Carmarthenshire County Council 100% Self Powered With Renewable Energy

24th January 2021

1. Carmarthenshire County Council declared a Climate Emergency on 20/2/19. Since then, almost 2 years later, the Council's CO_2 emissions remain the same (probably, although perhaps a fall due to Covid and change of working arrangements which will be negated when it is back to usual business). The only action that seems to have been carried out is the production of the CCC "Route towards becoming a Net Zero Carbon Local Authority" report[i], which was vague, and no new physical actions seem to have resulted from it.

2. Carmarthenshire County Council voted on 9/10/19 to "Divest value currently invested by Dyfed Pension Fund in fossil fuel companies (£141m[ii]) and reinvest directly in local renewable energy within 2 years". A year and half later, the fund has taken no action to invest in any local renewable energy, and from observing meetings and written confirmations, there is no intention to do this from the fund. Instead, the value of fossil fuel shares has fallen over 60% in the last year and lost pensioners £63m[iii].

3. Carmarthenshire Energy Proposed a plan for investment of the £141m in local renewable energy to the fund[iv], but this has been dismissed. As this seems intractable, an alternative method of Carmarthenshire County Council investing in local renewable energy and saving money which can then be used to other purposes to the benefit of the community, is proposed here.

4. The "Route towards becoming a Net Zero Carbon Local Authority" dismisses renewable energy generation as not possible due to electricity grid limitations from Western Power and removal of Feed In Tariff, and proposes to take no action until viability changes.

5. A simple solution to both these issues is to have 100% local consumption of generated electricity. This means:

    a. There is no requirement to export power, so no export limitations from Western Power. So, this can be done on any Council property at any time.

    b. There is no need of the Feed In Tariff or high export tariffs.

    c. All energy is used internally, saving the Council around 15p/kWh, so allowing the capital investment to be paid back. Then once fully paid back, the energy is completely free, and the savings can be passed on to enable the Council to benefit the community.

6. This is achieved by installing solar panels on all roof spaces and car park canopies, and using battery backup to store excess power at peak sunny times of day, and provide power to the building consistently throughout the day. Power will be generated directly at sites that need the power, so no transmission is required.

7. The benefits are:

    a. The Council will be self-sufficient in energy, so will not be subject to energy price increases.

    b. The Council's CO_2 emissions will be cut by 70% (the remaining is tackled through a push towards electric vehicles).

    c. While the Council currently purchases all its energy through an electricity supplier which supplies "renewable energy", this is only a notional concept, as the power is actually drawn from the nearest supplier. By generating its own power renewably, the Council frees up those grid resources to be used by others. In order to move all heating and transport to carbon zero energy sources, there needs to be an increase of 14 times the renewable electricity currently provided on the national grid, so everyone must play their part to help with that transition.

    d. Reduced reliance on the national grid, allowing more renewable energy projects to be added, which will be required as more heating and vehicles are converted to electricity.

    e. Installing solar panels and batteries is a quick installation, requiring the minimum of planning. This can all be done this year to set a prime example to others, and make a significant impact on reducing the Climate Emergency. There is no need to wait until 2030.

8. Calculations.

    The total energy requirements for the Council's non-domestic buildings are:

    20GWh/year electricity[v].

    44GWh/year fossil fuel heating.

    In order to achieve carbon zero, the fossil fuel heating would have to be replaced by electrical heat pumps, which generate 3-4 times more heat than electrical energy input. So, the electrical energy required for heating is around 15GWh/year.

    Total electrical requirement to power the whole estate for electricity and heating: 35GWh / year.

    This amount of energy can be provided by 41MW of solar panels with 41MWh of battery backup at a cost of around £41m[vi].

    These would take a space[vii] of 9,500m^2

    There are 429 council properties. So, an average required space of 22m^2 per property. The roof size of an average UK house is 120m^2, so on this very broad brush estimate it shows there is plenty of space available on the Council's estate to power itself. In practice most sites will be much a larger than this, so have a much greater capacity to mount the panels.

NB. These are very broad-brush calculations. In practice, there will be some reliance on importing power from the national grid in the winter, as the solar panels will produce less power in the winter due to fewer sunlight hours and intensity. This can be reduced by over-sizing the system so that it can produce more in the winter (and an unused excess in the summer).

9. Funding – Solar Power & Batteries

Government Salix funding is available interest free for projects that pay for themselves through energy savings within 8 years. This period can be extended where appropriate, or alternative funding found for the balance.

The savings will be:

20GWh electricity @ 15p/kWh = £3m

44GWh gas / oil @ 4p/kWh = £1.8m

Total = £4.8m / year.

Payback time = 8.5 years.

In particular, we note that only £2m has been claimed in Salix grants to date by the Council for energy improvements over the last 7 years. While the capital expenditure planned for the Council this year alone is £130m[viii]. How much of this is going to lead to zero carbon buildings (in particular since the successfully proven Passivhaus standard for new building mentioned in the net zero plan has been abandoned by the Council)? We understand a large amount is for rewiring County Hall – that would be a perfect time to install solar panels and batteries and save money by combining the works.

10. Funding – Heat Pumps

In order to generate all heat renewably, the easiest solution is to replace gas and oil boilers with electrically powered heat pumps. This investment can more than pay for itself through the Non-Domestic Renewable Heat Incentive scheme which has been extended, but *only up to March 2022* – so to take advantage of this, the Council must act rapidly.

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[i] https://www.carmarthenshire.gov.wales/media/1223704/gd6245-netzerocarbon-plan3.pdf

[ii] £141m figure provided by Cllr Rob James.

[iii] http://www.carmarthenshireenergy.org/YSG/NewsStory/Partial-win-for-local-campaign-group-but-too-late-to-save-pensioners-63-million-pounds

[iv] http://www.carmarthenshireenergy.org/YSG/PublicFiles/media/DyfedPensionFundDivestment.pdf

[v] https://www.carmarthenshire.gov.wales/media/1223704/gd6245-netzerocarbon-plan3.pdf page 5.

[vi] Figures from 9-year average from Solutions Factory 150kW array in Carmarthenshire: 960kWh/year. General UK average lower: 850kWh/year. Conservative, lower figure has been used in calculations.

[vii] Length: 1675mm, Width: 1001mm, Output: 370 Watts (per panel) = 0.23125 kW/m^2

[viii] Figures provided by Cllr Rob James.