Department for Business, Energy & Industrial Strategy

RENEWABLES STATISTICS

Background Quality Report

December 2016

Contents

1. Introduction

1.1 Background

RESTATS, the UK's Renewable Energy STATisticS database, is a project that has been running for more than 25 years and over this period has become the primary source of accurate, up-to-date statistics of UK renewable energy sources. The Department of Business, Energy and Industrial Strategy (BEIS) National Statistics for UK renewable energy are based on data compiled by Ricardo Energy and Environment, on behalf of BEIS. This report provides a summary of quality issues relating to these renewable energy statistics.

These data are used by BEIS, the Statistical Office of the European Communities (SOEC, also referred to as Eurostat) and the International Energy Agency (IEA) in establishing the wider deployment of renewable technologies.

The statistics are used by BEIS to monitor and guide energy and climate change policy. Many of the statistics published are used to monitor progress towards specific government targets. For example, one of the government's targets is that by 2020, 15per cent of final energy consumption should be accounted for by energy from renewable sources as required by the 2009 Renewable Energy Directive (RED). Covering electricity, heat and transport, the RED requires reporting of progress to Eurostat each year with a Progress Report every two years; the latest progress report was submitted in December 2015 and is available from the European Commission's website;

https://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports

1.2 Publications

Renewable statistics are published annually as part of the Digest of United Kingdom Energy Statistics (DUKES). An annual suite of Regional renewable electricity statistics are also produced and are available from the following link;

https://www.gov.uk/government/statistics/regional-renewable-statistics

In addition, electricity and biofuels used for transport statistics are published quarterly as part of Energy Trends. A monthly table on Renewable Obligation Certificates (ROCs) issued (and associated generation) is also published. All renewables statistics are available on the BEIS section of the gov.uk website at:

https://www.gov.uk/government/collections/renewables-statistics

Renewable energy statistics

DUKES (annual data published in July)

Chapter 6 of DUKES presents a range of statistics related to the use of renewable energy in the UK. These cover active solar heating, solar photovoltaics, onshore and offshore wind power, wave power, large- and small-scale hydro, bioenergy (biomass and bio-wastes, including co-firing), deep geothermal, heat pumps and liquid biofuels for transport. Data are gathered on known projects, technology type, installed capacity, generation (electricity and/or heat), fuel-type and biofuels for transport.

The following data tables are included in the report; however earlier years are included in the Excel tables:

Tables 6.1 to 6.3: Commodity balances (thousand tonnes of oil equivalent) for renewable energy sources, including transport fuels and heat pumps, covering each of the last three years.

Table 6.4: A 5-year table showing capacity (MW) of, and electricity generated (GWh) from, renewable sources. It also summarises the total generation from renewable sources eligible for the Renewables Obligation (RO).

Table 6.5: A 5-year table showing plant load factors that are calculated in terms of installed capacity and express the average hourly quantity of electricity generated as a percentage of the average capacity at the beginning and end of the year. This table also contains a second set of statistics to describe the load factor for schemes that have operated on an unchanged configuration basis throughout the calendar year.

Table 6.6: This shows renewable sources used to generate electricity, to generate heat, and for transport purposes for the most recent five years.

Table 6.7: This brings together the renewable sources data used to indicate progress under the 2009 EU RED (measured using net calorific values) towards the target of 15 per cent of UK energy consumption to be sourced from renewables by 2020.

Table 6.1.1: Renewable sources used to generate electricity and heat (thousand tonnes of oil equivalent) from renewable sources. This is an internet only table (see 'Long Term Trends' on the DUKES webpage) and is not included in the main DUKES report.

Table 6.1.2: Generation and operational capacity - MW DNC (Declared Net Capacity). This is an internet only table (see 'Long Term Trends' on the DUKES webpage) and is not included in the main DUKES report.

