

# Solar Farms in Wales

March 2015

## Introduction

Solar farms are the large-scale application of Solar Photovoltaic (PV) installations used to generate electricity. Their installation has grown significantly in the UK since the first planning application in 2010. This is partly due to the availability of government subsidies including Feed-in Tariffs, the Renewables Obligation scheme and Common Agricultural Policy funding. The industry is particularly prevalent in South Wales due to the relatively high radiation levels typical of the area though there are a number of large-scale applications in North Wales.

The unexpected rate of growth in the industry has triggered concerns relating to the loss of land for agricultural production and an increase in household energy bills which the subsidies are levied from. Following these concerns the UK Government has reduced, and in some cases stopped, subsidies in efforts to moderate the rate of installation with preference instead for rooftop installations. The UK Government's policy decisions on renewable energy are applied to Wales as renewable energy policy is not currently devolved. However decisions on planning applications for solar farms (unless above 50 Megawatts) are devolved and these decisions are normally made by local planning authorities.

This Research Note explores the advantages and disadvantages of solar farms, associated planning policy in Wales, the growth in the industry, and the recent changes to the funding schemes available.

## What are solar farms?

Solar farms, or solar parks, are the large-scale application of Solar Photovoltaic (PV) installations used to generate electricity which is fed into the local electricity grid. They often cover large areas of land (between 1 and 100 acres) and therefore are normally developed in rural locations. Data from DECC shows that the average capacity of solar farms operational in Wales is approximately 8 megawatts (MW).<sup>1</sup> Around 10 ha of land is required for every 5 MW of installation, enough to power 1,515 homes.<sup>2</sup>

## Views on solar farms

### Advantages of solar farms

- Reduction in the reliance on overseas fossil fuel imports;<sup>3</sup>
- Reduction in carbon emissions (for every 5 MW installed, solar farms are estimated to save 2,150 tonnes of CO<sub>2</sub>;<sup>4</sup>
- Creation of local green jobs;<sup>5</sup>
- Reversible land use;<sup>6</sup>
- Potential for dual purpose usage with grazing possible between rows;<sup>7</sup>
- Can support biodiversity simultaneously if managed well by allowing small animals access to otherwise fenced off land and sowing wildflower meadows around the modules;<sup>8</sup>

<sup>1</sup> DECC, [Renewable energy planning database monthly extract](#), 16 February 2015 [accessed 24 February 2015]

<sup>2</sup> Based on average annual consumption figures for a house of 3,300 kWh of electricity (source DECC, Ofgem) from [Solar Trade Association](#) Website.

<sup>3</sup> [Solar Trade Association](#) [accessed 19 February 2015]

<sup>4</sup> *ibid*

<sup>5</sup> Good energy, [Our wind and solar farms](#), [accessed 19 February 2015]

<sup>6</sup> [Solar Trade Association](#) [accessed 19 February 2015]

<sup>7</sup> Solar UK, [Enterprising seed company develops solar farm grass mixes](#), 19 May 2014 [accessed 19 February 2015]

<sup>8</sup> Good energy [Our solar farms](#) [accessed 19 February 2015]



- Maintenance is minimal due to no moving parts.<sup>9</sup>
- There is no by-product or waste generated, except during manufacturing or dismantling.<sup>10</sup>

### Disadvantages of solar farms

- Loss of land used for agricultural production;<sup>11</sup>
- Concern that they will lead to ‘creeping urbanisation of the countryside’;<sup>12</sup>
- Adverse effects of construction e.g. species loss, or damage or fragmentation of habitat;<sup>13</sup>
- Glint/glare can potentially impact on air traffic safety;<sup>14</sup>
- Security fencing may pose a barrier to movement through the site for larger species;<sup>15</sup>
- Potential impact on birds or invertebrates is uncertain although CCW has commented that there is some evidence about solar arrays being confused for areas of water;<sup>16</sup>
- impact on ground flora due to shading;<sup>17</sup>
- impact on the historic environment through ground works such as piling for foundations or excavation of trenches for cables;<sup>18</sup>

<sup>9</sup> Green Match, **Solar Farms in the UK**, 27 January 2015 [accessed 24 February 2015]

<sup>10</sup> *ibid*

<sup>11</sup> Welsh Government, **Practice guidance: Planning implications of renewable and low carbon energy development**, February 2011 [accessed 19 February 2015]

<sup>12</sup> *ibid*

<sup>13</sup> Natural England, **Solar parks: maximising environmental benefits (TIN101)**, 9 September 2011 [accessed 19 February 2015]

<sup>14</sup> Pager Power, **Solar impact on Air Traffic Control: UK concerns** [accessed 19 February 2015]

