Flexible Power

Guide to API Setup & UAT Testing

Version 2.2 October 2021

Contents

1. Definitions

DER	Distributed Energy Resource
CFP	Contracted Flexibility Provider
User	CFP appointed person with access to The Portal
DNO	Distribution Network Operator
The Portal	The Flexible Power Portal
API	Application Programming Interface
CMZ	Constraint Management Zone. A geographical zone defined by the DNO within with the CFP has been award a contract to deliver flexibility services.
UAT Environment	The version of the portal where User Acceptance Testing is conducted
Live Environment	The version of the portal where live flexibility operations are conducted
MU	Meterable Unit
DG	Dispatch Group
DSR	Demand Side Response

2. Introduction

This guide has been produced to assist Contracted Flexibility Providers (CFP) in their set-up within the Flexible Power Portal ('The Portal').

The Portal is the operational platform through which CFPs are able to declare their Distributed Energy Resource (DER) availability and submit associated meter readings. The Distribution Network Operator (DNO) uses the portal to accept availability declarations and instruct utilisation events.

The Portal is also equipped with functionality that calculates baselines, event performance, event earnings & monthly invoices.

Note: We recommend using a Chrome browser to access the platform.

It should be noted that Portal is subject to continuous improvement and development. As such this guide will be updated on a regular basis. To find the latest guide please visit the Flexible Power Website (www.flexiblepower.co.uk)

3. Applicability

The Portal is used by the following UK DNOs to administer their flexibility operations;

1. Scottish & Southern Electricity Networks; flexible.services@sse.com
2. Scottish Power Energy Networks; flexibility@spenergynetworks.co.uk
3. Northern Powergrid; flexibility@northernpowergrid.com
4. Western Power Distribution; wpdflexiblepower@westernpower.co.uk
5. Electricity North West: Flexible.contracts@enwl.co.uk

CFP appointed users will be provided with a portal account once they have been awarded a contract by any of the above DNOs.

4. API Set-up

4.1 An Introduction to APIs

An Application Programming Interface (API) is a software intermediary that allows two applications to talk to each other.

In the context of Flexible Power's services, the API replaces the requirement for dedicated hardware to be connected at a DER site in order to collect the metering data and send instructions from a DNOs central control desk.

There are a large variety of DER control arrangements, ranging from a single asset such as a standalone generator through to a complex estate with multiple assets or even part of a portfolio under management by a commercial aggregator. Therefore, CFPs are required to develop their own interface for the API to their DER control.

DNOs are available to assist in discussions to advise the options that may be appropriate for specific DER control arrangements. For further advice, email your DNO as detailed in section 3.

4.2 Testing Environment

All API set-up and testing must be performed in the User Acceptance Testing (UAT) environment which offers new users as a safe environment in which test establish and test the technical aspects of the Flexible Power service.

UAT replicates the live environment that is used for operating all Flexible Power services. CFPs can use this to establish the API interface as well as familiarise with the diary system used for capacity declaration.

- The UAT Environment (for testing only) is found at: https://uat.flexiblepowerportal.co.uk/
- UAT includes a self-testing environment where users can set up and test API and declaration procedures.
- A supervised test will be required before a user is given access to the Live Environment

4.3 Live Environment

The live 'Production' environment is found at; https://flexiblepowerportal.co.uk. Access will be provided following the successful conclusion of testing in UAT.

4.4 Signal and Control Requirements

For the latest detailed signal definitions, please refer to the online API definition on the Portal.

At a high level, the following data needs to be provided via the API;

- Readings: Current power usage in kW, with timestamp, per MU and per CMZ

- Emergency stop signal, per MU, per DSR programme and per CMZ

More details can be found at https://flexiblepowerportal.co.uk/docs/api_from_participant_v1_1.html

In addition, the following control signals will need to be received;

- Dispatch start instruction, per DSR programme, per CMZ, listing the relevant MUs

- Dispatch stop instruction, per DSR programme, per CMZ, listing the relevant MUs

More details can be found at https://flexiblepowerportal.co.uk/docs/api_to_participant_v1_1.html

The API requires continual provision of minute-by-minute readings data throughout the operational season, ideally three weeks before a CMZs operational season begins. This provides the portal with both data for the baselining and so delivery can be verified in real time/close to real time.

It is recommended that readings data is submitted within 24hrs of real time to allow for accurate reporting and settlement processes.

5. Accessing the Portal for the first time

New CFPs requiring an account for the Flexible Power Portal should do so by providing the following information to their DNO;

- Organisation / Company name
- CMZs in which they have been awarded contracts and wish to declare capacity
- Full name and email address for initial user account

An account will then be created within three working days for the UAT environment. The DNO will send a notification to the user when this has been completed.

