

Distributed Generation

A discussion of the changes that have taken place since the introduction of the Embedded Capacity Register

Introduction

From July 2020 all Distribution Network Operators (DNOs) were required to publish a standardised register of all sites larger than 1MW with Distributed Energy Resources (DERs).¹ that are connected to or have an agreement to connect to their networks and influence the operation of the GB power system². Previously, DNOs had worked together via the Energy Networks Association to agree a common System Wide Resource Register but this lacked some important data which they did not have the approval to publish. The DCUSA code change gave them the approval to add this to the register which was renamed as the Embedded Capacity Register. This thought piece will explain the work we, the Electricity System Operator (ESO), have done with the DNOs and how the ECR has changed our data and results and will also explain the importance of this change taking place.

Key Messages

This work is in line with the Energy Data Taskforce commissioned by Ofgem, BEIS and Innovate UK as they strive to modernise the UK energy system³. To ensure the most cost-effective solution to the consumer and to ensure we can accurately forecast demand the decision was made to switch to the ECR.

We have worked closely with the DNOs to ensure that the most relevant and up to date data is available and ready for use.

This work ensures that we and the DNOs are aligned. Collaboration with the DNOs will continue to ensure that where possible there is consistency across the energy system.

Previously, due to a lack of a standardised register it was difficult to ensure that all the relevant data had been extracted without duplication. Some of the existing disparate registers that we were previously using such as the Renewable Obligation Register have closed to new entrants and so the ECR is critical to ensure that we can continue to track the market.

This data will be used to restructure many of the models that we use, and it will be used to underpin the data and analysis used yearly within the FES publication.

This work allows us to better understand the energy system on a more granular level and is an example of the work that we are continuing to do to regionalise data that typically has only been published at GB level.

¹ DERs includes generation, storage and demand sites that have a contract to provide demand-side response/management

² <https://www.dcusa.co.uk/dcusa-document/related-documentation/embedded-capacity-register/>

³ <https://es.catapult.org.uk/report/energy-data-taskforce-report/>

Why has this work taken place?

Following discussions with BEIS Panel of Technical Experts (PTE)⁴, it was agreed that this was an important area to fix to contribute to consistency in datasets across the energy sector⁵. The following section will address what some of the key issues were previously and how the ECR will help overcome these issues.

One of the reasons that this change was proposed was because there was insufficient or incomplete data available surrounding distributed generation⁶. This incomplete data made it difficult for us to accurately forecast demand. This switch to using a standardised ECR was introduced to ensure we have a single source of the truth that accurately reflected sites that are operational with details about their technology type and capacity. Another reason Ofgem and BEIS wanted this change to take place was so that the messages and data that are produced in the Future Energy Scenarios (FES) by the ESO are in line with the data produced by the DNOs in the DFES (Distribution Future Energy Scenarios). This change will allow for more consistency and fairness across the energy market.

Where were the gaps in the data?

The data ESO was receiving regarding distributed generation was submitted using different platforms and each register had different ways of logging their embedded generation. These disparate registers made it difficult for us to ensure that we had all of the relevant and up to date data without duplication. This made it difficult for us to develop a complete view of distributed generation.

Two of the registers that we were using before the introduction of the ECR were related to renewable subsidy schemes which have now closed to new participants. This meant that key data on new build renewable generation had become hard to find, often requiring us to search developers' websites for hints to new sites. This lack of consistent and up to date data posed many challenges within our modelling and forecasting.

After the initial switch to the ECR it was clear that not all the DNOs had all the required data and some of the data that they had was not up to date. This was particularly true for some of the earliest embedded generation which connected prior to modern record keeping. This required us to work closely together with the DNOs to ensure that the data within the ECR would address the gaps.

Such gaps in the data make it difficult to accurately forecast the energy demand, and inaccuracies can potentially impact consumers directly in the form of increased costs. These costs come from unnecessary overspend in the Capacity Market (CM) and potentially increased costs in operating and maintaining the electricity network⁷.

Evidently there were many issues that arose from the previous gaps in the data. The cost to the consumers as well as the challenges faced to accurately forecast embedded generation were key drivers for collaborating and standardising the data through the ECR.

What work have we done with the DNOs?

