

RENEWABLE ENERGY RESOURCE, % OF DEMAND MET CALCULATIONS AND MAPS**Summary**

The numbers/tables within AECOM’s REA have been used to inform policy, but are full of errors, uncertainties, and figures which are insufficiently justified or the derivation of which simply can’t be understood/justified. Constraints which should have been applied to achieve robust figures have not been applied. This consistently serves to overestimate the potential resource and understate current generation and understate the intended ‘production by reference to consumption’ in 2026. No sound policy can be underpinned by figures and calculations which, like these, are simply not robust.

The following figures which are critical to the establishment of targets and policy are entirely opaque in their derivation:

- Baseline existing large scale renewable energy capacity
- Table 4 REA - Potential wind resource 1124MW (P5 – what has been added and how is this justified – not transparent)
- Table 4 REA – Potential Hydro resource 15MW
- Table 8 – Predicted energy consumption

What is the real target for Powys? We are very disturbed by the mismatch between figures as shown in Table 12 – Potential GWh **1603.70** and page 37: *‘The maximum potential electrical energy that could be generated across Powys from renewable and low carbon energy technologies (including existing and potential) in 2026 is circa 5,029 GWh, which equates to circa 30% of the total electrical consumption across Wales in 2008. However, excluding the contribution from renewable wind, the total potential renewable electricity that could be generated by 2026 is circa 1631 GWh.’* From this it appears a real target for Powys of GWh 5029 – 1631 = **3398 GWh** is intended, more than double what has been stated on page 12. If the target for Wales as a whole for 2026 is 2GW (Low Carbon Revolution Energy Policy Statement) ie approximately 5TWh of installed wind, this makes Powys’s contribution out of all 68% of the total. There is no honesty or clarity about this intention to ‘repurpose’ Powys within this document, nor has there been any public debate on this issue

PLAN TARGET

- Appropriateness/achievability of a target depends on realistic identification of appropriate land resource by application of suitable constraints & realism as to MW capacity of that land resource.
- 600MW target relies on figures of resource which are obscure in derivation (see above, and full explanation below), inclusion of land resource which is reached by application of only the most minimal constraints/failure to apply even those constraints which are identified within the Toolkit and TAN8, over ambitious MW output figures for each km² of land resource (wind).
- It is not clear what if any weight the breakdown by technologies has on the achievement of the target, whether these are individual technology specific targets or whether there are mechanisms to ensure no inappropriate development resulting from favouring any particular technology. (It would perhaps be clearer if the Monitoring Framework were contained within consultation documents.)
- Targets with application across several technologies would in any case be better expressed in GWh as otherwise having little real meaning.

- The relationship between targets and production outside/inside the SSAs is wholly unclear.
- It is stated that this policy lasts beyond the plan period. The statement appears to have no basis in law – this plan is valid till 2026, the development of the next plan is the responsibility of the council then in office. The intention seems to be imposition in 2026 of another target for generation from the same LSAs. Given the many ways in which the resource and therefore the target seems almost ridiculously overstated, and the current target beyond what can be achieved without harm, this is serious cause for concern.

Information presented in RE1 Schedule of Further Focussed Changes is materially misleading.

Maps demonstrate that majority of land within LSAs is constrained even by reference to very limited constraints applied within mapping process.

REA TABLES – CRITIQUE

1. Table 1 REA: Existing large scale renewable energy capacity in Powys

- **312.7MW** figure for existing wind generation capacity doesn't seem sufficient. See <https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract> Extracting Powys operational and consented gives **378.7MW**.
- Page 16 'Strategic Search Areas' states that there is **78.95MW** installed and operating, **140.3MW** consented, and **347MW** in planning. We are told this is **2015** data provided by Powys – why has this not been brought up to date? This will impact on the calculations and on the cumulative impacts. These figures should be brought up to date and clearly broken down and explained.
- Current figures are hard to establish – different sources recording information in different ways, with inconsistencies. Baseline figures need to be robustly evidenced.

Conclusion: Baseline generation figures are not robust/up to date.

2. Table 4 REA: Potential renewable energy resource in Powys in 2026 - Figure of 1124MW – wind resource

- It is impossible to trace derivation of **1124MWe** figure. This should derive from Tables 11 & 12, but these are expressed in km² and GWh.
- Potential wind resource in GWh of **1603.7GWh** from Table 12 equates to **678MW not 1124MW**.
- Note at base of page 5 REA states '*this figure [1124MW] includes the current planning applications (consented is considered as existing) being considered within the SSA plus the resource in the wider county.*' This is entirely unclear, but seems to mean **1124MW** = resource + in planning in SSAs. This arithmetic does not work: resource = **678MW**, in planning in SSAs (we are told) = **347MW** i.e. total is **1025MW**.
- Anyway, this approach cannot be correct – the target must be related to the available land. If it is intended that the target should address available capacity within the SSAs, this needs to be properly calculated. MW 'in planning' has no bearing on capacity remaining. Until this calculation is done and presented for public consultation, there should be no addition to the figure of **678MW** above.
- There is a further logical failure in that the land areas falling into Priorities 5 and 6 are included within available resource. These priorities are identified as potentially problematic for NATS. These issues should be resolved before inclusion or the inclusion otherwise justified. In which case the available resource becomes **1005.12GWh = 424MW**, rather than **678MW**.
- There is a further logical failure in that the wind 'resource' is being calculated without reference to constraints such as landowner willingness, landscape character and economic distance to grid connection, all set out as