The user should then visit; https://uat.flexiblepowerportal.co.uk/

Step 1. Follow the '*Login*' link at the top right corner of the page.
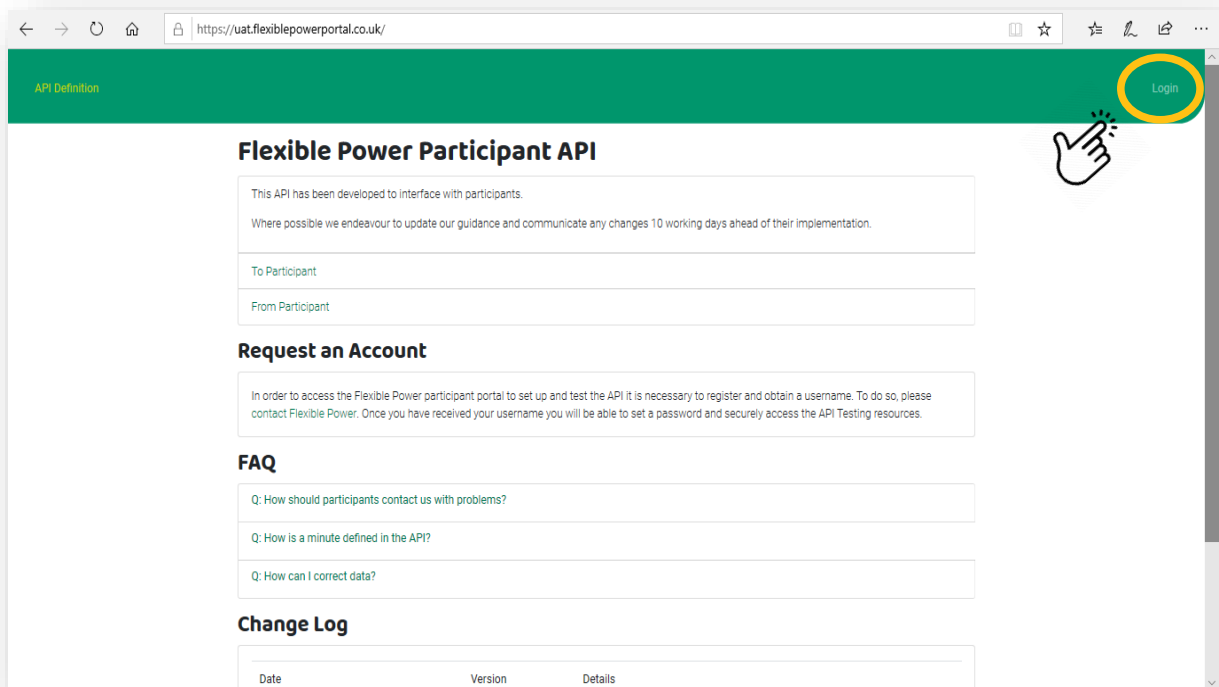
Step 2. On the first time visiting this page the user should use the '*lost password*' link and input the email address that has been previously provided to set up the users account.

Step 3. Check the email account for an email from Flexible Power with a reset link to create the user's password (please note only one user account per organisation is typically provided in the UAT environment, but multiple are permitted when set up in the Live Production Environment).

6. API Access Tokens

A unique API access token is generated for you by default and is used to authenticate the signals sent via the API. We recommend this is retained, however where users need to create a new API access token this can be done using the 'Create a new token' button.
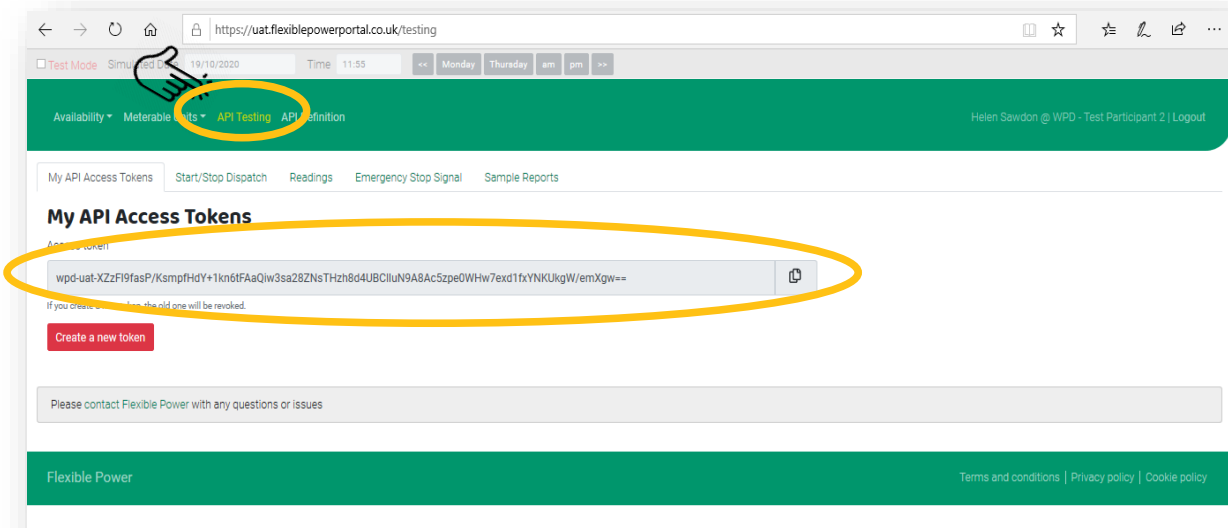
Step 1: To find your API access token, please navigate to the "My Access Tokens" tab of the API testing page.

