

December 2018 Addendum to the Renewable Energy Assessment for Merthyr Tydfil County Borough Council June 2017

The Renewable Energy Assessment (REA) for Merthyr Tydfil County Borough Council, produced by Regen SW in June 2017, identified areas of solar and wind energy potential based on a number of specific mapping constraints.

The REA recommended further refinement of the areas of technical resource identified in order to inform the designation of local search areas in the Local Development Plan (LDP) and target setting in accordance with the Planning for Renewable and Low Carbon Energy - A Toolkit for Planners.

Consequently, this addendum provides further analysis of the identified wind and solar resource in accordance with the practice guidance toolkit Project Sheet B (Wind Energy Resource), Step 9 (Assess cumulative visual and landscape impact issues and reduce resource accordingly) and Project Sheet K (Assessing Solar Photovoltaic Farm Resource), Step 4 (Addressing cumulative impact). This further assessment is required in order to identify prioritised local search areas for wind and solar energy in the Local Development Plan.

An updated Resource Summary and Target Scenarios for Renewable Electricity table is provided as part of this addendum. This supersedes the Resource Summary table contained in the June 2017 Regen SW REA report (Table 53, Page 112). This table has informed the monitoring framework of the Replacement LDP providing the basis for the Renewable Electricity targets.

The refinement exercise set out in this addendum has identified 3 local search areas for solar energy (of local authority wide renewable energy capacity) which have been designated on the Replacement LDP Proposals Map.

Potential Wind Resource

The Regen SW Renewable Energy Assessment (REA) identified numerous areas of technical capacity for potential wind energy development across the County Borough area. However, there are a number of limitations to the constraints mapping approach that mean constraints such as electricity grid connection viability and landscape impacts can only be assessed at the project level. In order to identify local search areas for wind energy potential the REA advised the following:

Cumulative and landscape impact can only truly be assessed on a site by site basis and both are key factors in the assessment of a planning application. Cumulative and landscape impact are not usually considered in a resource assessment; however, they are important considerations for the deployment of wind turbines in any area. In considering what might be the deliverable capacity from wind energy for the Local Development Plan, the Council should consider cumulative and landscape impacts in a refinement exercise of the theoretical capacity identified in this report. Regen SW REA, Section 5.3 (Page 34)

Cumulative and landscape impacts have not been considered in this resource assessment; however, they are an important consideration in the delivery of wind turbine developments. Consequently, in considering what might be the deliverable capacity from wind energy for the Local Development Plan, the Council should consider landscape impacts in a refinement exercise of the theoretical capacity identified in this report. This should inform the identification of Local Search Areas and renewable energy target as set out in the Welsh Government toolkit. Regen SW REA, Section 5.9 (page 46)

This section sets out the refinement steps undertaken in accordance with the Welsh Government Renewable Energy Practice Guidance Toolkit, Project Sheet B (Wind Energy Resource), Step 9 (Assess cumulative visual and landscape impact issues and reduce resource accordingly).

The REA identified nine sites with the potential to accommodate large scale (2MW or greater) wind turbines (shown in Fig. 1). Turbines of this scale would have a blade tip height of 120m (as indicated in Project Sheet B, Step 1, Wind turbine typology, p136-137 of the REA Toolkit).

The identified sites with less than 5MW potential capacity (i.e. local authority wide scale potential) were removed as specified in Section P3, P119 of the REA Toolkit, resulting in four sites remaining (shown in Fig. 2). Sites identified in the REA for medium-scale (500kw) turbines were not considered as the capacity of these areas was identified as being less than 5MW (Section P3, P119 of the REA Toolkit).

A 7km buffer was applied to the remaining potential wind resource areas as indicated by the REA toolkit (the rationale being that beyond this distance, wind farms no longer appear dominant in the landscape), prioritising the largest area (Ffos-y-fran), as stated in Sheet B, Step 9, p144 of the Toolkit (shown in Fig. 3). Following this exercise, one potential wind farm area (Ffos-y-fran) remained (shown in Fig. 4).

A 7km buffer was then applied to existing erected turbines, and extant planning permissions for turbines, within Merthyr Tydfil County Borough (shown in Fig. 5), and in the adjoining local authority areas (shown in Fig. 6) as suggested by Project Sheet B, Step 9, point 2 of the REA toolkit. As can be

seen, the remaining site at Ffos-y-fran falls wholly or partially within 7km of several erected and permitted turbines within Merthyr Tydfil County Borough and in the adjoining local authority areas.

Furthermore, the area falls within an area of high landscape sensitivity to very large wind turbine development (turbines with a blade tip height of 109m and over), as identified by the *Heads of the Valley Smaller Scale Wind Turbine Development Landscape Sensitivity and Capacity Study 2015*. Additionally, a recent planning appeal, for a large scale wind turbine near Ffos-y-fran (APP/U6925/A/17/3176287) was refused and ultimately dismissed at appeal on landscape impact grounds.

Considering this landscape sensitivity to wind turbine development, along with the results of the refinement exercise, the whole of the potential resource for large scale turbines has been ruled out for identification as specific local search areas. It is considered that the landscape sensitivities are such that identifying a local search area would not provide the certainty to potential developers due to the landscape sensitivity to large scale wind turbine development in the areas of potential. Individual turbines may be acceptable however the landscape and visual impact of these will need to be considered on their own merits as part of detailed development proposals.

Therefore no specific local search areas for wind energy are recommended to be included in the replacement LDP 2016-2031. It is however recommended that the LDP should provide a broad positive policy approach that enables individual wind turbine schemes in the County Borough to come forward for development in instances where these can be justified. This approach is considered appropriate given the landscape sensitivities in wind energy resource areas.

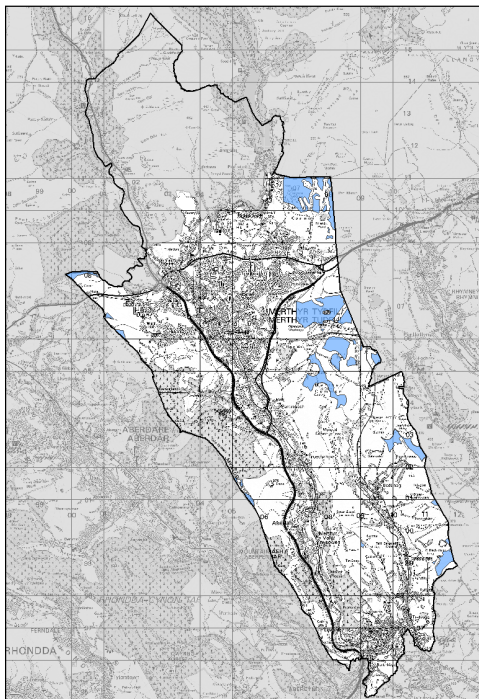


Figure 1 – Sites identified by the REA with the potential to accommodate large scale wind turbines