<sup>15</sup> Welsh Government, **Practice guidance: Planning implications of renewable and low carbon energy development**, February 2011 [accessed 19 February 2015]

<sup>16</sup> *ibid*

<sup>17</sup> *ibid*

<sup>18</sup> Natural England, **Solar parks: maximising environmental benefits (TIN101)**, 9 September 2011 [accessed 19 February 2015]

- Subsidies available for large-scale installation could ‘soak up money’ intended to help homes, communities and small businesses generate their own electricity.<sup>19</sup>

## Planning

Applications for the development of solar farms must be submitted to the Local Planning Authority (LPA). *Planning Policy Wales*<sup>20</sup> includes general planning policies about the encouragement of renewable energy sources (though it does not contain specific policies relating to solar farms) and also the protection of the highest quality agricultural land to limit the harm of energy generation developments to agricultural production. Section 4.10 requires that the best and most versatile agricultural land (i.e. grades 1, 2 and 3a of the Defra Agricultural Land Classification System) ‘should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations.’

*Technical Advice Note 8: Planning for Renewable Energy (2005)*<sup>21</sup> sets out the Welsh Government’s advice for renewable energy and planning. It states that:

Other than in circumstances where visual impact is critically damaging to a listed building, ancient monument or a conservation area vista, proposals for appropriately designed solar thermal and PV systems should be supported.<sup>22</sup>

<sup>19</sup> UK Government, **Huhne takes action on Solar farm threat**, 7 February 2011 [accessed 24 February 2015]

<sup>20</sup> Welsh Government, **Planning Policy Wales, Edition 7**, July 2014 [accessed 19 February 2015]

<sup>21</sup> Welsh Government, Topics, Planning, Policy and Guidance, **Technical Advice Note 8: Planning for renewable energy** (2005), July 2005 [accessed 19 February 2015]

<sup>22</sup> *ibid*



The Welsh Government's *Practice Guidance: Planning implications of renewable and low carbon energy development*<sup>23</sup> is designed to support LPAs in dealing with applications for renewable and low carbon energy development in Wales. This is the main source of detailed planning guidance on solar farms (referred to in the report as 'solar PV arrays') provided by the Welsh Government.

The guidance states that ecological and landscape sensitivity to the proposed development will be key factors in determining whether an Environmental Impact Assessment (EIA) is required. The guidance gives a summary of potential impacts (along with mitigation measures) that should be considered by the relevant LPA. These include the:

- visual impacts;
- glint/glare impacts;
- impacts on the ecology of the site;
- loss of the agricultural value of the site;
- impacts on the historic environment; and
- hydrology and flood risk.<sup>24</sup>

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<sup>23</sup> Welsh Government, *Practice guidance: Planning implications of renewable and low carbon energy development*, February 2011 [accessed 19 February 2015]

<sup>24</sup> *ibid*

The cumulative impacts of solar farms should be considered with each application; the guidance states that:

Proximity to the grid is a key factor affecting the economic viability of solar PV arrays. The need for sites to be located close to a suitable grid connection means that proposals are likely to cluster around these grid connection points. This makes it especially important that the sustainability effects of solar PV array proposals are considered not only in isolation but also in terms of the potential cumulative effects with similar proposals and other forms of development.<sup>25</sup>

The guidance provides a description of the technology associated with solar farms, describes technological and financial constraints and discusses planning requirements.

The UK Government's guidance from the Department of Communities and Local Government relating to solar farm development in England highlights particular factors a local planning authority will need to consider which include:

...where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays.<sup>26</sup>

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<sup>25</sup> Welsh Government, *Practice guidance: Planning implications of renewable and low carbon energy development*, February 2011 [accessed 19 February 2015]

<sup>26</sup> Department of Communities and Local Government, *Planning Practice Guidance, Renewable and low carbon energy*, 6 March 2014 [accessed 2 March 2015]

The Department of Energy and Climate Change's (DECC's) Renewable Energy Planning Database contains information on renewable energy projects and includes details of applications submitted for solar farms in Wales.<sup>27</sup>

Many applications for solar farm development have been focussed in South Wales due to the relatively high radiation levels, with the Vale of Glamorgan becoming a favoured area. A map of solar farms operating, under construction or with planning permission in Wales in February 2015 can be found at the end of this Research Note (Figure 2).

## Growth in the industry

Solar farms are a relatively recent development in renewable energy generation; planning applications for solar farms in the UK began in 2010.

Pembrokeshire became the first council in Wales to grant planning permission for a solar farm at Rhos-y-Gilwen Mansion in January 2011.