Should you want to reset your access token proceed to step 2.

Note: this will break any existing API integrations and will automatically update the curl commands shown on the 'readings' and 'emergency stop' pages. Whenever a new token is created it will be necessary to update the API software script for communications to continue.

Step 2. Under 'My API access tokens', create a new access token that you can use for authorisation purpose when using the APIs
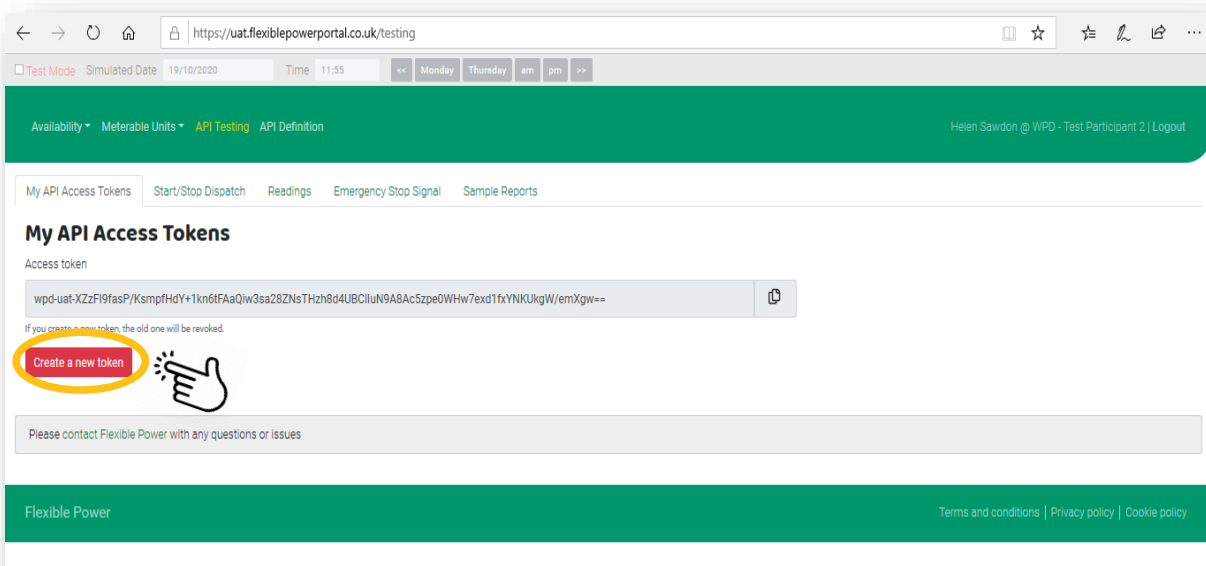
7. Setting-Up Meterable Units and Dispatch Groups

To allow for a variety of different CFP set ups, Flexible Power operates a core data structure made of 2 primary components.

- A Dispatch Group (DG) is the higher level component and is used for availability declarations, dispatch and settlement.
- A Meterable Unit (MU) is made up of one or more flexibility assets behind a single metering feed. Baselining is applied at the Meterable Unit level.

One or more Meterable Units can be aggregated into a Dispatch Group. This allows for a more detailed view of how each MU operates, whilst allowing delivery risk to be shared.

