increased significantly to approximately 480 MW (mostly solar, with some biomass and anaerobic digestion). This is equivalent to roughly 10% of all energy demand within the Dorset Council area.

To date, Dorset Council have installed a range of renewable energy technologies across the corporate estate and schools, currently totaling a capacity of roughly 1MW.

The Council-run, EU-funded Low Carbon Dorset programme is currently encouraging (through advice and grants) the installation of around 4 MW of renewable energy capacity across the Dorset Council and BCP areas.

However, Dorset still lags in comparison to many other SW local authorities in deployed capacity and currently has no large-scale wind, on or offshore.

3. FUTURE DIRECTION - SCALE OF THE CHALLENGE

National

To address the climate emergency, **all** energy currently provided by fossil fuels for heating, transport, and electricity generation will need to come from a low carbon source. This will need to be largely electricity generated from renewable energy (solar, wind, hydro) with potentially a small proportion of renewable heat from biomass or nuclear.

We will need to switch heating to low carbon alternatives such as biomass, heat pumps, or hydrogen, and switch transport to electric batteries or hydrogen. This will require an enormous increase in the amount of electricity generation to meet the energy demand currently provided through fossil fuels.

Efficiencies will be gained by switching to more efficient heat pumps and electric vehicles but there will still need to be a huge increase in renewable electricity capacity. It will be critical that significant gains

³ UK Energy & Emissions, Energy & Climate Intelligence Unit

are made in improving the energy efficiency of our buildings, appliances, and processes to reduce the demand for additional electricity generation.

It will also be essential to be able to store energy locally and manage our energy in a smarter way in order to meet peak energy demand and to make the most of the renewable energy we produce, reducing bills and carbon emissions.

Hydrogen could be generated from either methane with carbon capture and storage (so-called 'blue' hydrogen) or by electrolysis from water powered by renewable energy ('green' hydrogen).

The best option for heating in the UK⁴ is likely to be a hybrid between electrification and hydrogen. In either case, *and* once transport was also changed to electric batteries or hydrogen, energy demand in the Dorset Council area would equate to around **4 billion kWh/yr**. In simple terms, for Dorset to play its fair share and generate 100% of this total energy demand, we will require around 4 GW of solar (around 19,000 acres) or 2 GW of wind (around 700 big turbines), or some combination of the two.

Dorset

Dorset Council itself will need to make the switch from fossil fuels to heat pumps, electric vehicles, and hydrogen over time. It is estimated that in the region of **60 MW of solar PV** (or 30MW of wind) will be required to cover its own energy needs. This could be provided through direct power purchase agreements (PPA) with a new Dorset energy installation or, with more clarity over additionality, via direct investment in renewable energy projects.

To ensure this future demand is kept to a minimum, improving the efficiency of our buildings will be critical (see Buildings).

4. CONSIDERATIONS

National

At this point, there is uncertainty at a national level around key strategic decision and direction, which includes the direction of heat (electric or hydrogen). In addition, the electricity grid is limited in its ability to support the deployment of renewable energy at the scale needed.

In some areas, such as electric vehicle infrastructure, hydrogen generation, and boilers, the technology is still developing to enable mass deployment. National pilots and trials are currently underway.

The current policy framework does not support the journey to a low carbon future. The scale of deployment at a county level is likely to be unfeasible without changes in National policy and support from central government.

⁴ Committee for Climate Change

Dorset

For both Dorset Council and Dorset county, delivery at scale is required. This needs to be at all levels, such as large scale developments (solar and wind), and at organisation, individual household, and community level. Every opportunity to utilise renewable energy to meet current demand needs to be taken and large-scale deployment projects need to be developed.

Dorset Council's renewable energy capacity needs to increase by a factor of 60. Dorset County's capacity needs to increase by a factor of eight (though a much higher factor, possibly of 20 or more, may be sensible, since BCP have large energy demands and little opportunity to generate themselves). However, deployment of onshore renewable energy has essentially stagnated since 2016, and the Navitus Bay offshore wind farm was not given permission.

This stagnation has occurred for two reasons, both of which are out of Dorset Council's control. Firstly, the planning system does not actively encourage renewable energy installations (indeed, it actively *discourages* wind turbines). Secondly, the removal of all subsidies for onshore renewable electricity generation, the reduction and imminent closure of the subsidy for heat (RHI), and a less favourable view of renewable energy by the tax system have meant that investing in renewable energy is no longer financially attractive in any but a very few cases.

In the small set of conditions where investment is financially viable, decision makers are not always aware of the opportunity. Some technologies are still not clearly understood, and much more needs to be done to demonstrate technologies, provide advice, and support organisations.

Dorset County has many opportunities to improve the renewable energy situation. The most important is the largely untapped resource of solar, onshore wind, offshore wind, and possibly some tidal energy. We can feasibly meet all of our own needs once the national planning and economic climate allow it.

Several key technologies are still developing, but some, such as hydrogen generation from renewable electricity, could be combined with our large energy resource to make Dorset a net exporter of energy, placing it in an excellent economic and resilient position.