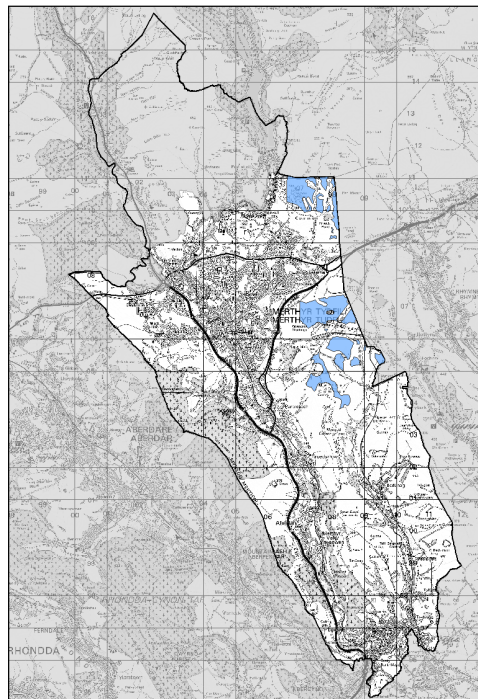


Figure 2 – Removal of sites with less than 5MW potential capacity

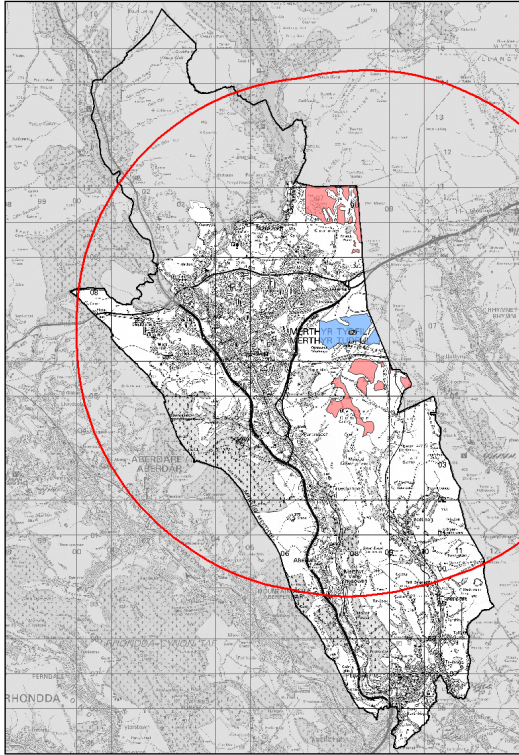


Figure 3 – 7km buffer applied to remaining sites (starting with the largest)

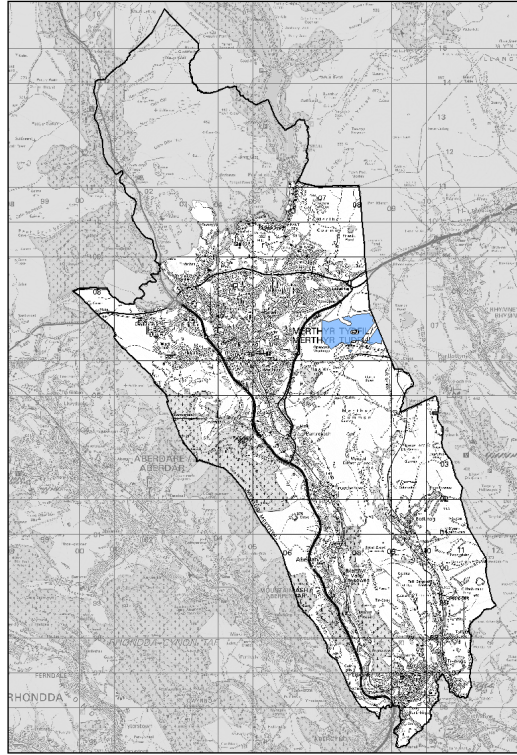


Figure 4 – Site remaining after application of 7km buffer

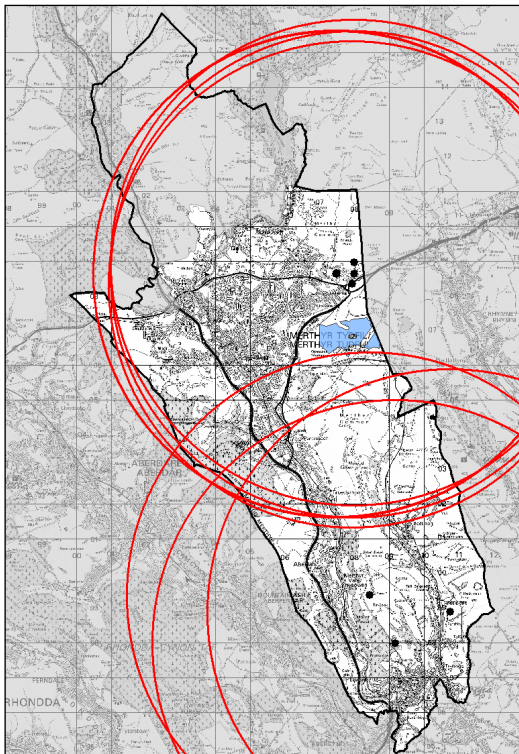


Figure 5 – 7km buffer applied to currently erected wind turbines, & those granted planning permission but not yet erected within MTCB

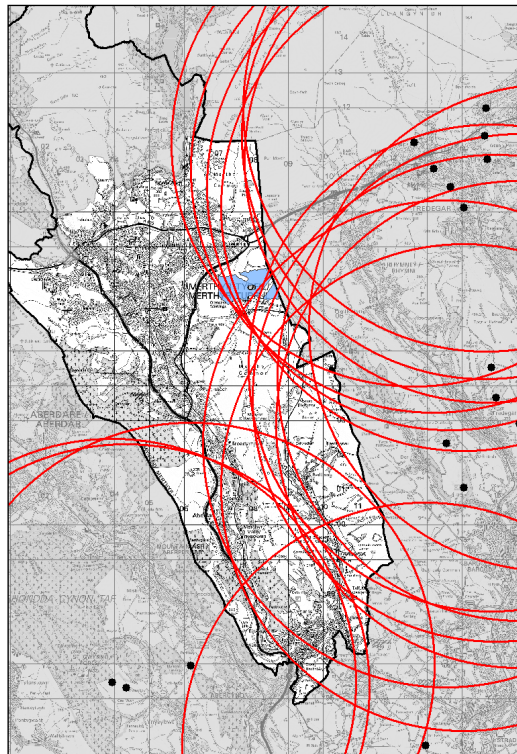


Figure 6 - 7km buffer applied to currently erected wind turbines, & those granted planning permission but not yet erected within adjoining LAs