The table below highlights how Dispatch Groups and Meterable Units can be set up in various situations.
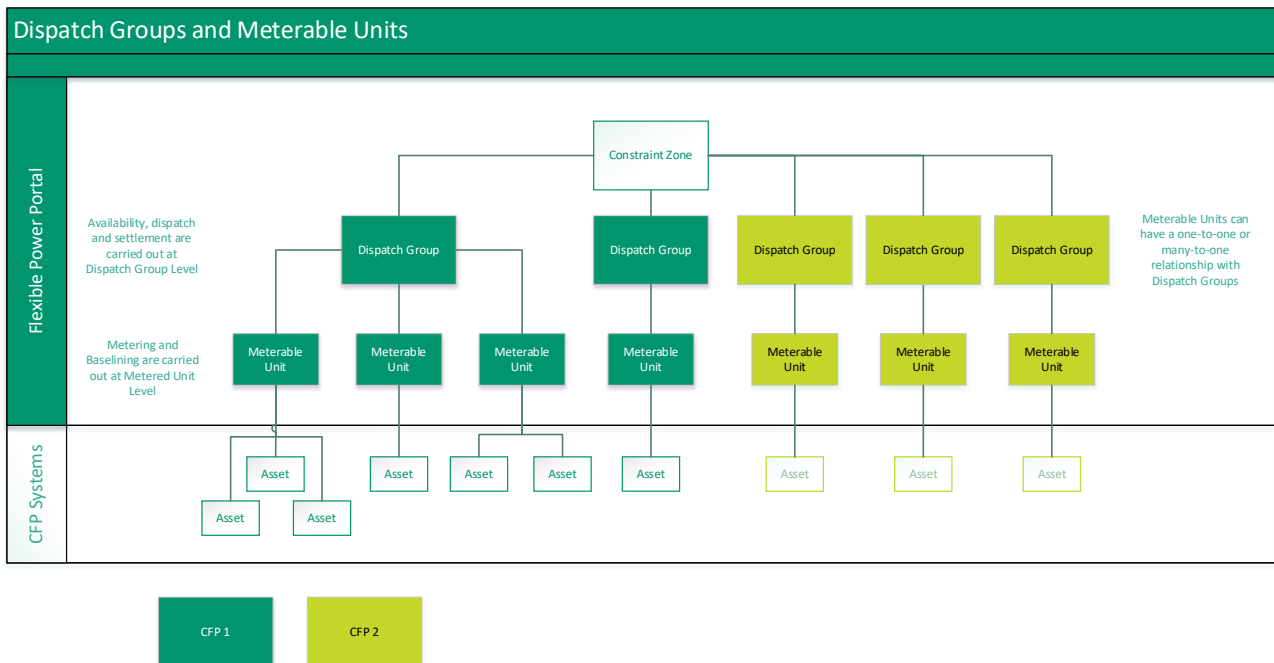
It should be noted that a direct one to one relationship between the MU and DG can be, and often is, specified.

DG Set-up and Control - Your Dispatch Group will be created for you as part of their setup of your access to the Portal. If there are any issues with set up of your Dispatch Group, please contact the relevant DNO.

MU Set-up and Control - Due to variations in ways of contracting, there are a number of options for the implementation of Meterable Units depending on the DNO.

Where **CFP controlled MU** is in place, the CFP is free to create and adjust MUs as required.

Where "**DNO controlled MU"** is in place, only the DNO can create and adjust MUs.

The relevant implementation will be specified by your DNO and may differ between the UAT and PROD environements.

Note: where any change is made, they will apply from the next declarable week onwards.

To view your Dispatch Groups and Meterable Units navigate to the Meterable Unit Section.

In order to test the start/stop API Meterable Units (MUs) will need to be created. These can be created to reflect your real assets, but for the purpose of testing any value can be used to create the Meterable Units.

Step 1. Go to the "Meterable Units" page, select 'sandbox' and review the Dispatch Group set up. As part of the review, please check that the correct pricing information has been added to you Dispatch Group(s)
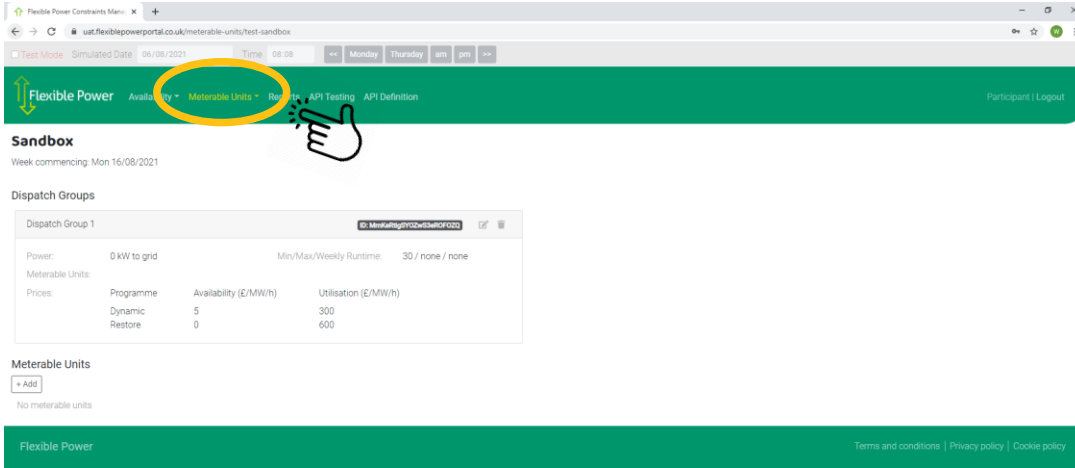
If no Dispatch Group is present, or there are any errors, please contact the relevant DNO (see section 3).
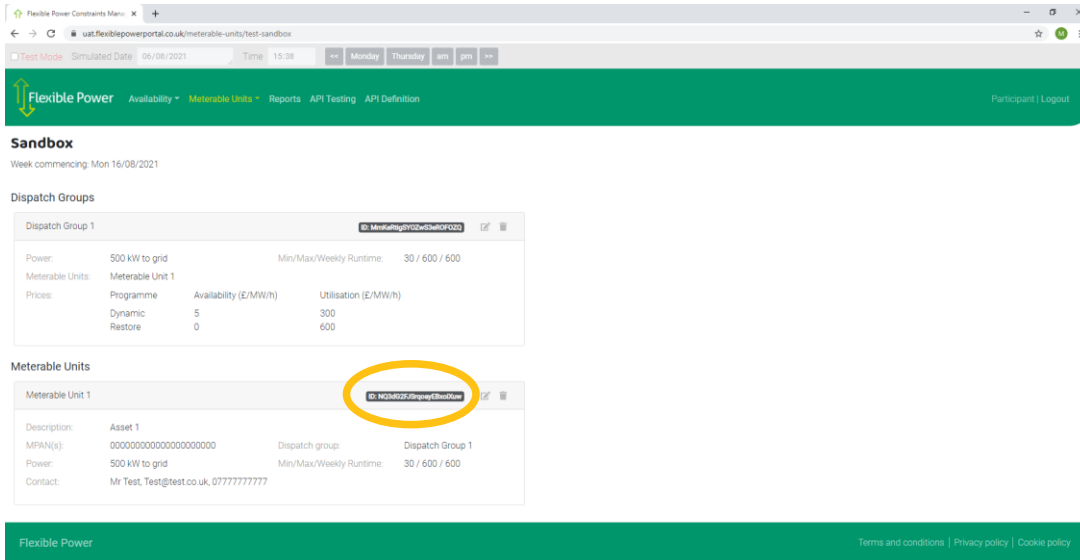
Please note the process varies depending on whether "CFP controlled MU" or "DNO controlled MU" is implemented.