constraints to development in the Toolkit, and the latter two capable of being incorporated into a GIS screening system, as the REA confirms. Planning policy Wales 8 para 5.3.13 confirms the requirement to consult LANDMAP. REA states ‘An exercise can be undertaken whereby areas that are recorded as having a ‘high’ or ‘outstanding’ value attributed to them within the ‘Character and Scenic Quality’ column within the Visual and Sensory Layer of LANDMAP can be identified and constrained within GIS maps; this exercise has not be [sic] undertaken as part of this assessment’. Why not? To arrive at a robust mapping of resource LANDMAP data for both Visual and Sensory and Historic Layers should have taken place. A further landscape constraint which should also be applied is impact on neighbouring designated landscapes. The target should therefore be reduced again below the **424MW** above. (See <http://www.brecon-and-radnor-cprw.wales/maps/> for mapping of Visual and Sensory and Historic High and Outstanding aspect areas.)

- Constraints re historic assets take into account physical damage only and not setting – the newly published PPW9 reinforces the need to consider the historic environment, which requires consideration of both the settings of historic assets and historic landscapes. Decisions need to be based on ‘an understanding of the significance of Wales’ historic assets’, and these will include archaeological remains. (PPW9 Para 6.2.1) Similarly, a separation distance of 500M from a 120m turbine is insufficient to protect residents from noise nuisance and damage to health. If these constraints are properly addressed there will be a further reduction in available land.
- A further anomaly – ‘This exercise has removed the following land parcels: Unconstrained land within TAN 8 already earmarked for wind development (p19)’ The meaning of this is unclear in that the whole REA mapping exercise has excluded land within the SSAs anyway, but it may mean either: that development within the SSAs does not contribute to the target, or that land within the SSAs does contribute to targets and much more land has been identified outside the SSAs than is necessary for the achievement of the objectives presented in the LDP.
- All TAN 8 SSAs together have a total capacity of **1120MW** – if further argument were needed this points up unlikelihood of ‘resource’ if properly identified amounting to anything even approaching **1124MW**.

Conclusions:

1) The land base which forms the basis for targets is excessive in that many constraints are not addressed. The addition of an unspecified figure – see note at base of page 5 – cannot be justified without full explanation of the rationale. It appears the target should be somewhere below 424MW.

2) The target is excessive, its application within Powys (including or not including the SSAs) is not clear, and attempts to enforce this target will lead to substantial environmental harms.

3. Table 4 REA: Potential renewable energy resource in Powys in 2026 – Figure of 1234MW - solar resource

- **1234MW** (1081GWh on P30) derives from 29.61km² (P30) at assumed generation of 1MW/2.4Ha.
- The ‘resource’ is calculated without reference to constraints such as landowner willingness, landscape character and economic distance to grid connection, all set out as constraints to development in the Toolkit, and the latter two capable of being incorporated into a GIS screening system. Application of these constraints might substantially reduce the ‘resource’ so that the **1234MW** is not a robust figure.
- Solar output calculations assume a 10% load factor. Welsh Assembly report (2015) shows all large scale solar development in Wales is on the south coast or south Angleseyⁱ. DECC documentⁱⁱ shows average load factors for Welsh sites to be just under 10% - making 10% for hilly mid Wales impossible. A more precautionary load factor should be applied. SolarGIS mapping could have been referred to to estimate a reasonable outputⁱⁱⁱ.
- It is clear (page 30) that screening according to Agricultural Land Classification is desirable but has not taken place - although it is assumed to have taken place on page 21 in discussion of biomass resource.

Conclusion: The figure of 1234MW for potential solar energy resource is not robust, nor is assumed output.

4. Table 4: Other potential renewable energy resources. We have not analysed these in detail but:

- **Biomass: Crops:** The figure given seems to rest on the assumption set out on page 21: *‘This assessment has assumed that 10% of the suitable land area identified for energy crops could actually be planted with energy crops.’* It is not clear why this should be a reasonable assumption or whether impacts on food production have been taken into account. Has any account of distance of travel been taken in arriving at potentially available land area? Page 21: Why have ancient woodlands/local designated sites etc. not been excluded from available land area?
- **Biomass: Wood fuel:** Page 22: The wood fuel figures assume a potential of **62.5MW** from wood fuel, **23.3MW** of which would come from Forestry Commission woodland. What is the evidence for assuming the remainder can be sourced from privately owned woods? Have potential environmental impacts been taken into account in arriving at the numbers?
- **Waste:** Why is this section not informed by up to date information from the NFU/FUW?
- **Hydro:** This figure is derived from Table 19 – but there is no explanation of the derivation of the **51.3MW** *‘high sensitivity’* figure given, nor why it is considered reasonable to assume that 25% of these schemes could be developed. When micro hydro schemes can be as small in output as 2kw, this is assuming that potentially more than 6000 small hydro schemes might be developed in highly sensitive sites. More explanation of the rationale for this assumption is required.