Various Indicators are used throughout the document to highlight general trends in the development of renewable energy technologies and include:

- Trends in the use of renewable energy sources for electricity, heat and transport;
- Increase in the electricity generation capacity from all significant renewable sources;
- Growth in the proportion of electricity produced from renewable sources, including the progress towards the renewables targets set under the RO and the RED;
- Renewable generating capacity from the Non-Fossil Fuel Obligation (NFFO) schemes, former NFFO contracts (including equivalents in Scotland and Northern Ireland) and capacity outside of NFFO.
- Load factors for renewable electricity generation.

Energy Trends (quarterly data)

Quarterly estimates of installed electricity capacity and generation, disaggregated by UK country, are produced for publication in Energy Trends.

Energy Trends articles (June and September)

Each June, a special feature article is published containing highlights of UK Renewable Statistics at the national level, and includes a first estimate of progress against the Renewable Energy Directive for the previous year.

The September issue contains Regional renewable electricity statistics plus an analysis of load factors for on-shore and off-shore wind, hydro, landfill gas, sewage and other bioenergy. The statistics from 2000 onwards have been disaggregated by UK country, and the regions of England. In some cases, particularly for early years, it has been necessary to combine the data for certain regions so that information about individual sites provided in confidence is not disclosed. Supporting spreadsheets – including capacity, generation, number of sites, GVA, and the two measures of load factor, are also published.

From 2014, data has also been published, showing generation, capacity and number of sites, by UK local authority, for each of the main technology groups.

1.3 Methodology and documentation

The various inputs are gathered from a number of different administrative sources including BEIS' Major Power Producers (MPP) survey and Ofgem's Renewable Obligation Certificate (ROC) and Feed-in Tariff (FiT) Registers. New schemes are also identified from the Renewable Energy Planning Database (REPD), together with their operational dates, so that the appropriate amount of generation may be estimated; care is taken to ensure no double-counting of schemes between data source (for example, installations supported by FiTs are flagged). Owing to the timing of ROCs data releases, data are only available for the first two months of the new reporting Quarter so estimates must be made for the final month, using typical load factors. These quarterly data are reconciled against the Annual survey data at the end of the cycle.

BEIS appointed consultants collate these data and generate all statistical outputs, both those expressed explicitly in DUKES and those used by BEIS in support of the generation of statistical tables presented in other Chapters of DUKES.

Detailed procedures and methodologies for generating outputs and Quality Assurance (QA) reside at BEIS appointed consultants within appropriate delivery spreadsheets and desk notes.

Summarised notes on these data sources, their relative importance in terms of the capacity covered by each, and the methodology and protocols used to generate the statistical outputs are presented in Chapter 6 of DUKES and in a methodology report;

https://www.gov.uk/government/publications/renewable-energy-statistics-data-sources-and-methodologies

2. Relevance

2.1 Content

The purpose of the RESTATS project is to:

- monitor the renewables sector to ensure that the aims and targets of energy policy are being met;
- compile the renewable energy components of the main economic series to the Office for National Statistics;
- promote competition and efficient electricity production by providing a reliable, timely and unbiased picture of the renewables industry (and hence the electricity industry) as a whole, and
- fulfil the UK's obligations to provide regular renewables statistics to the European Union (EU), and to the IEA.

The statistical product is presented for public consumption in DUKES and Energy Trends publications as a series of statistics tables where data are presented in the most disaggregated form possible without disclosing commercially sensitive attributes of individual projects.

Much of the primary data used in the statistical product is provided primarily in response to United Kingdom climate change policy programme; e.g. Combined Heat & Power Quality Assurance (CHPQA), Renewables Heat Incentive (RHI), RO, FiTs. A statement of administrative sources used to compile National and Official Statistics is available on the gov.uk website;

https://www.gov.uk/government/publications/administrative-sources-statement

2.2 Completeness and geographical coverage

The statistical product presented in DUKES and Energy Trends covers a number of years, so as to inform the user of past and emerging trends. The statistical product covers the whole of the United Kingdom. Statistical outputs are reported to the level of the Government Office Regions of the United Kingdom in Energy Trends, and, from 2014, to Local Authority level.