If "DNO Controlled MU" is implemented:

Step 2. On the same page as your Dispatch group review the Meterable Units that have been set up.

Note: The Meterable Unit ID, needed for the API set up is shown on this page.

If "CFP Controlled MU" is implemented:

Step 2. Go to the "Meterable Units" page, select 'sandbox' and create your Meterable Units.
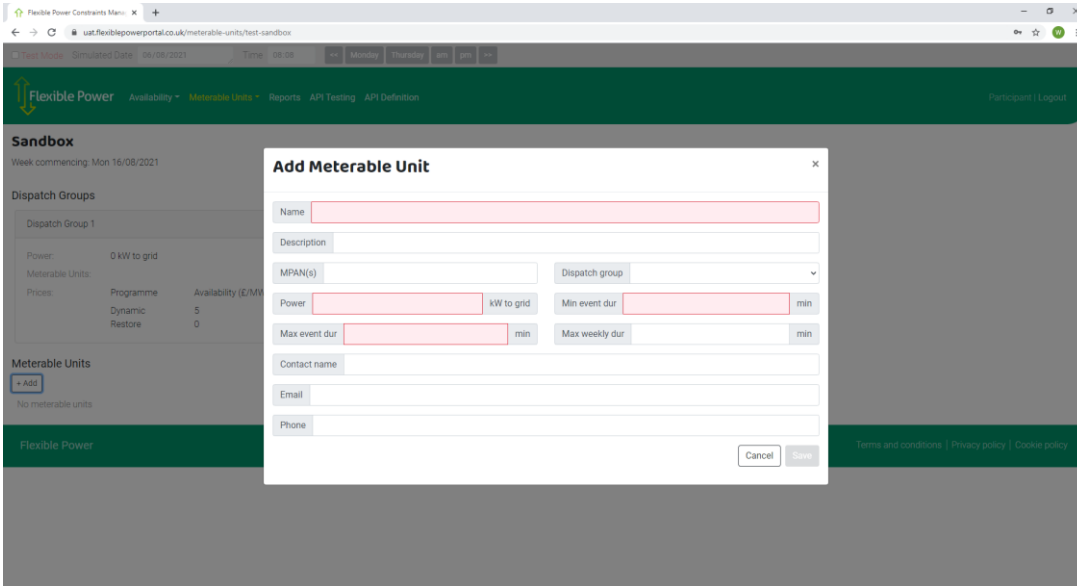
Please add details to all the relevant fields.
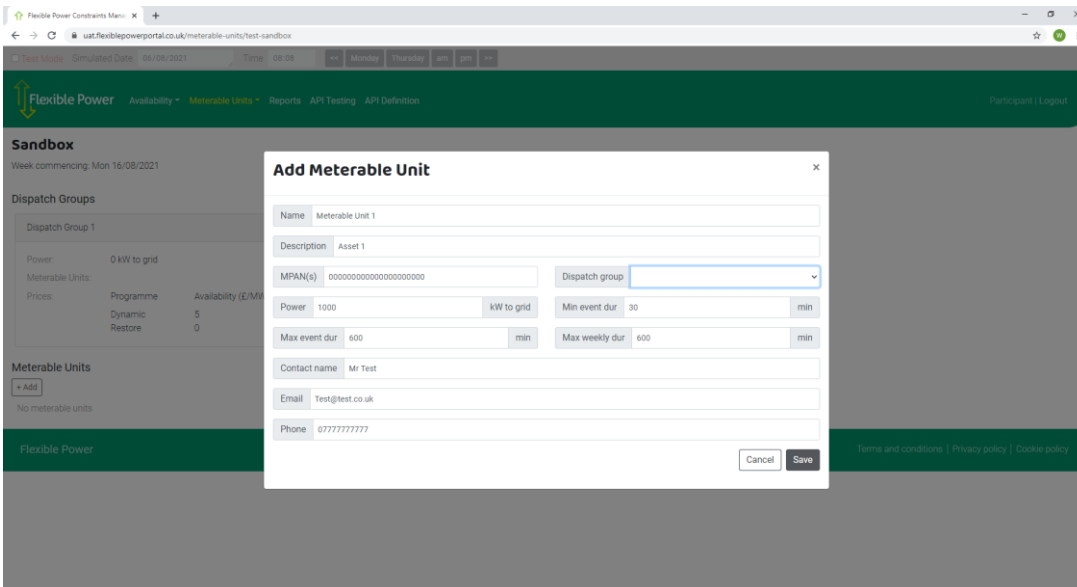
Step 3. Add details to all the relevant fields and Assign the Meterable Unit to your Dispatch Group