Potential Solar Resource

The Regen SW Renewable Energy Assessment (REA) identified numerous areas of technical capacity for potential solar energy development across the County Borough area. However, there are a number of limitations to the constraints mapping approach that mean constraints such as electricity grid connection viability and landscape impacts can only be assessed at the project level. In order to identify local search areas for wind energy potential the REA advised the following:

Landscape impacts have not been considered in this resource assessment; however they are an important consideration in the delivery of solar farm development. Consequently, in considering what might be the deliverable capacity from ground-mounted solar for the Local Development Plan, the Council should consider landscape impacts in a refinement exercise of the identified theoretical capacity. This should inform the identification of Local Search Areas and targets as set out in Welsh Government guidance. Regen SW REA, Section 10.3 (Page 62)

This section sets out the refinement steps undertaken in accordance with the Welsh Government Renewable Energy Practice Guidance Toolkit, Sheet K (Assessing Solar Photovoltaic Farm Resource), Step 4 (Addressing cumulative impact).

The REA identified nineteen sites with the potential to accommodate large scale (250kW or greater) solar renewable energy development (shown in Fig. 7).

The identified sites with less than 5MW potential capacity were removed to prioritise sites of local authority wide scale as indicated at Section P3, P119 of the REA Toolkit, resulting in fourteen sites remaining. One site (Northwest of Aberfan), falls entirely within the identified boundary of the Aberfan Cemetery and Memorial Garden Historic Park and Garden. Due to this designation and its local importance, this site was removed from the potential solar resource. The remaining areas of solar energy potential of local authority wide scale (i.e. above 5MW) are shown in Fig. 8.

A 3.5km cumulative impact buffer was then applied to the remaining potential solar resource areas, prioritising the largest area, as stated in Project Sheet K, Step 4, p197 of the REA Toolkit (shown in Fig. 9). Following this geographic refinement step, five sites remained (Ffos-y-fran, North East of Trelewis, North of Bedlinog in part, Merthyr Road, and South West of Merthyr Vale in part). The potential landscape impacts from solar energy development were reviewed to ensure any areas to be recommended as local search area would be realistic and provide sufficient certainty to developers. One of the remaining resource areas, the area North of Bedlinog, was identified as being unsuitable for large scale solar energy development. This was due to the likely impact on the Gelligaer Common Landscape of Special Historic Interest, which the search area is almost wholly within, and proximity of a number of Scheduled Ancient Monuments (including the Gelligaer Common cairns) and important views between them. Consequently, this area was ruled out as a local search area. This was later confirmed by a Landscape Sensitivity Study prepared to support the identification of the local search areas (referred to in the following section), which identified the area as having high landscape sensitivity.

Following this refinement exercise, four solar areas remained - Ffos-y-fran, North East of Trelewis, Merthyr Road, and South West of Merthyr Vale (shown in Fig. 10).

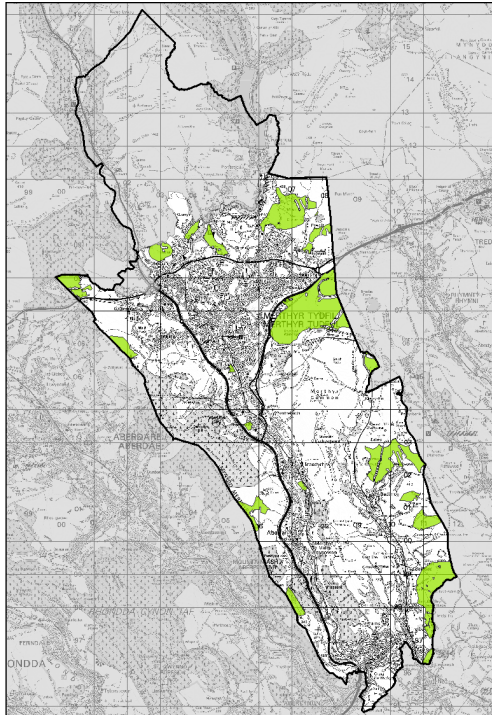


Figure 7 - Sites identified by the REA with the potential to accommodate large scale solar development

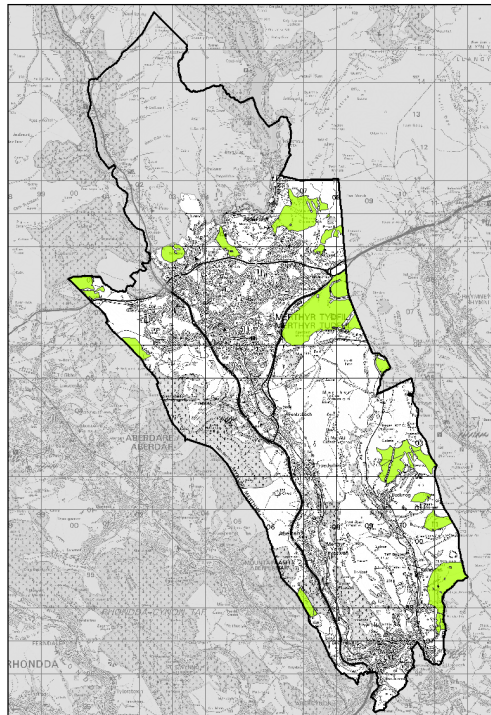


Figure 8 - Removal of sites with less than 5MW potential capacity

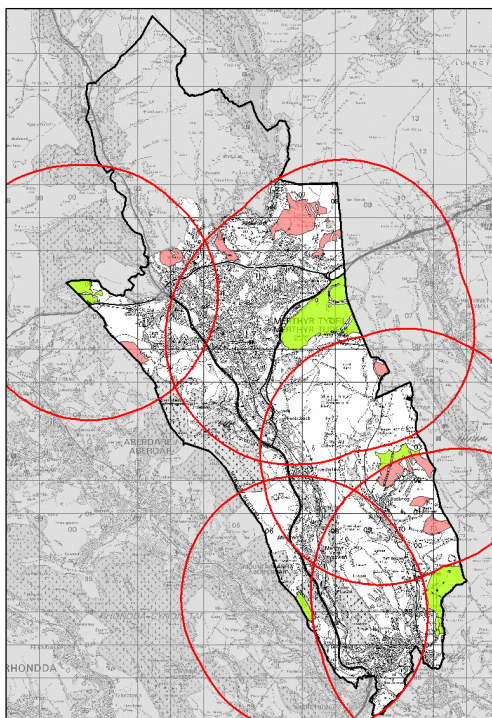


Figure 9 - 3.5km buffer applied to remaining sites (starting with the largest)