2.3 User needs

The end users of the statistics are varied. Requests for clarification on data indicate that users include: Government, Devolved Administrations, Local Authorities, policy makers, international statistics organisations, Industry, energy consultancies, academic institutions, the energy industry and the general public.

Users often request a higher degree of disaggregation of the data which cannot always be provided for reasons of confidentiality. That may be considered to constitute a gap between user needs and the statistical product provided.

2. Relevance

Each year, BEIS issues a survey of user views to determine if the statistics are meeting user needs. The survey is sent to known users and published on the department's website. Any suggestions for improvements are carefully considered, balancing any additional burden on the department, data providers, and also any potential disclosure issues.

3. Accuracy and reliability

3.1 Annual renewable energy statistics

Administrative data

Historically, the RESTATS project annually surveyed all renewables technologies but has now gradually integrated with other administrative data collection activities (e.g. BEIS' MPP Survey) which in turn has made it more efficient. In addition, incorporating new data sources (e.g. Ofgem's ROCs database containing details of renewable obligation certificates issued for various renewables technologies) has given the project more complete coverage.

This approach, however, gave rise to issues of data quality from these disparate sources and led to the development of appropriate quality checking procedures. This includes data cleansing (duplicates), where geo-referencing of these data is helpful, crosschecking with other data sources to ensure, to best endeavours, that these data are both complete and consistent, and undertaking 'sanity' checks (e.g., comparison of load factors) to confirm that data are meaningful prior to acceptance.

Data relating to electrical generating capacity and electricity generation are submitted by operators to Ofgem every month. As the quantity of electricity generated has a financial value in the form of ROCs, a minimum standard of electricity metering accuracy is stipulated by Ofgem. These standards are subject to audit by Ofgem at which time a check is also made that site held data corroborates the data and calculations submitted to Ofgem.

Whilst BEIS' MPP Survey, the NFFO Database, the Combined Heat & Power STATisticS (CHAPSTATS) database, and the REPD, all have their own internal checking procedures to ensure data quality procedure, further sense checking is also undertaken before these data are imported into the RESTATS database.

Regular ad hoc surveys

For those technologies which are not included in the MPP survey and where no administrative data exists, regular ad hoc surveys are conducted as part of a programme of 'Gap Analysis' studies. For example, a survey of clinical waste incinerators is conducted every three years and in 2015 BEIS undertook a one-off survey of domestic wood users. No one approach has been shown to be completely effective so the protocol for conducting these surveys is summarised below:

- Where the data required are not available from other sources, large projects are surveyed through an annual questionnaire, issued by email (and occasionally post) with telephone follow-up of non-respondents.
- Where there are large numbers of small projects, estimates are based on a sub-sample.

- On-line survey forms were also made available from a secure web site as an alternative method of responding but are no longer offered for the annual survey.
- Modelling and estimates are made where surveys are not practical, with independent assessment and verification of the data where practicable.

The estimated proportion of respondents and the percentage of energy that comes from each is summarised in the following table:

Approach	% of Respondents	% of Energy
Small number of Large projects	14%	21%
Large number of Small projects	78%	3%
On-line form	8%	<1%
Models/estimates	0%	7%
Other sources	0%	67%
TOTAL	**100%**	**100%**

A list of BEIS statistical surveys (including those relating to renewable energy) is available on the BEIS website;

https://www.gov.uk/government/publications/statistical-surveys

Estimates and modelling

In a few cases, such as domestic wood use, active solar and straw combustion for heat, where good data are not available, these are estimated by an appropriate technical expert (having a good knowledge of both the technology and industry), and peer reviewed by a competent external organisation/contractor (e.g., The Forestry Commission relating to the domestic wood survey). This approach is reviewed in the light of new data sources and methodologies and undertaken as part of the 'Gap Analysis' work. The information on which these estimates are based is supplemented, where possible, by carrying out a limited survey on a sub-sample of projects and modelling. Further details are to be found in the methodology note;

https://www.gov.uk/government/publications/renewable-energy-statistics-data-sources-and-methodologies

4. Timeliness and punctuality

4.1 Timeliness

The results of this survey and associated analytical work are published on an annual and quarterly basis and, as they are classified as National Statistics, these data are published according to an agreed pre-announced timetable;

https://www.gov.uk/government/publications/statistical-releases-timetable-for-twelve-months-ahead

The table below details the publication timetable of each release, with examples.