It is worth noting that some properties (such as Power, max and min runtime) get automatically aggregated when MUs are assigned to a Dispatch group(s).

Note: Once your Meterable Unit has been created, The Meterable Unit ID, needed for the API set up is shown on this page.

8. Submitting Meter Readings

Readings for each Meterable Unit within a CMZ can be submitted via the API. All the information needed to develop this API can be found here; https://uat.flexiblepowerportal.co.uk/docs/api_from_participant_v1_1.html

A 'self-test facility' is available within the UAT portal, this provides an environment in which users can develop and test their API interface. To access this;

Step 1. Login to the UAT Portal and go to 'API Testing' via the link at the top of the page.

Make sure that all the timestamps are in ISO 8601 UTC

Step 2. Go to 'Readings' via the link at the top of the page.
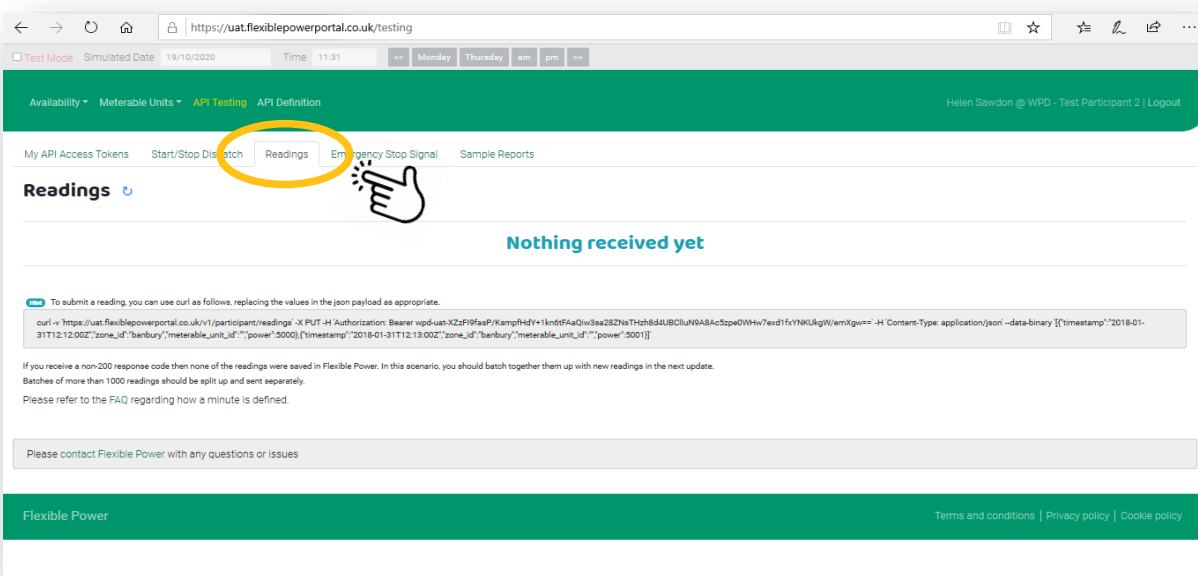
Step 3. Under 'Readings', the user can see the most recent data points they have sent to the portal, compare these data points to the original data points to make sure the data and times are correct.

An example '**curl**' command to send reading the platform can be found in the grey box at the bottom.

Flexible Power uses a 'REST API' the advantage of this is that you can use almost any programming language to call the endpoint. The endpoint is simply a resource located on a web server at a specific path. Each programming language has a different way of making web calls. Rather than providing different methods to make web calls in a multitude of different languages such as Java, Python, C++, JavaScript, Ruby, and so on, we are able to show the call using curl.

Curl provides a generic, language agnostic way to demonstrate HTTP requests and responses. Users can see the format of the request, including any headers and other parameters. This allows users the ability to translate this into the specific format for the language they're using.