We have worked closely with the DNOs to ensure that this transition is smooth not only for us but also for them. We are eager to explain this change and highlight all the work that we have done working together.

⁴ <https://www.gov.uk/government/groups/electricity-market-reform-panel-of-technical-experts>

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/900062/panel-technical-experts-report-on-2020-electricity-capacity-report.pdf

⁶ <https://www.ofgem.gov.uk/publications/dcp350-creation-embedded-capacity-registers>

⁷ <https://www.ofgem.gov.uk/publications/dcp350-creation-embedded-capacity-registers>

The first step of collaboration with the DNOs was to work closely with them and explain the importance of making this change. We highlighted the challenges that we were facing and how we were not able to forecast accurately using the old format of the registers.

The initial work that was completed in the summer of 2020 by the DNOs in the ECR saw a significant step change in the data we had access to help with forecasting accuracy. An additional area of improvement was highlighted to further improve the usefulness of the data in our forecasts - 4.5GW of generation was not assigned a type but rather was listed under the 'other' category. We made it our priority to work with the DNOs to reduce this number and try to accurately label this generation within the correct technology. We developed tools to assist the DNOs with this change to ensure that the transition was as easy as possible.

This collaboration with the DNOs is ongoing and we will continue working with them to ensure that both us and the DNOs, as well as other stakeholders across the industry are able to benefit from this change and to continue ensuring as low a cost as possible to end consumers.

How has the data improved?

The data that is available to us now is much more beneficial to us. Since we are receiving updates from the DNOs every month and all the data is in a standardised format we can more accurately forecast our energy demand. Our energy demand is used across many different departments within the ESO highlighting the importance of its accuracy.

An increase in distributed generation means that there is more underlying demand, this demand must then be covered by the Capacity Market to ensure that we maintain security of supply. If there are inaccuracies in forecasting this may lead to unnecessary spend in the Capacity Market which in turn may lead to increased costs to the end consumers.

The use of the improved datasets in the forecasting process for FES has resulted in significant time saving and has reduced the time needed to process and check the data. This is summarised in Figure 1.

