

Review of solar PV capacity publications

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Introduction

This paper sets out the current methodology for producing solar photovoltaic (PV) deployment statistics. It highlights suspected data gaps in the current approach, (e.g. some unsubsidised commercial scale installations between 50 kW and 1 MW capacity). It also discusses our plans to make the statistics more accurate and complete as new data sources become available.

BEIS statisticians are conducting this work in conjunction with Sheffield Solar (a research group at The University of Sheffield who currently provide capacity and generation estimates to National Grid ESO) and Solar Energy UK, the main trade association for the solar industry in the UK. These discussions are ongoing.

We are seeking further feedback from industry and users of the data. To comment on any of the issues discussed in this article please email: renewablesstatistics@beis.gov.uk

Background

The use of solar PV to generate electricity in the UK has grown rapidly since 2010, increasing capacity from 95 MW to 13,800 MW at the end of 2021. There are now over one million solar PV installations in the UK. In 2021¹ solar PV contributed more than 10 per cent of renewable generation and more than 4 per cent of total electricity generation in the UK.

BEIS solar PV capacity and generation statistics are compiled from a range of sources as no single dataset currently covers all installations. These sources include administrative datasets used to monitor subsidy schemes, surveys, and commissioned research such as:

Ofgem's Renewables Obligation (RO)² dataset and **Central FiTs Register (CFR)** which records sites registered with the Feed in Tariff (FiTs)³ scheme. Ofgem grants access to BEIS statisticians under data sharing agreements. However, as the RO closed to new applicants in March 2017 and FiTs closed to new applicants in March 2019, so these are largely historic datasets.

BEIS' **Major Power Producers (MPP)** survey is a monthly survey covering electricity generated by UK major power producers. These are defined as companies with a generation portfolio over 100 MW or 50 MW for wind and solar PV.

The **Microgeneration Certification Scheme (MCS)** covers installations that are 50 kW or less. Solar PV installers are encouraged to register with the MCS to assure customers of equipment and performance standards⁴. Registering with the MCS was a mandatory prerequisite for FiTs; owners couldn't receive financial support without doing so. MCS registration is also a prerequisite for Smart Export Guarantee (SEG), the government's current financial incentive for embedded generation⁵. However, registering with the MCS is not compulsory and our statistics may omit some unregistered small-scale installations.

¹ Provisional data for 2021 is published in ET 6.1 [here \(opens in new window\)](#)

² Information on the RO can be found on the Ofgem website [here \(opens in new window\)](#)

³ Information on the closure of FiTs can be found on the Ofgem website [here \(opens in new window\)](#)

⁴ From MCS website [here \(opens in new window\)](#)

⁵ For more details of SEG see [here \(opens in new window\)](#)

These data are supplemented with data from other sources, discussed in more detail in the Methodology section. Even with this wide range of data we are not guaranteed to have full coverage. For instance, a suspected partial data gap is with installations smaller than 5 MW since the closure of FiTs in March 2019. This particularly affects sites with capacity between 50 kW and 1 MW. Larger sites are more likely to be covered in our other data sources (discussed further in the methodology section) whilst many installations with capacity below 50kW are recorded in the MCS data.

Conversely, there are reasons why the statistics may overstate the total capacity. Information on whether installations have been decommissioned or when they are offline is not available in all of our data sources. We will continue to monitor this issue.

Methodology

We currently have two methodologies for calculating solar PV capacity. These are used in different BEIS Energy Statistics publications to meet differing timeliness and coverage needs:

	Publication	Frequency and Timeliness	Purpose
i)	Solar Deployment tables	Monthly One month in arrears	Developed in 2010 when the Feed-in-Tariff sparked rapid solar PV deployment, this publication was designed to give an early, up-to-date estimate of solar installations and capacity. Uses provisional administrative datasets where necessary.
ii)	Energy Trends	Quarterly Three months in arrears	National Statistics. Provides a quarterly update on UK energy including solar PV capacity and generation. Based on more comprehensive surveys and administrative datasets that are available in a longer timeframe.
iii)	Digest of UK Energy Statistics (DUKES)	Annual Six months in arrears	National Statistics. Presents annual UK energy statistics with consistent time series, including solar PV capacity and generation. Based on more comprehensive surveys and administrative datasets that are available in a longer timeframe.