9. Testing start and stop signals

Step 1. Go to '**Start / Stop Dispatch'** tab via the link circled below

Step 2. Under send a test dispatch, add your '**url endpoint'**, this is where the Portal will send the dispatch instructions to. It will typically be a webserver that can receive the metering data but doesn't have to physically be located where the asset is. Aggregators for example will in most cases have their own systems connected to customer sites to collect data back to their own central facilities which in turn may be located in 'the cloud' rather than at a specific premises.

Step 3. While developing and self-testing the user should choose any programme from the drop-down menu (Secure, Dynamic / Restore) and select the 'Sandbox' subzone of styles.

Step 4. Enter one or more MU ID, these can be found on the Meterable Units page.
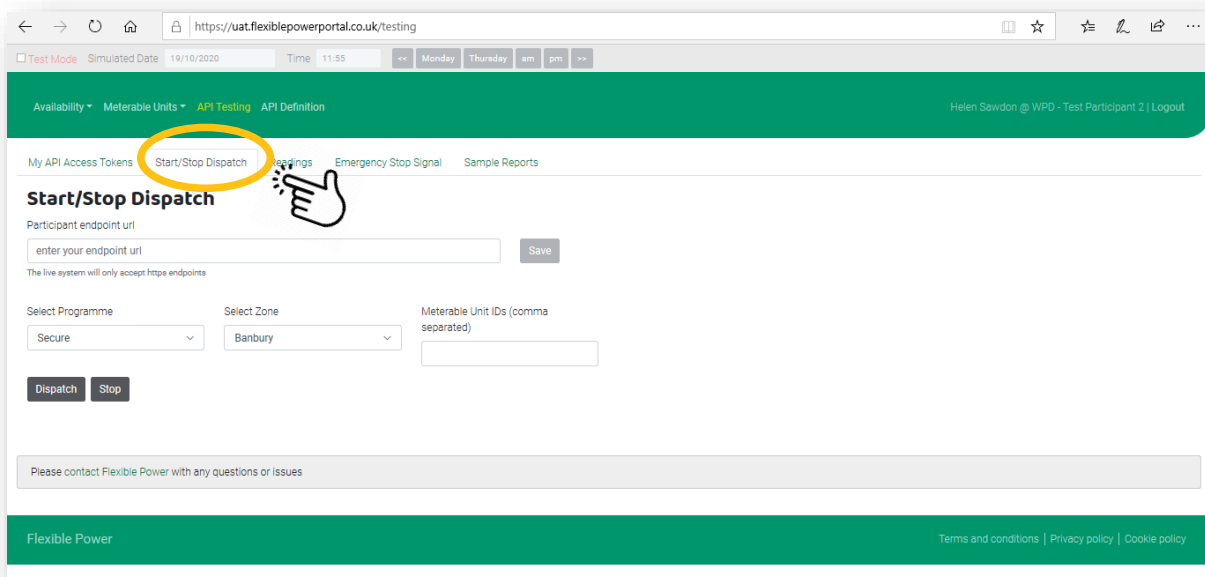
Note: For the testing the Meterable Unit ID are self-entered. Once in production it should be noted that the relevant Meterable Units IDs linked with the dispatch will automatically be added. The relevant Meterable Units are those linked ot the relevant Dispatch Group.

Step 5. When ready click on '**Dispatch'**.

This will send a dispatch order via the dispatch API for the '**Sandbox**' sub-zone/program, only to the MU that was added under "participant endpoint url".

Step 6. Check the endpoint to confirm;

- the dispatch order is received
- the dispatch order is for the chosen programme and 'sandbox' sub-zone

Step 7. Repeat the same process to confirm that the '**STOP**' signal can also be received to the endpoint.
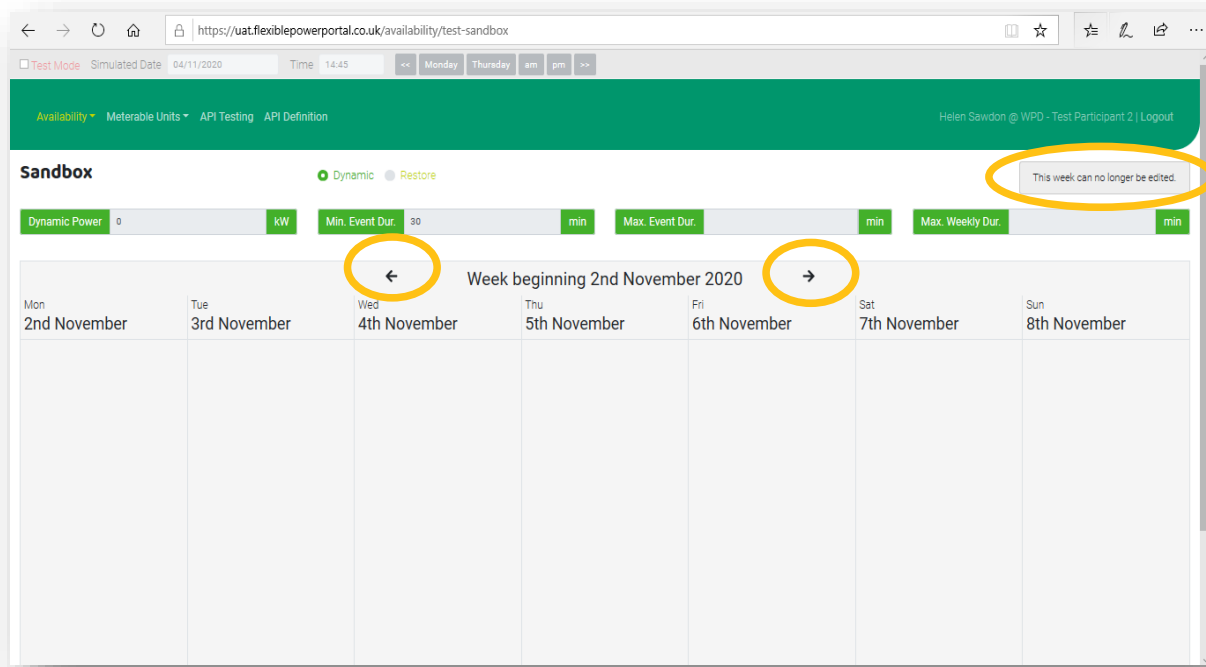
Note: When testing APIs in the UAT environment the zone ID needs to be configured to be sandbox-*DNO service type (e.g. restore)-DNO name (e.g. ENWL).* An example of the zone ID can be located within the example curl; which can be found in the readings, or emergency stop signal tabs of the API testing environment. When transitioning APIs from the UAT environment to the production environment the Zone ID will need to be amended.