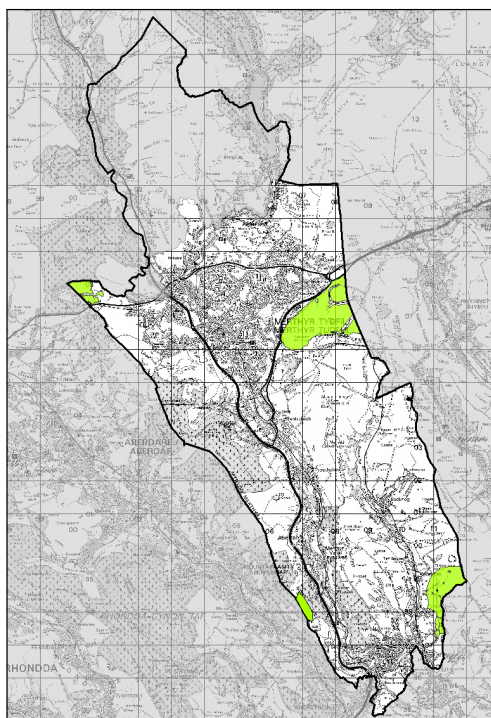


Figure 10 - Sites remaining after application of 3.5km buffer

Landscape Sensitivity Study

The Renewable Energy Assessment for Merthyr Tydfil, along with the cumulative impact refinement exercise described above, was used to identify the local search areas for solar energy in the Replacement LDP. The WG renewable energy toolkit is not prescriptive about this stage and while the refinement was undertaken in accordance with the steps suggested, the landscape sensitivity of the search areas had not been systematically assessed (i.e. consideration of the landscape value and susceptibility to solar energy development to ascertain the “sensitivity” of those search areas). Landscape impacts are an important consideration in the delivery of solar farm development and representations on the Replacement Deposit Plan were received from Natural Resources Wales that requested additional evidence to support the identified search areas.

Consequently, the Council has prepared a Landscape Sensitivity Study which more rigorously assesses the landscape sensitivity of the identified search areas. This is set out in more detail in the separate Landscape Sensitivity Study for Solar Energy Search Areas background paper (December 2018). The study resulted in a focused change to remove one search area due to the landscape sensitivity identified. This updated addendum provides a summary of the results and updates the overall resource assessment tables.

As a result of the Landscape Sensitivity Study, the Merthyr Road local search area was identified as having high landscape sensitivity to solar energy development. This assessment, along with the fact that the Merthyr Road search area adjoins the Brecon Beacons National Park, resulted in it being ruled out as a search area. This is because the landscape constraints identified have clear implications on the level of certainty that can be provided to landowners and developers for gaining planning consent for solar energy development. Two smaller potential resource areas within the 3.5km buffer of the Merthyr Road area were also considered as these could have provided alternative search areas (North of Cefn Coed and West of Heolgerrig). However, the Landscape Sensitivity Study found these areas have very high and medium-high sensitivity, respectively. Given the assessments, along with the close proximity of the sites to the Brecon Beacons National Park, it was not considered appropriate to designate these areas as alternative local search areas.

The remaining three solar search areas were assessed as being less sensitive (Ffos-y-fran – medium sensitivity, North East of Trelewis – medium-low sensitivity, and South West of Merthyr Vale – medium sensitivity) and are considered appropriate to be identified as local search areas as there remains a reasonable level of certainty for landowners and developers.

The REA assessment makes clear these areas do not indicate the acceptability of solar energy development across the whole search area identified, due to the need to consider detailed proposals and the remaining levels of constraints (or viability/costs to connect to the electricity grid), however they can provide the basis of local search areas for potential ground-mounted solar energy development where detailed proposals can be further refined. Following the Landscape Sensitivity Study the Council is satisfied the three areas identified can provide the level of certainty required to designate these as local search areas for solar energy development in the Replacement LDP.

In recommending the three proposed solar search areas, the Council has had regard to the requirements of PPW, the Welsh Government Dear CPO Letter dated 10 December 2015 and the REA Toolkit Practice Guidance (September 2015) which requires local authorities to identify areas of

local authority wide potential (above 5MW capacity) where appropriate. The following section sets out the resource assessment tables which have been amended as necessary.

Solar Energy Areas Potential Annual Energy Outputs

Having identified the prioritised local search areas for solar energy the annual electricity output has been calculated.

The REA Toolkit states that, according to the DECC UK Solar PV Strategy (Part 1: Roadmap to a Brighter Future) the land area required for a 1MW fixed-tilt PV array is approximately 0.024km². This figure should be used to determine the potential installed capacity (MW) of each local search area.

In order to assess the annual energy output from each identified site (MWh), a capacity factor of 0.1 has been used as assumed in the REA Toolkit. This can be used to calculate the total annual generation; that is to say the annual energy output is a product of its installed capacity, the capacity factor and the number of hours in a year. The annual energy output can therefore be calculated as follows:

For example, for site no. 1 Ffos-y-fran:

$$2.5 \text{ (Km}^2\text{)}/0.024 \text{ (Km}^2\text{)} = 104.2 \text{ MW}$$

$$104.2 \text{ (MW)} \times 0.1 \text{ (capacity factor)} \times 365 \text{ (days)} \times 24 \text{ (hours)} = 91,279 \text{ MWh}$$

These formulae were applied to the remaining potential solar resource areas to produce potential capacity (MW), and potential annual energy output (MWh), shown in Fig.11 below.

Figure 11: Solar Energy Areas Potential Annual Energy Outputs

| Site no. | Site name | Area sq km | Potential capacity (MW) | Potential annual energy output (MWh) |
|----------|---------------------------------------|------------|-------------------------|--------------------------------------|
| 1 | Ffos-y-fran | 2.5 | 104.2 | 91,279 |
| 2 | North East of Trelewis | 1.1 | 45.8 | 40,121 |
| 3 | South West of Merthyr Vale | 0.2 | 8.3 | 7271 |
| | Max. accessible land for solar | 3.8 | 158.3 | 138,671 |

Renewable Energy Contribution Targets

The Regen SW REA (June 2017) identified target scenarios for the year 2031 of 8MWe (low) and 12.5MWe (high) for wind renewable energy electricity development (Table 53, Page 112). This level of potential relates to the technical resource assessment identified prior to the refinement exercise set out in the REA toolkit practice guidance.

The low target for wind is based on assumptions of three 2MW and one 500kW turbines. Given the findings of the refinement exercise the assumption of three 2MW turbines will be

removed from the target. This would equate to a reduction of 6MWe and therefore the amended low target scenario for wind renewable energy development would be 2MWe.

The high target scenario would require the removal of four 2.5MW turbines, which would equate to 10MW. Therefore the amended high target for wind energy would be 2.5 MWe (from 12.5MWe). Given the geographic spread of the technical area of potential for wind and the various scales of development that could help deliver this (depending on cumulative landscape impacts which will require further assessment), this target is considered to be appropriate.