The figures for Energy Trends and DUKES are based on the same method and are aligned, but there are some minor methodological differences between the monthly Solar Deployment tables and the Energy Trends and DUKES figures. The total capacity shown in the Solar Deployment tables and the National Statistics tables differ by less than 1 per cent.

The tables below outline the two different approaches we take for

- i) the monthly Solar Deployment tables and
- ii) Energy Trends.

In the following explanations, datasets are listed in order of decreasing priority for each method with duplicate installations removed at each stage. The tables show the solar PV installation capacity added from each source dataset.

i) **Solar Deployment tables – December 2021 figure as published in January 2022**

Source dataset	Capacity from each source (MW)	Capacity covered	Notes
<p>Microgeneration Certification Scheme (MCS)</p> <p><i>Of which:</i></p> <p><i>Unmatched at closure of FITs Installed since April 2019</i></p> <p><i>FITs (on Ofgem's Central FITs Register, CFR)</i></p>	<p>4,053</p> <p>313</p> <p>430</p> <p>3,311</p>	<50 kW	<p>The unmatched figure refers to old MCS registered installations that do not appear in the Central FITs Register (CFR). This relies on historic MCS data and may be slightly inaccurate.</p> <p>The MCS data here uses Declared Net Capacity (DNC) but the CFR uses Total Installed Capacity (TIC) (see below)</p>
ROOFIT	1,684	50kW – 5MW	Schemes that are accredited with FITs but larger than the 50 kW MCS threshold
Transferred to FIT from RO	9	< 50 kW	Schemes that were on RO before FITs existed but moved over to FiTs in 2010
RO (Renewables Obligation)	6,988	>50kW	Taken from Ofgem's public report. Still being updated routinely but RO now closed to new entrants
CfD (Contracts for Difference)	23	>10 MW	Two operational sites from LCCC's online CfD register. Netley Landfill Solar is excluded as it does not have a start date in the CfD register
REPD (Renewable Energy Planning Database)	530	>150 kW	The REPD aims to capture all schemes greater than 150 kW. Until recently the threshold was 1 MW. This is based on planning application data and may not have complete coverage. There are known differences between the REPD and other data sets
Great Britain total	13,286	-	
Northern Ireland MCS	126	<50 kW	MCS since 2010 + RO under 50kW
Northern Ireland RO	200	Any	FiTs was not available in Northern Ireland but unlike the rest of the UK, RO was available to small scale schemes. Small installations are excluded to avoid double counting with above
Northern Ireland REPD	66	>150 kW	See REPD line above
Northern Ireland total	393	-	
Pre 2010 estimate	15	Any	To account for the small number of installations in place before any of the other data sources existed
UK total	13,693		

ii) **Energy Trends table 6.1 – provisional 2021 - published March 31st (also used for DUKES)**

Source	Capacity (MW)	Notes
MPP (Major Power Producer survey)	4,615	BEIS' major power producer survey, data is received directly from electricity generators and is given preference over other sources
ROCs	3,234	Does not include sites believed to already be in MPP
CFR (Central FiTs register)	4,551	5,108 MW total minus 557 MW for installations already in MPP
ROOFIT residual	27	Installations in ROOFIT data not appearing in CFR
Microgeneration Certification Scheme (MCS) residual	754	A combination of MCS installations that could not be matched with CFR and new installations since closure of FiTs. Excluding Northern Ireland capacity included in NI RO line below.
Pre 2010 estimate	15	As in solar deployment tables
Northern Ireland RO	115	sub-50 kW sites in NI from RO data, unlike the rest of UK, RO was available to microgeneration in NI but FiTs was not. A lot of these are also registered with the MCS so the MCS figure in this table is lower than in table i) to avoid double counting.
REPD (Renewable Energy Planning Database)	488	Given lower priority than in Solar Deployment tables method as some already captured in MPP. Includes CfD sites
UK total	13,799	