The development of the Dorset Local Plan provides an opportunity to explicitly encourage and support the development of all of this renewable energy in Dorset, both at a large scale and smaller scale on new buildings. There are significant opportunities for installing renewables across Dorset Council's estate of buildings, and some of the Council's land holdings may enable large scale deployment which is financially viable now (tens of MW).

It is technically possible for Dorset Council to transition its estate and operation to zero carbon, and many of the measures required offer a good financial return. There is therefore an excellent opportunity for Dorset Council to show leadership and set an example.

The Bournemouth Dorset and Poole Renewable Energy Strategy (2012) identified the use of biomass as a significant opportunity in Dorset, and little has changed in the interim. We have a large untapped resource and potential for economic development in a rural economy.

Bridport is currently hosting a pilot project, the first in England, to allow local trading of renewable energy. This reduces energy bills to consumers but, critically, will also increase potential earnings for generators, making small-scale renewable energy attached to the Bridport substation more financially viable. This is likely to restart deployment, and there is interest to copy the model elsewhere in Dorset.

The Low Carbon Dorset programme has illustrated that there are certain circumstances where small-scale renewable energy deployment is still a good business proposition. There are many companies and buildings in Dorset that are in these circumstances, and the skills in the Low Carbon Dorset team can be used to ensure that the owners of these buildings are aware of them.

Dorset Council cannot itself deploy the Giga Watts of renewable energy required at a Dorset area level and does not have control of national planning policy or the economics of renewable energy.

5. KEY OPPORTUNITIES

There are, however, many things that the Council can do to facilitate the transition from the current state to a situation where Dorset supplies its own energy demands with renewable energy.

Direct Action

- **RE1.** Maximise renewable energy opportunities of Dorset Council's own buildings. This will involve all the buildings off the gas grid having their heating converted to heat pumps or biomass, all the building on the gas grid having their heating converted to hydrogen-ready hybrid heat pumps, and every building having as large an array of solar PV as possible fitted.
- **RE2.** These actions, along with many potential energy efficiency ones, will not be enough to make Dorset Council's operations zero carbon. This will require the construction of a large renewable energy installation (around 60 MW of solar PV or 30 MW of wind turbines). The Council owns land suitable for this, and a feasibility study to select the most appropriate technology, site, and capacity is needed.
- **RE3.** The Council owns far more land than will be needed to cover its own renewable energy needs. A study into the opportunities provided by the County Farms and the Council's car parks should show that there are opportunities for more renewable energy to be generated once the planning and economic climates allow it.
- **RE4.** Potential for the Council to work with renewable energy developers in Dorset through investment, partnership, or purchase agreement to secure new renewable energy generation in Dorset to meet the needs of the Council.

Indirect Through Service

- **RE5.** Dorset Council is the Local Planning Authority. Whilst it cannot overturn the national discouragement of wind turbines, it can actively encourage other renewable energy deployment. A policy in the developing Local Plan to actively encourage large-scale installations would encourage further deployment.
- **RE6.** Undertake an exercise of detailed resource mapping. This would confirm Dorset Council's current understanding that Dorset has the technical resources to be self-sufficient and would allow potential sites to be identified in the Local Plan.
- **RE7.** As well as large installations, many small-scale ones are also needed. Use planning policy, unless the Future Homes Standard prohibits it, to insist upon renewable energy being integrated into all new buildings. A supplementary planning policy will need to be developed to achieve this.

Influence / Partnership

- **RE8.** Whilst Dorset Council has no control over the major hurdles to renewable energy deployment, it can and will lobby central government about them, as well as the decision regarding the Navitus Bay wind farm, the investment needed (at a national level) on grid infrastructure, and on the urgency of a decision regarding the future of heat.
- **RE9.** Partnership working with BCP to commission and contribute to a study aimed at planning what a zero-carbon Dorset energy system would look like. Whilst there are likely to be several options (mostly around heat), these options would allow pathways for various elements (% of heating off the gas grid converted to biomass, % of cars switched to electric, etc) to be projected back to the present day from any target date, giving detailed projections of required progress against which to measure progress.

Progress would then be monitored against these detailed pathways, with annual reports on the best estimate of each of the key measures.

This level of planning and monitoring falls below the scale of the UK Government, and is not going to be provided by the private sector. Therefore, it is an essential action for Dorset Council to take in order to help it steer the required transition.

- **RE10.** Deploy Dorset Council resources in the current final year of the Renewable Heat Incentive to promote renewable heat to users that are most likely to find it financially viable. And extend to other areas where Low Carbon Dorset has identified good business cases for unsubsidised renewable energy (such as swimming pools, certain factories, garden centres, etc). As well as extending the existing Low Carbon Dorset programme.
- **RE11.** Dedicate Council resources to assist with the expansion and awareness of the Energy Local project in Bridport. Once it is shown to work well the Council could assist with setting up

similar projects elsewhere in Dorset, using relatively small amounts of public resources to set up the conditions for others to invest in renewable energy.

- **RE12.** Review whether Council-run schemes addressed at reducing fuel poverty could install renewable heating systems, such as heat pumps rather than the gas boilers which they currently do.