Statistical release	Timeliness	Example
Headline estimates for renewable energy and progress against the RED	Energy Trends published 6 months after the end of the year covered.	Final outputs to 2015 published in June 2016
Annual survey	DUKES published 7 months after the reported year	Final outputs for 2015 published in July 2016
Regional breakdown of generation statistics	Published 9 months after the reported year	Final outputs for 2015 published in September 2016
Quarterly estimates	Energy Trends published 3 months after the end of the quarter	Q1 2015 estimates published late June 2016
Monthly Renewables Obligation Certificates issued to accredited generators	Energy Trends. Published 3 months after the end of the month in question	In October 2016, published provisional data for June 2016

Pre-release access to the statistical release, briefing and data tables is granted 24 hours ahead in accordance with BEIS' statement of compliance with pre-release access;

https://www.gov.uk/government/publications/official-statistics-order-2008-statement-of-compliance-with-the-pre-release-access

4.2 Punctuality

The results of this survey and associated analytical work are published on an annual and quarterly basis and, as they are classified as National Statistics, these data are published according to an agreed pre-announced schedule. In accordance with the Code of Practice for Official Statistics, releases are published at 9.30am.

5. Accessibility and clarity

5.1 Accessibility

All statistical releases and accompanying documents and data tables are published on the relevant area of the ".gov.uk" website. Data tables are provided in Excel format, although users may request other formats if they wish. Known users are notified via email that the statistics have been published and are available

Users of assistive technology can request a version of the publications or data tables in a more accessible format by contacting BEIS correspondence.

There are no restrictions on the availability of the statistical output, as this is published in DUKES. There are no restrictions on the use to which the statistical outputs can be put by the user, nor are there restrictions on the sharing of the statistical outputs with third parties, as the statistical outputs are publically available.

Underlying data, used to generate the statistical outputs, are currently not available to users, as much of this is supplied as commercial-in-confidence'. Disclosure control is based on the '3-site rule' which supresses output where fewer than 3 records make up a reported value or if one of the records for the 3-site minimum makes a major contribution to the final figure.

With the exception of small-scale generation schemes, the database holds individual project site details that are geo-referenced. As part of the INSPIRE protocol, discovery data (metadata) have been produced and are available for download from data .gov.uk;

http://data.gov.uk/dataset/the-uk-renewable-energy-statistics-database

5.2 Clarity

Each statistical release comprises a written statistical release containing a summary of the data, along with contextual information, and information about drivers of change in the data. For more expert users, data tables are provided. Some methodological information is summarised in the releases, but more technical methodological documents are provided for users who need this.

6. Coherence and comparability

6.1 Accuracy and consistency

The activities described above have allowed a view to be formed of the accuracy and consistency of the data from these and other various data sources. The ROCs generation figures should be at least the same as NFFO and could be greater if the site is generating more than its NFFO contract; it can never be less. NFFO data therefore provide a good crosscheck with ROCs as these schemes are recorded in both databases. When ROCs first began, there were a number of discrepancies that were primarily related to combustion schemes as the latter required proof of the nature and calorific value of the fuels and this would result in a delay in the issuing of certificates. At present, there is usually a good correlation in excess of 99 per cent for the schemes.

One of the shortcomings of the difference in the reporting periods for the data contained in DUKES (end of calendar year) and Ofgem finalised ROCs data (end of financial year), is that the finalised Ofgem figures are not available for use during the compilation process for both annual and quarterly reporting, and data for the most recent month for ROCs are estimated when included in BEIS's quarterly statistical reports.

Following the request by BEIS that MPP provide hydro data on a site-by-site basis, rather than on an aggregated basis, data quality has improved enormously and there is now a correlation exceeding 99 per cent with both NFFO and ROCs data sources if they also hold information on these schemes. MPP data are now provided for many wind, biomass and MSW schemes with plans to extend this to cover Co-firing.