The sector has seen very strong growth in the UK in recent years both in terms of the installed capacity and the number of installations. Data from DECC's Renewable Energy Planning Database (REPD), shows that from 2011-2015 there have been 23 solar farms made operational in Wales, totalling 198.6 MW of installed capacity (Table 1).<sup>28</sup>

**Table 1. Solar PV deployment in Wales. Source REPD.<sup>29</sup>**

	# Made operational	Capacity of operational farms (MW)	# Planning permission granted
2011	2	4.9	7
2012	3	13	4
2013	3	15.2	20
2014	15	165.5	34
2015 (to Feb 2015)	0	0	1
Total (2011-Feb 2015)	23	198.6	66

This increase in development is partly due to support from the government funding streams including small-scale Feed-in Tariffs, the Renewable Obligation Scheme and Common Agricultural Policy funding for farmers (see 'Funding Schemes' section below). Therefore it has been an economical option for landowners to develop solar farms instead of crops. Costs of the solar panels have also decreased rapidly as a result of global development and deployment in large markets like Germany and China.<sup>30</sup> Indeed, the price of PV panels dropped by 50% between 2010 and 2012.<sup>31</sup> The increase in solar farms has also been driven by concerns that the electrical grid has limited capacity for renewable energy and so there has been a recent race to guarantee grid connection.<sup>32</sup>

<sup>27</sup> DECC, **Renewable energy planning database monthly extract**, 16 February 2015 [accessed 24 February 2015]

<sup>28</sup> *ibid*

<sup>29</sup> *ibid*

<sup>30</sup> DECC, **Consultation on changes to financial support for solar PV**, 13 May 2014 [accessed 20 February 2015]

<sup>31</sup> Brinckerhoff (Prepared for DECC) **Solar PV Cost Update**, May 2012 [accessed 23 February 2012]

<sup>32</sup> BBC News, **Grid capacity worries spark UK solar farm boom**, 29 October 2013 [accessed 19 February 2015]



## Funding schemes

To date, various government funding streams have supported solar farm development. However due to the unexpected growth in the industry, subsidies have been reduced over recent years and some have been discontinued:

### Renewables Obligation (RO) scheme

Solar farms have, until recently, been eligible for financial support under the Renewables Obligation (RO) scheme.<sup>33</sup> Defra introduced the RO in 2002 to provide incentives for the deployment of large-scale renewable electricity in the UK (above 5 MW capacity) with payments levied from household energy bills. It places an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources. DECC data show that at the end of January 2015 in the UK, solar PV capacity accredited under the RO stood at 1,843 MW, across 9,392 installations.<sup>34</sup> In January 2015 RO capacity represented 36% of total solar deployment, compared to 19% at the end of 2013.<sup>35</sup>

On 27 January 2015, DECC laid the *RO Closure (Amendment) Order 2015* which will close the RO to large-scale (>5 MW) solar PV from 1 April 2015. Grace periods have been made available which will ensure that unfinished projects, which have already been invested in, have a chance of proceeding. Ofgem has published draft guidance explaining how they propose to administer this closure, including the process for applying for the grace periods.<sup>36</sup> It is consulting on the draft guidance for an eight week consultation period closing on 25 March 2015.

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<sup>33</sup> Defra, **The Renewables Obligation (RO)**, 12 February 2015 [accessed 20 February 2015]

<sup>34</sup> These statistics represent large-scale solar PV installations eligible for the RO scheme and so include some large roof-top projects (>5 MW) as well as solar farms. Source: UK Government, **Solar photovoltaics deployment**, 26 February 2015 [accessed 20 February 2015].

<sup>35</sup> *ibid*

<sup>36</sup> Ofgem, **Consultation on guidance: Renewables Obligation (RO) - closure of the scheme to large-scale solar PV**, 28 January 2015 [accessed 20 February 2015].

DECC stated that the cuts are necessary to stop a surge in solar farm developments breaching the government's budget and increasing consumers' energy bills.<sup>37</sup> It stated that large scale solar PV has been deploying 'much faster than previously expected' (see 'Growth in the Industry' section).<sup>38</sup> DECC hopes these cuts will encourage the development of smaller-scale and community energy production such as rooftop installations.<sup>39</sup>

### Feed-in Tariffs (FIT)

The Feed-in Tariff scheme (FIT) was launched in April 2010 to support households and communities who generate their own electricity (up to 5 MW) from renewable or low carbon sources through regular payments from their energy supplier. Solar farms, generating up to 5 MW, can receive subsidies via the Feed-in Tariff Scheme (FIT).<sup>40</sup> 5 MW solar farms can typically occupy 12.5-15.0 ha of land, but this may vary as technologies develop in the UK.<sup>41</sup>