With regards to solar energy, given the scale of the remaining 158.3 MWe potential, it is considered that both the suggested low and high targets remains appropriate for inclusion into the replacement LDP. The amended renewable energy resource assessment and target setting table is shown in Fig.12.

Whilst solar energy provides the majority of the potential available renewable energy resource within the County Borough, remaining levels of constraints would need to be considered and it is likely that not all of this resource will be realised. However, the amended low and high targets for overall renewable electricity generation (as illustrated in Fig.12 overleaf) are considered to be appropriate for inclusion in the Replacement LDP.

Given the renewable electricity resource identified by the REA (across all technology types) it is recommended that the high overall electricity generation target be included as a monitoring target in the Replacement LDP. I.e. by 2031, 22% of the electricity demand in MTCBC will be met by renewable energy, the equivalent of 37.4MWe of capacity or 50 GWh/yr.

With regards to renewable heat generation, it is recommended that the overall high and low heat generation targets be included as a monitoring target in the Replacement LDP. I.e. by 2031, 14% of the heat demand in MTCBC will be met by renewable energy, the equivalent of 19.4MWth capacity or 49.8 GWh/yr. This is considered appropriate as the LPA will have less control over the take up or installation of technologies such as biomass boilers or heat pumps which may not require planning permission. In this respect, the high target scenario assumes 5% of homes install heat pumps and 3% install biomass boilers.

Moreover, while the REA identifies a number of Heat Priority Areas (Project Heartland, Goat Mill Road and the Hoover Strategic Regeneration Area) with the potential to support District Heat Networks (DHNs), there are viability and constraint issues raised for each area, for example, the presence of physical barriers such as main roads and water-courses and potential mix and viability of future uses. The high target scenario would assume two of the scenario areas are built with district heating in addition to at least one smaller retrofitted installation and the development of larger commercial combined heat and power units.

As a result of these uncertainties it is considered appropriate to include reference to both the high and low heat generation targets shown in Fig.13 which provides a copy of the target scenarios for renewable heat generation shown in the RegenSW REA.

Figure 12: Amended resource summary and target scenarios for renewable electricity

| Renewable Energy Technology | Available (undeveloped) resource | | Current installed capacity (erected, installed or permitted) | | Target scenarios for renewable energy generation by 2031 | | | |
|--|----------------------------------|-------------------------------|--|------------|--|-------------|-------------|------------|
| | MWe (Capacity) | GWh/yr (Annual energy output) | MWe | GWh/yr | Low | | High | |
| | | | | | MWe | GWh/yr | MWe | GWh/yr |
| Onshore wind | 0 | 0 | 1.5 | 3.5 | 2 | 4.7 | 2.5 | 5.9 |
| EfW | 0.0 | 0.0 | 0.0 | 0.0 | - | - | - | - |
| Landfill gas | N/A | N/A | 6.2 | 23.4 | 3.5 | 13.2 | 3.5 | 13.2 |
| AD | 0.01 | 0.06 | - | - | - | - | - | - |
| Hydropower | 0.24 | 0.5 | 0.1 | 0.48 | 0.1 | 0.3 | 0.2 | 0.6 |
| Building integrated solar | N/A | N/A | 2.4 | 2.6 | 5.9 | 5.7 | 11.2 | 10.9 |
| Stand-alone solar PV | 158.3 | 138.7 | - | - | 10.0 | 9.7 | 20.0 | 19.4 |
| Total | 158.55 | 13.26 | 10.2 | 6.0 | 21.5 | 33.6 | 37.4 | 50 |
| Merthyr Tydfil projected electricity demand 2031 | | | | | | 208 | | 228 |
| Percentage electricity demand in 2031 potentially met by renewable energy resources | | | | | | 16% | | 22% |

Figure 13: Resource Summary and target scenarios for renewable heat (unchanged from the Regen SW REA)

| Renewable Energy Technology | Available (undeveloped) resource | | Current installed capacity (installed or permitted) | | Target scenarios for renewable energy generation by 2031 | | | |
|---|--|----------------------------------|---|--------------|--|-------------|-------------|--------------|
| | MWth (Capacity) | GWh/yr (Annual energy output) | MWth | GWh/yr | Low | | High | |
| | | | | | MWth | GWh/yr | MWth | GWh/yr |
| Biomass CHP or large scale heat only | 6.2 MWth (heat only application) Or 1.4 MWth & 0.69 MWe (CHP) | 19.1 (heat only) Or 8.4 (CHP) | 0.4 | 1.2 | 3.0 | 9.2 | 8.5 | 26.1 |
| Biomass boilers | | | 0.03 | 0.09 | 7.9 | 24.1 | 16.4 | 50.4 |
| Anaerobic Digestion | 0.036 (heat only) Or 0.011 MWth & 0.01 MWe (CHP) | 0.22 (heat only) OR 0.135 (CHP) | - | - | - | - | - | - |
| EfW | - | - | - | - | - | - | - | - |
| Heat pumps | N/A | N/A | 0.2 | 0.4 | 8.6 | 16.5 | 14.9 | 28.7 |
| Solar thermal | N/A | N/A | 0.03 | 0.02 | - | - | - | - |
| Total | N/A | N/A | 0.7 | 444.5 | 19.4 | 49.8 | 39.8 | 105.2 |
| Merthyr Tydfil projected heat demand 2031 | | | | | | 364 | | 368 |
| Percentage heat demand in 2031 potentially met by renewable energy resources | | | | | | 14% | | 29% |

Merthyr Tydfil Renewable Energy Assessment - Wind and Solar Resource Assessment

Constraints Justification (December 2018)

Representations were received from Welsh Government on the Replacement Deposit Plan that requested further clarification of the constraints and buffers utilised in the REA to identify the solar and wind energy resource. This section provides more detail in this respect.

The MCTBC Renewable Energy Assessment (REA) was produced for the purpose of identifying local renewable energy resources following the guidance contained in the Welsh Government (WG) Planning for Renewable and Low Carbon Energy – A Toolkit for Planners (2015).

The Council commissioned specialist consultants Regen to undertake the resource assessment of the renewable energy opportunities in its area to inform the policies for the Replacement Local Development Plan. Regen is a specialist not for profit organisation offering independent expert advice on all aspects of sustainable energy delivery, who are experienced in preparing and undertaking Renewable Energy Assessments. Regen have therefore drawn on their specialist technical, financial and policy knowledge to inform the Merthyr Tydfil REA.