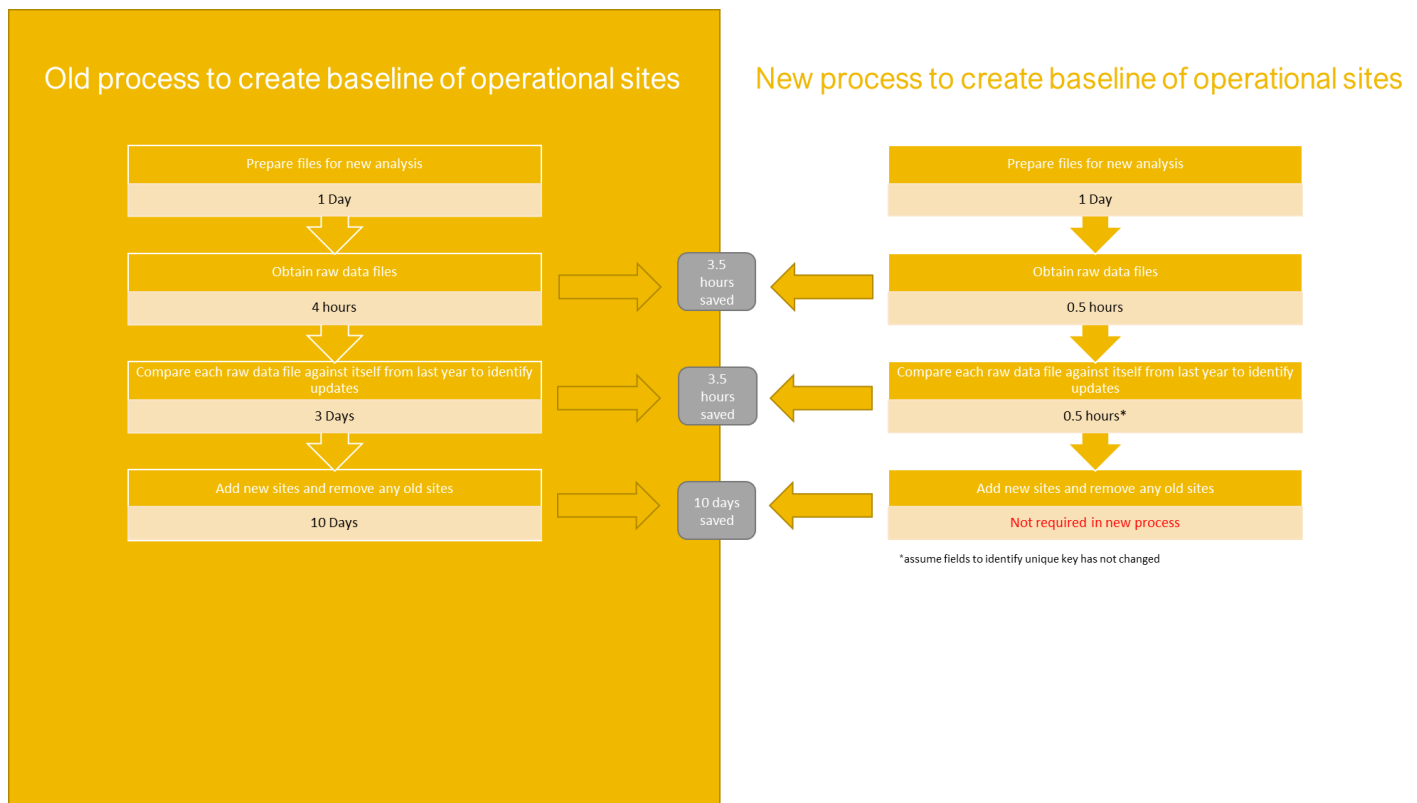


Figure 1 Time saving considering old versus new process to create a baseline of operational generator sites currently connected to distribution networks.

How are we using this data and how will we use it in the future?

We have already started using this data to restructure many of our models. We will continue to use this data within our modelling and to underpin key FES analysis.

This data will be used in all future FES publications and analysis going forward there will be continued ongoing collaboration with the DNOs to ensure the most accurate and up to date data is available for our analysis. This data will ensure that we are able to continue forecasting GB wide demand as well as giving us a more accurate granular view of local demand breakdown.

This switch to the ECR is a first step which has allowed us to gain better insights into the distributed generation that is connected to the distribution networks across GB. This first step has also allowed us to ensure that our work is better aligned with the DNOs and is allowing for better collaboration.

This collaboration with the DNOs will be ongoing as they continue to add more data regarding distributed generation to the ECR and as we continue to develop our models. Through collaborating effectively with the DNOs we ensure that we have the most accurate data, and this data is in line with the data used by the DNOs.

Link to regionalisation of FES

This work highlights some of the changes that we have made to better understand the more granular details of the energy system. This is a key area of focus within our modelling and the insights we provide as we enhance our processes with more bottom-up assumptions.

This recent work and the developments that have taken place since the introduction of the ECR shows that through a more detailed understanding of what generation is connected and where, we can

enhance our planning process. There have been several benefits so far in developing a better understanding of how local factors will impact the energy system and there will be benefits continuing this work in different areas.

We will continue to develop our research and understanding of how local factors will drive different outcomes on the energy system through our regionalisation of FES activities, and we will continue to work with the DNOs to ensure that we operate a fair system in the most cost-effective way for the end consumer.

Wider uses of the ECR

This thought piece has focussed on the benefits the Embedded Capacity Registers have brought to the modelling process undertaken by the ESO, such as the Future Energy Scenarios and analysis used to support the Capacity Market. There are wider uses of the ECR by other stakeholders within the energy industry which are worth highlighting. The ECR data can be used alongside additional data produced and published by the DNOs to highlight how current generation connected to the network could contribute to system security as well providing supporting information to help planning new connections of Distributed Energy Resources.

Conclusions

This thought piece has highlighted the importance of accurately representing distributed generation within the modelling for the Future Energy Scenarios. Recent changes by the DNOs in reporting generation connected to their networks in a standard way has given the ESO a way to keep data and models up to date. This has removed reliance on older systems such as registers related to former renewable subsidy schemes. The ECR has also allowed us to develop a more granular view of demand, we are continually working with DNOs and other stakeholders to better understand the regional differences in our journey to net zero and this ongoing work highlights some of the key relationships that have been built and the work that we have been doing.