FITs have been reduced substantially since 2011 by the UK Government 'following growing evidence that large scale solar farms could soak up money intended to help homes, communities and small businesses generate their own electricity'.<sup>42</sup>

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<sup>37</sup> *ibid*

<sup>38</sup> *ibid*

<sup>39</sup> DECC, **Consultation on changes to financial support for solar PV**, 13 May 2014 [accessed 20 February 2015]

<sup>40</sup> UK Government, **Feed-in Tariffs: get money for generating your own electricity**, 4 February 2015 [accessed 20 February 2015]

<sup>41</sup> Welsh Government, **Practice guidance: Planning implications of renewable and low carbon energy development**, February 2011 [accessed 19 February 2015]

<sup>42</sup> UK Government, **Huhne takes action on Solar farm threat**, 7 February 2011 [accessed 24 February 2015]

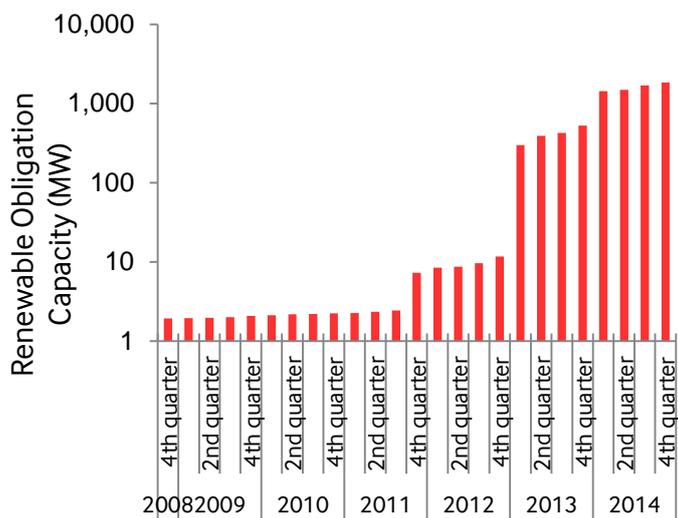


Figure 1. Solar Photovoltaics Deployment under the Renewable Obligation Scheme. It is important to note that the DECC does not have data that distinguishes where the Solar PV is installed (e.g. roof based versus ground based) but it does clearly demonstrate the increasing trajectory. Source: DECC.<sup>43</sup>

### Basic Payment Scheme

Following the reform of the Common Agricultural Policy (CAP) solar parks will no longer be eligible for the Basic Payment Scheme (BPS) as the predominant activity on the land is not agricultural.<sup>44</sup> A similar decision has been made in England. This followed Defra's concerns associated with the impact of increasing solar farm development on the disruption to food production, agricultural productivity, impacts on biodiversity and effects on landscape and visual amenity.

The change in Wales, which came into effect in 2015, prevents farmers who use fields for solar panels and grazing simultaneously from receiving any farm subsidy payments for that land, including the land between, underneath and around the panels.

<sup>43</sup> UK Government, **Solar photovoltaics deployment**, 29 January 2015 [accessed 20 February 2015]

<sup>44</sup> Welsh Government, Gwlad, **Solar parks – new rules** [accessed 20 February 2015]

If solar panels are concentrated in one part of a field, farmers may fence off that part of the land parcel, creating two separate land parcels; one agricultural, one solar farm to receive subsidies for the agricultural land.

The UK Government, commenting on a similar change in England, stated:

Britain has some of the best farmland in the world and ministers want to see it dedicated to agriculture to help boost our food and farming industry that is worth £97 billion to the economy... Solar panels are best placed on the 250,000 hectares of south facing commercial rooftops where they will not compromise the success of our agricultural industry.<sup>45</sup>