The main differences between the two methods are that:

- Energy Trends / DUKES uses data from BEIS' Major Power Producers (MPP) survey which is published monthly, two months in arrears, whereas the Solar Deployment tables do not.
- The Solar Deployment tables prioritise the MCS data as it is updated faster and then add the remaining installations from the CFR. Energy Trends / DUKES takes the CFR data and then adds on the remaining installations from the MCS. This is a subtle difference but results in a discrepancy. This is because declared net capacity (DNC) is used for the MCS installations rather than total installed capacity (TIC)⁶ and some installations are listed with different capacities in the two sources. The implied FiTs total (including ROOFIT) from the Solar Deployment tables is **4,998 MW**, while in Energy Trends this is **5,108 MW**.

The reason for this is that the MCS data didn't always include the total installed capacity (TIC) in earlier years so the more frequently completed declared net capacity (DNC) was used to keep the time series

⁶ Definitions of Declared Net Capacity and Installed Capacity are given on p9 of the renewables methodology note [here \(opens in new window\)](#)

consistent. More generally, the quality of MCS data is not as good for the early years of FiTs (2010 – 2014).

The total installed capacity is the total amount that the solar panels can generate in DC (direct current). The declared net capacity (DNC) measures capacity after the current has been inverted to AC (alternating current) so that the electricity can be consumed by the user or exported to the grid. BEIS solar PV capacity statistics are based on the total installed capacity (TIC) where possible, with DNC used where TIC is not recorded. TIC will generally be the same as or higher than DNC; however, recent research suggests that commercial solar farms may increasingly install extra capacity (TIC) in excess of the inverter capacity (DNC) to maximise generation at times when the panels are not operating at peak potential. This will widen the gap between TIC and DNC and increase the importance of recording both capacity metrics.

- Lastly, the data for Energy Trends and DUKES are reviewed by an external renewables statistics contractor, employed by BEIS to improve data quality. This can lead to more installations being identified (for instance in the REPD). Likewise, it can lead to capacity being removed if double counting between datasets is identified. The contractor does not review data for the monthly Solar Deployment tables due to time constraints.

Going forward, **we will align the two methods so that the Solar Deployment tables will match the BEIS Energy Trends and DUKES National Statistics publications.** This is now possible as the historic subsidy datasets (the Renewables Obligation database and the Central FiTs Register) have stabilised and we have made improvements to our internal data processing and matching procedures. The monthly solar deployment tables will still be provisional for the latest months and subject to revision.

Planned improvements

We are considering options for improving the coverage of solar PV statistics. These have included purchasing additional data from additional sources. However, no current data source is believed to measure total solar capacity perfectly. Furthermore, we will investigate the possibility of making a capacity register freely available to the public, using commercial data may raise barriers to that.

We plan to include data from the recently released Embedded Capacity Register (ECR). This is compiled by the Distribution Network Operators (DNOs) and currently includes a complete register of generators over 1MW capacity connected to the distribution network (as opposed to the transmission network). This is effectively all solar PV generators in the UK over 1 MW as there is currently no solar generation on the transmission network. The data should help identify installations not already included in the Major Power Producers (MPP) survey and other data sets. Links to the ECRs from the different distribution network operators are available via the Energy Networks Association here: <https://www.energynetworks.org/industry-hub/databases>

From April 2022 the ECR will cover systems with capacity greater than 50 kW. While the ECR is not yet at its planned capability, and it will take months for the ECR data collection processes to become mature it is expected that ECR's coverage will increase and we will incorporate it into our statistics when suitable. We plan to place the dataset second in the methodology priority behind the BEIS MPP survey. This work won't be complete in time for DUKES 2022, published in July this year, but we hope to include the data in DUKES and Energy Trends in 2023. At that point we will revise solar capacity and generation accordingly.

We will investigate the feasibility of publishing a regional solar PV capacity dataset, potentially at MSOA or LSOA level although this will depend on GDPR and the level at which data becomes disclosive.

We welcome further feedback from industry and users of the data. To comment on any of the issues discussed in this article please email: renewablesstatistics@beis.gov.uk



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