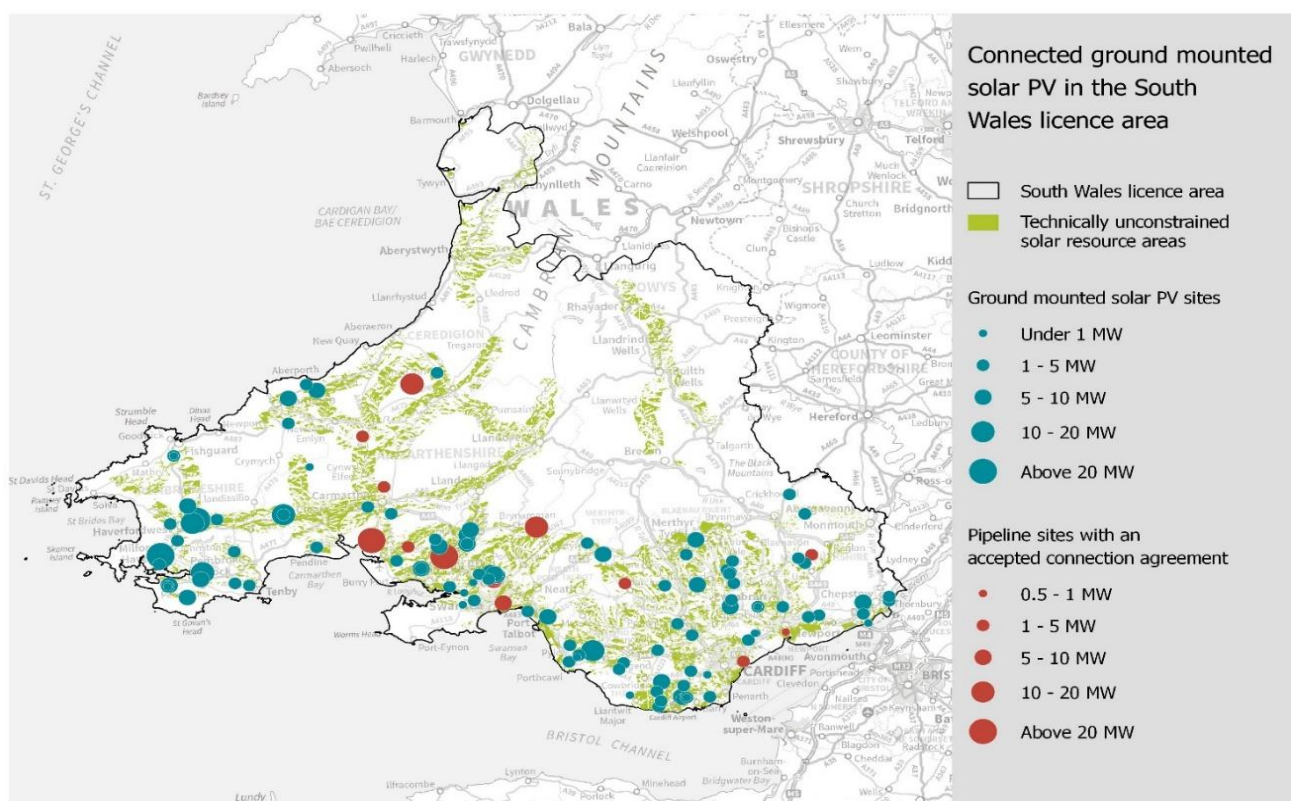
The REA follows the task structure set out in the WG Renewable Energy Assessment Toolkit. For some tasks set out in the Toolkit, Regen used their in-house tools and specialist experience in delivering renewable energy projects where appropriate as these offer an updated and more robust or practical approach. The method followed is documented in the REA against each WG Toolkit Task (Evidence Base E1-E4 and Policy Options P1-P6). This document summarises the list of constraints considered in the wind and solar energy resource assessments and seeks to clarify these and provide additional justification where necessary.

No Strategic Search Areas (SSA) are located within the County Borough; however, the resource assessment informed the Council's consideration of Local Search Areas (LSAs) for wind and solar energy as set out in this addendum.

The constraints that were applied in the MTCBC REA, in relation to identifying viable areas for wind and solar development, are listed on pages 31-34 and 60-61 of the REA document. Similarly, the resource mapping constraints specified in the WG Toolkit are listed on pages 136-142 and 195-197 of the Toolkit document. These are included in the following summary tables (figures 15 and 16) which compares the resource mapping constraints used. This demonstrates that the constraints contained in the REA align with the WG Toolkit mapping constraints and suggested assumptions. Where these deviate due to the scale of wind energy technology being assessed, or where additional constraints have been considered, these are listed and justified in the summary tables overleaf.

As an example, the solar resource assessment in the REA uses a 2km grid connectivity buffer as proximity to the grid reduces connection costs. In Regen's experience, grid connection costs over 2km are typically higher which can impact on the economic viability of ground-mounted solar energy projects. This buffer distance is appropriate as Regen's analysis shows that nearly all solar farms developed to date fall within this distance (or closer) to the 33kV or higher voltage electricity network. The exception to this is behind-the-meter solar farms that provide electricity directly to a commercial/industrial user; these are not identified through the resource assessment process. Figure 14 shows the results of Regen's ground mounted resource assessment mapped against existing and proposed solar farms for the whole of the south Wales Western Power Distribution licence area. This level of correlation stands for every region assessed to date by Regen using this methodology, which in addition to South Wales includes, in England, the West Midlands, East Midlands, East of England, South East, Southern and South West licence areas. Regen have advised that even when economic viability for solar energy development was strong in 2015 due to high subsidies, schemes were situated within 2 km of the network. Furthermore, developers have reported that they do not often consider going beyond 1.5km.

Figure 14



Source: Regen's 2018 study for Western Power Distribution: Distributed generation and demand study, south Wales licence area (not yet published)

The 2km grid connectivity distance was not applied for the large scale (2MW) wind assessment as this scale of wind energy projects are more financially viable and lengthier connection distances to the grid are more realistic. Consequently, no grid connection restriction was applied to the large scale wind energy assessment (2MW). With regards to the smaller scale wind assessments (500kW), areas that were more than 2km from a 33kV or higher power line were removed due to the impact of longer connection distances on the viability of schemes at this scale of turbine.

Wind Resource Assessment

A number of assumptions were made for the two scales of turbines, which are based on the Welsh Government Practice Guidance toolkit and SQWenergy methodology where appropriate. The SQWenergy methodology was commissioned by the UK government for the English regions in 2010¹. Regen commissioned Wardell Armstrong to pilot the SQW methodology for wind in the south west in 2010. Since then, Regen has built on that early experience to refine the constraints for onshore wind in discussion with the renewables industry. The assumptions used are set out below.