The REPD provides a crosscheck with electricity generating schemes that have become operational during the reporting year to ensure completeness. There are some limitations as the database now only holds data on schemes greater than 1MW that require a planning approval and provides only installed capacity and address details. In addition, some technologies, such as Sewage Gas and Co-firing, which do not require planning approval, will not be picked up.

Accuracy and consistency of other data sources is varied, especially when they are only used for estimates; e.g., the British Hydropower Association database of sites and the different data sources and anecdotal evidence used for estimating domestic wood use.

There are no other statistical outputs covering the same theme against which to compare these statistical outputs.

6.2 Revisions to data

Statistical outputs for past years are susceptible to update. In DUKES, data on renewables operation are reported for a number of years in order to give a historic time series perspective. Where better data have been identified, it is normal practice for revisions to be made to the data for previous years. All data in a time series will need to be reported consistently, which means that, as far as possible, the time series should be calculated

using the same methods and data sources in all years. Updates are made each year to relevant parts of the time series to take account of new methods and data. Final inventory data is reported in a methodologically comparable time series dating back to 1989.

7. Trade offs

It is recognised that one of the shortcomings of the differences in the reporting periods for the data contained in DUKES (end of calendar year) and Ofgem's finalised ROCs data (end of financial year), is that the finalised Ofgem figures are not available for use during the compilation process for both Annual and Quarterly reporting. Owing to the timing of the Quarterly publications dates and ROCs release dates, the data for the most recent month for ROCs are estimated when included in BEIS' quarterly statistical reports.

8. Assessment of user needs and perceptions

BEIS recognise that users will have different needs and welcome views from both internal and external customers through the Renewables Statistics Mailbox:

renewablesstatistics@beis.gov.uk

Contact details for specific publications are also provided within each statistical release.

Further information about BEIS' user engagement policies can be found in the Customer Service and Engagement statement published on .gov.uk;

https://www.gov.uk/government/publications/customer-service-and-engagement-statement

A survey of users of all of BEIS' statistics was conducted in 2012, with the outcomes published on .gov.uk;

http://webarchive.nationalarchives.gov.uk/20131223060902/https:/www.gov.uk/government/uploads/system/uploads/attachment_data/file/239316/decc_statistics_user_survey_2012.pdf

The uses to which the statistical products are put are also received informally when answering user queries. Informally, the main uses are: Government policy formulation, consultants carrying out research for clients and energy service companies gathering information to help them understand the market for Renewable Energy.

9. Performance, cost and respondent burden

As well as providing a more detailed picture of energy use as part of the DUKES publication, the UK is required by the EC and the IEA to produce an annual report.

A large proportion of the primary data used to generate the statistical product is provided from sources of Official Statistics in response to United Kingdom climate change policy programme (e.g. CHPQA, RHI, RO, FiT). As such, with the exception of the annual survey of Municipal Solid and Industrial Waste projects and the Gap Analysis Surveys for information not available from these key definitive sources, the compilation of the statistical product does not place an additional burden on the respondent.

An Annual Report is prepared for the Survey Control Unit that summarises the potential impact on target businesses and the cost of undertaking this work. The cost of this work to BEIS in 2015 was estimated to be £65k. Response rates of about 65per cent were achieved.

10. Confidentiality, transparency and security

The transparency of renewables statistics is fundamental to their effective use, review and continuous improvement. Clear explanations are given in both DUKES and the Methodology Report.

Much of the data is publicly available though commercially sensitive data are also provided by BEIS (MPP Survey) and Ofgem, who provide some data not available on their public web sites. Where organisations have provided information on the condition that the data remains confidential, these sources are reported at a level of aggregation to eliminate disclosure of individual schemes. This ensures compliance with the UK Code of Practice for Official Statistics. Where detailed data is required, for example due to a freedom of information request, any elements of confidential data in the set are identified and suppressed.

These primary data are held on secure servers and networks hosted at BEIS appointed consultants; protocols are also in place for the secure transfer of these data.