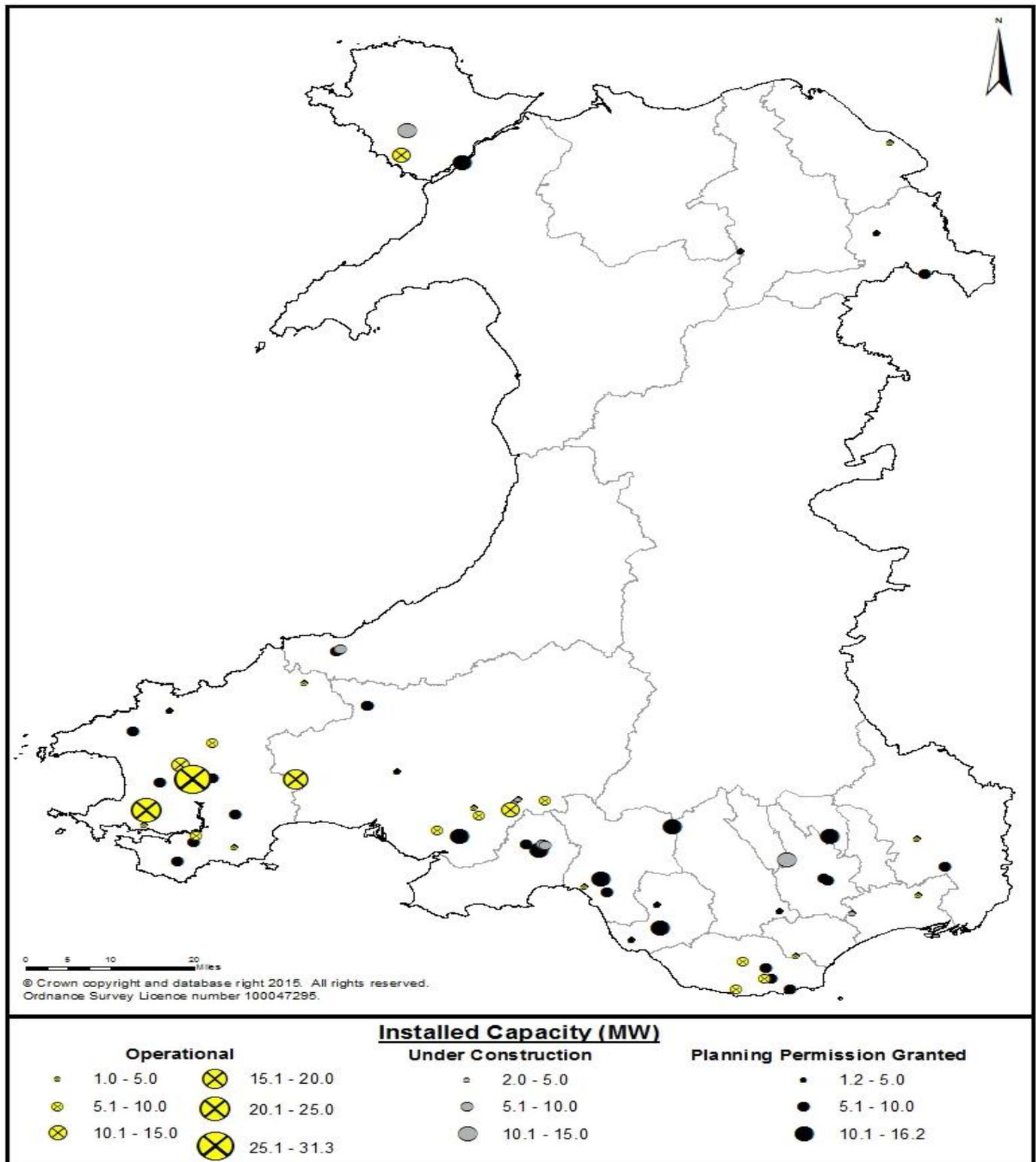
However AEE Renewables plc have argued that it is 'a myth' that solar PV encroaches on valuable land calculating that 0.5% of the land surface in England and Wales could provide 10% of the UK's electricity from solar farms.<sup>46</sup>

<sup>45</sup> UK Government, **Subsidies for solar farms to be cut to help safeguard farmland**, 19 October 2014 [accessed 23 February 2015]

<sup>46</sup> AEE Renewables plc in the UK Government's **Correspondence in relation to evidence informing the policy to remove CAP subsidy on solar arrays**, 16 February 2015 [accessed 23 February 2015]



Figure 2. Solar farms in Wales (February 2015). Data sourced from DECC.<sup>47</sup>



<sup>47</sup> DECC, [Renewable energy planning database monthly extract](#), 16 February 2015 [accessed 24 February 2015]

## Further information

For further information on **Solar Farms in Wales**, please contact **Katy Orford** ([Katy.Orford@assembly.wales](mailto:Katy.Orford@assembly.wales)) or **Graham Winter** ([Graham.Winter@assembly.wales](mailto:Graham.Winter@assembly.wales)) Research Service.

### See also:

- [Renewable Energy in Wales in figures - Research paper](#)
- [The Planning Series 9 Small-scale renewable energy schemes - Quick guide](#)
- [Climate Change & Energy Goals - Research Note](#)

On the environmental impacts of solar farms:

- [Natural England, Solar parks: maximising environmental benefits \(TIN101\)](#)
- [BRE National Solar Centre Biodiversity Guidance for Solar Developments](#)

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