Figure 15 – Wind Resource Assessment Constraints

| WG Toolkit Constraints - Wind | MTCBC REA Constraints – Wind 2MW | MTCBC REA Constraints – Wind 500kW |
|---|---|--|
| <p>Mapping average annual wind speed:</p> <ul style="list-style-type: none"> Suggests using an average annual wind speed of 6.0m/s at 45m above ground level, and ideally in excess of 6.5m/s. <p>The toolkit acknowledges that the level of average annual wind speed that is required to make a site commercially viable changes over time, depending on the size and height of available machines, the costs of construction and grid connection and the value that developers can achieve from their generation. The latter is influenced by the value of ROCs, or, for smaller installations, FITs. There is no established guidance on this.</p> | <ul style="list-style-type: none"> Wind speed below 6.2 m/s at 45m excluded Minimum wind speed considered necessary for turbines to be economically viable. Whilst there is no one set figure, the wind speed figures used in the REA are considered to be appropriate by Regen for identifying viable resources areas and they are in line with those suggested in the toolkit. The REA report incorrectly quoted wind speed below 6.2 m/s at 80m had been excluded however this was a typographical error and RegenSW have confirmed the assessment was undertaken at 6.2 m/s at 45m. | <ul style="list-style-type: none"> Wind speed below 6.2 m/s at 45m excluded 500kW turbine hub heights vary greatly, so this was considered an appropriate assumption on the basis that wind speeds below 6.2 m/s would not be economically viable. |

¹

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/226175/renewable_and_low_carbon_energy_capacity_methodology_jan2010.pdf

| | | |
|--|---|--|
| <p>Exclude the following environmental designations:</p> <ul style="list-style-type: none"> • Special Protection Area (SPA) • Special Area of Conservations (SAC) • Candidate Special Area of Conservation (cSAC) • RAMSAR sites • National Nature Reserves (NNR) • Site of Special Scientific Interest (SSSI) • Marine Nature Reserves (MNR) • Scheduled Ancient Monuments (SAM) • Area of Outstanding Natural Beauty (AONB) | <p>The following environmental designations were excluded:</p> <ul style="list-style-type: none"> • Special Protection Areas • Special Areas of Conservation • Candidate Special Area of Conservation • RAMSAR sites • National Nature Reserves • Sites of Special Scientific Interest • Marine Nature Reserves (none within authority area) • Scheduled Ancient Monuments with 200m buffer • Historic Parks and Gardens • Areas of Outstanding Natural Beauty • Local Nature Reserves • Brecon Beacons National Park <p>The REA included additional known constraints such as the Brecon Beacons National Park, Local Nature Reserves and Historic Parks and Gardens where significant wind turbine development would not be appropriate. The REA also lists RSPB reserves however none are located within the County Borough.</p> | <p>For the 500kW scale resource assessment, the 2MW resource constraints were also applied.</p> |
| <p>Principal transport network (motorways, trunk roads and rail infrastructure) exclusion areas:</p> <ul style="list-style-type: none"> • Suggests tip height + 50m | <p>In accordance with the toolkit an exclusion area was applied to the following key transport features:</p> <ul style="list-style-type: none"> • Roads (Primary, A and B): 150m = turbine topple height + 10 % • Railway: 150m = turbine topple height + 10 % | <p>Given 500kW hub heights can vary greatly, an approximate 100m turbine topple height plus 10 per cent was used against transport infrastructure.</p> |
| <p>Secondary transport network (other LA transport network) exclusion areas</p> <ul style="list-style-type: none"> • Suggests Tip height + 10% | | |
| Woodland (Natural Resources Wales) | Wooded areas were removed from the analysis in accordance with the toolkit | Wooded areas were removed from the analysis in accordance with the toolkit |
| Inland waters (lakes, canals, rivers, reservoirs) | Inland waters were excluded with a 50m river exclusion area applied to safeguard waterways. | Same as 2MW resource assessment. |
| Map existing dwellings and apply a noise buffer (500m suggested for 2MW wind turbines) | 600m dwelling noise mitigation buffer was used. Regen recommended a 600m buffer distance in the REA as an estimated distance to protect homes from noise from wind turbines. This is considered to be an appropriate buffer distance which is broadly in line with the toolkit assumption. It is acknowledged that specific sites could be closer than 600m to housing if the site conditions allow it – e.g. there are hills between the turbines and the homes however this would be better assessed on a case by case basis. As the buffer distance used is broadly in line with the toolkit, | 450m dwelling noise mitigation buffer used for the 500kW assessment as a reduced distance was considered to be more appropriate noise mitigation buffering for this scale of wind turbine. |

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| | <p>reducing this to 500m would not have a significant impact on the overall accessible resource.</p> <p>Additional analysis was also carried out to remove miscellaneous buildings such as barns to improve accuracy.</p> | |
| Existing aviation and radar constraints | No such areas in or near the plan area. | No such areas in or near the plan area. |
| Assessing potential installed capacity and energy outputs | <p>Installed capacity per km² - Benchmark figure 10 MW per km²</p> <p>The Practice Guidance toolkit states based on the use of 2 MW turbines, it is possible to fit 5 turbines into 1km². This equates to an installed capacity of 10 MW per km², based on relatively widely spaced turbines.</p> | <p>Installed capacity per km² – one to two turbines per area identified</p> <p>It is unrealistic on a large scale to have a wind farm of 500kW turbines; higher capacity turbines are more likely to be used. 500 kW turbines are more appropriate for small sites with one or possibly two turbines. Therefore, the larger resource areas suitable for 2MW turbines have been removed to maximise output. However, in reality a range of turbine sizes are likely across the whole resource.</p> |
| <p>Other resource constraints:</p> <p>Step 4 of the toolkit involves mapping transport infrastructure and other physical constraints. To improve accuracy the REA included consideration of the physical constraints listed.</p> | <p>Other resource constraints considered:</p> <ul style="list-style-type: none"> • Unavailable areas removed With local knowledge aided by Merthyr Tydfil County Borough Council, areas where wind turbine development is not possible were removed, such as those where housing development is planned. • Unfeasible areas removed Small areas of land that were inaccessible or on steep slopes were removed from the unconstrained area. • Miscellaneous sites The Ffos-y-Fran site (active opencast mine to the west of the County Borough) has the potential for wind turbine development especially as it is located near the Goat Mill Road potential development areas, which offers opportunity for a private wire agreement to meet new demand. However, as the Ffos-y-Fran Restoration Strategy (2024) and Aftercare (+5yrs) is assumed not to be available until 2029. Furthermore, the technical ability of the restored landform (which is intended for | <p>Other resource constraints considered:</p> <ul style="list-style-type: none"> • Unfeasible areas removed In addition, areas that were more than 2km from a 33kV or higher power line were removed, as the cost of connection to the grid at a greater distance than this becomes unviable at this scale of turbine. It should be noted that the unconstrained resource for smaller scale wind energy typically overlaps with the larger scale wind energy resource areas. Therefore the grid connection distances applied to the smaller scale wind energy assessment would not result in a meaningful reduction in the overall |

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| | grazing, and would not be compacted) to be stable enough to take the pressures of rotating turbine bases and their associated infrastructure would need to be assessed, along with the increased ground compaction affecting agreed and planned water runoff rates from the area. | wind energy resource potential. |
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Solar Resource Assessment

The potential large scale solar resource in Merthyr Tydfil was assessed by mapping a number of constraints to identify areas with potential for solar farms. The constraints used and listed below were compiled by Regen through discussions with solar developers and their experience of completing similar resource assessments for other local authorities.