Conclusion: Other potential renewable energy resource figures given in Table 4 are insufficiently evidenced.

5. Table 29 Resource summary for renewable electricity in 2026

- There is no clear explanation of the percentages applied
- ‘Percentage electricity demand in 2026 potentially met by renewable energy resource’ is wrong as the calculation does not include existing installed capacity. This sum should be $(810GWh + 1243GWh)/606GWh = 339\%$

Conclusion: Table 29 materially misstates the multiple by which Powys would be exceeding its own demand by the end of the plan period.

6. Tables 7 & 8 Energy Consumption

- Assumptions underlying these tables are not evidenced.

Conclusion: Predicted consumption in 2026 (Table 8) is not evidenced.

TOPIC PAPER TABLES – CRITIQUE – WIND AND SOLAR

1. Table 1 Summary of the 2016 REA Update

- This table is needlessly confusing and uninformative. There is no requirement to show 2012-2016 figures within this summary table and doing so simply obscures the important figures.
- Why is the ‘Predicted consumption by 2026’ given in GWh while other figures appear in MW? Use of different units of measurement simply obscure the fact that **936MW** converts to **1782GWh (973GWh + 809GWh)** i.e. almost 300% of **606GWh**.

Conclusion: Table 1 is difficult to read and does not identify to the reader that Powys is intended to become a major net exporter of renewable energy by 2026.

SCHEDULE OF FURTHER FOCUSED CHANGES TABLES – POLICY RE1

1. Table RE1 – Summary of Renewable Energy Contribution

- In calculating the *'Percentage of Powys Electricity Demand in 2026 potentially met by Renewables in Powys'* both the existing *and* the potential additional energy generated must be included. The correct sum becomes $(810GWh + 973GWh)/606GWh = 294\%$ not 106%
- Even the incorrect sum $973GWh/606GWh$ has been incorrectly calculated and should give 161% and not 106%

Conclusion: the table is full of errors and extremely misleading.

2. Table RE2 – Resource summary table for renewable heat in 2026

- This table contains a similar error to Table 1. *'Percentage thermal demand in 2026 potentially met by renewable energy resource'* should be calculated as $(146GWh + 75GWh)/1463GWh = 15\%$

Conclusion: Once again figures presented understate Powys's renewable generation as a % of predicted demand.

MAPS – AECOM MAPS (EVIDENCE BASE)

The maps underlying resource calculations are also confusing.

- The rationale for designation of huge land areas around small areas of resource is not explained and is in conflict with Richard Pitts' presentation to councillors on 10/11/2016 *'Local Search Areas...are intended to be "guide" to where "least constrained" areas may be – where "probably best" to start looking.'* The greater part of most LSAs is **constrained** land even according to the minimal constraints so far applied.
- The term *'excl dwellings'* (Maps W2 and W3) is unclear and seems even inconsistent in meaning between Maps W2 and W3.
- The *'priority'* areas (Maps W4 and W5) are not explained within the FFC documents.
- The cumulative exercise seems lacking in real purpose in that it does not inform the LSA designation (Maps W5 and S5).
- Maps W6 – Local Search Areas are designated for development of 5MW to 25MW – why is there a category of resource - much of which is actually constrained out by cumulative factors – for 0-25MW? If this is corrected, what impact does this have on available resource?
- Why if, as stated on p30 REA, *'The result of applying these criteria reduces the area of land that could for a Local Search Area for PV Solar Farms across Powys to 29.61km²; this is essentially the theoretical maximum of land that can be utilised to generate electricity from PV farms in Powys as shown in the following maps'* are the Local Search Areas for solar generation clearly so very much larger than 29.61km². (Note Richard Pitts presentation to councillors states that 7.4km² is required for achievement of targets.)
- It is unclear what the status of the AECOM maps is intended to be.

Conclusion: The maps are hard to follow and insufficiently explained. It is completely unclear why so much constrained land has been included in the LSAs in addition to the unconstrained (according to those limited constraints so far applied) resource.

ⁱ <http://www.assembly.wales/Research%20Documents/RN15-005%20-%20Solar%20Farms/RN15-007.pdf>

ⁱⁱ <https://www.gov.uk/government/statistics/quarterly-and-annual-load-factors>

ⁱⁱⁱ <http://solargis.com/products/maps-and-gis-data/free/download/united-kingdom>