Figure 16 - Solar Resource Assessment Constraints

| WG Toolkit Mapping Constraints and Resource Assessment Steps – Solar | MTCBC REA Constraints – Solar |
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| <p>Built-up areas and locations of other infrastructure (Step 1)</p> <p>No buffer distance specified however the Swansea assessment used 50m and Powys 500m to reduce likelihood of including constrained land and reduce potential impacts on residential amenity.</p> | <p>25m buffer to houses was applied. This was to allow for land taken up by gardens and access roads and to reduce immediate visual impacts. Urban and other developed land (housing and industrial areas) was also removed where the potential for significant ground-mounted solar development would be unlikely. However, open spaces were included.</p> |
| <p>Map environmental and heritage constraints (Step 2)</p> <p>Physical environmental constraints: Roads, woodland, rivers and water bodies where development is generally not feasible.</p> <p>Environmental and heritage designations:</p> <ul style="list-style-type: none"> • Special Protection Area (SPA) • Special Area of Conservations (SAC) • Candidate Special Area of Conservation (cSAC) • RAMSAR sites • National Nature Reserves (NNR) • Local Nature Reserves (LNR) • Site of Special Scientific Interest (SSSI) • Marine Nature Reserves (MNR) • Scheduled Ancient Monuments (SAM) • Areas of Outstanding Natural Beauty | <p>Roads, woodland, rivers and water bodies removed where development is generally not feasible.</p> <p>Environmental and heritage designations removed:</p> <ul style="list-style-type: none"> • Special Protection Areas • Candidate Special Area of Conservation (none within authority area) • Special Areas of Conservation • RAMSAR sites • National Nature Reserves • Local Nature Reserves • Sites of Special Scientific Interest • Marine Nature Reserves (none within authority area) • Scheduled Ancient Monuments (SAM) • Areas of Outstanding Natural Beauty • Brecon Beacons National Park <p>Regen have advised that solar projects can and have been built within both designated landscapes and environmental designations. However, whilst there maybe opportunities in these areas, for the purpose of the resource assessment, these areas have been removed in accordance with the REA toolkit as they represent a significant constraint to large scale solar energy development.</p> |
| <p>Areas of suitable slope and topology (Step 3)</p> | <p>Solar farms are most suitable where topography is relatively flat to minimise visual impact and access issues. Unfeasible land such as very steep slopes was removed. The following limits were used in accordance with the toolkit:</p> |

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| | <ul style="list-style-type: none"> • Inclinations of 0-3°, all orientations can be considered • Between 3-15° only south-west to south-east facing areas • All slope above 15° was removed as a constraint |
| <p>Addressing cumulative impacts (Step 4)</p> <p>Consider cumulative impacts (such as visual and landscape impacts or grid capacity) and incorporate these as a constraint to the accessible resource and revise accordingly.</p> <p>No set methodology is prescribed as it is suggested each local authority considers the cumulative impacts of the potential solar resource in their area. It is suggested that the larger sites are assumed to be the ones that will be built out (as they are likely to be more viable) and that any buffering should first be applied to these larger areas until all sites are accounted for.</p> | <p>The REA advises that landscape and visual impacts are not included as part of the resource assessment (Section 10.3, Page 62) and further work was undertaken to inform the Deposit Plan (June 2018).</p> <p>The WG Toolkit (Step 4) does not provide prescriptive guidance regarding the consideration of cumulative impacts but recognises that <i>“The output from the above steps will give an estimate of the maximum accessible solar PV resource in your local authority area. However, in reality, harnessing all of that resource may cause cumulative impacts (these might include visual, landscape or be constrained by capacity to feed into nearest grid point), particularly in more rural areas”</i>. It is considered that cumulative impacts including landscape and visual impacts are significant constraints in terms of considering the deliverability of the identified solar resources and the level of certainty required for land owners and developers in order to identify these as Local Search Areas.</p> <p>The guidance suggests that local authorities consider the potential cumulative impacts for their area and in applying restrictions to potential resource areas, the larger areas are prioritised, as they are assumed to be the more viable, with surrounding smaller areas excluded until all areas are accounted for.</p> <p>The REA Addendum (June 2018) provides full details of the process undertaken to identify the proposed Local Search Areas in the Deposit Plan. A 3.5km cumulative impact buffer distance was applied as this was considered to represent a reasonable buffer distance, to minimise the cumulative landscape and visual impacts, so that solar PV farms would appear less dominant in the landscape if such areas were to be fully built out. This buffer distance has been used in other recent REAs in Wales and was considered appropriate for Merthyr Tydfil given the scale and distribution of the solar resource areas across the County Borough.</p> <p>Following representations from Natural Resources Wales, the designation of Local Search Areas has been informed by a landscape sensitivity assessment. The buffering approach has been reviewed taking into account the results of the sensitivity assessment for each resource area (including whether specific sites should be ruled out or not and which should be prioritised in the buffering exercise).</p> |
| Assess potential installed capacity and energy output (Step 5) | This step does not relate to constraints mapping to refine the resource. The calculations align with the toolkit are provided on page 62 of the REA and in the REA Addendum. |
| <p>Map locations of suitable Agricultural Land Classification and apply further constraints as necessary (Step 6):</p> <ul style="list-style-type: none"> • Remove Agricultural land grade 3 or above. | Grades 1, 2 and 3a are the best and most versatile for food production, however, there is no land of this grade available in MTCBC. |
| <p>Other constraints:</p> <ul style="list-style-type: none"> • The toolkit does not specify a standard grid connection | <p>Other constraints considered:</p> <ul style="list-style-type: none"> • Solar resource areas with grid connectivity within 2 km of 33 kV (or higher) electricity grid lines were included. |

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| <p>distance for the solar energy assessment. Use of a buffer distance could be locally justified as part of assessments. WG have suggested that buffer distances used in other local authorities REAs indicate that 10km could be a suitable grid connection distance.</p> | <p>There is no established standard grid connection buffer distance for use in assessments however proximity to the grid will reduce the cost of grid connection. In Regen's experience nearly all solar projects built are within 2km or less to 33kV (or above) electricity network, due to the impacts a greater distance has on grid connection cost, which will impact on solar energy development viability.</p> |
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