# 10.	Creating Declarations

In addition to the API functions, the portal includes access to the declarations diary to enable users to familiarise themselves with the screens within the live environment. This can be used to practice making declarations of capacity. This guide can also be used to assit with decalration making in the live environment.

Step 1. Click on the 'Availability' menu and four zones should be shown in the drop down.

Step 2. Select 'Sandbox' from the drop down menu of Zones. Please note that the zone is designated as a 'Dynamic' service zone but the principals are the same for all services.
(In the live environment this will list the zones in which the CFP has capacity.)


Step 3. There is an information dialogue in the top right that tells you whether the current viewed week is available for editing. Navigate the weeks using the arrows next to the date to find the editable week.
Alternatively, to make any week editable, you can use the "test Mode". Turn on the test mode in the top left and reduce the date until the week becomes editable. This function is only available in UAT and is present to simplify testing.

**Step 3.** Select a programme in the top left

Step 4. Select one of the DGs you have available to make declarations for.

Note: Weekly values will automatically be populated based on the combined values of the MUs within your DG.
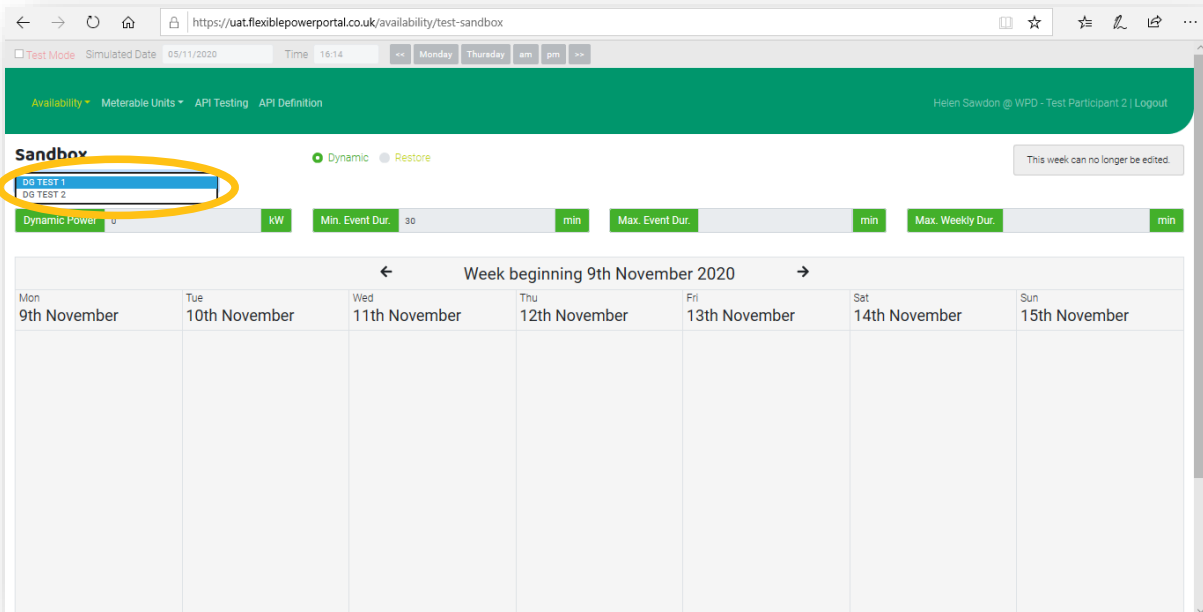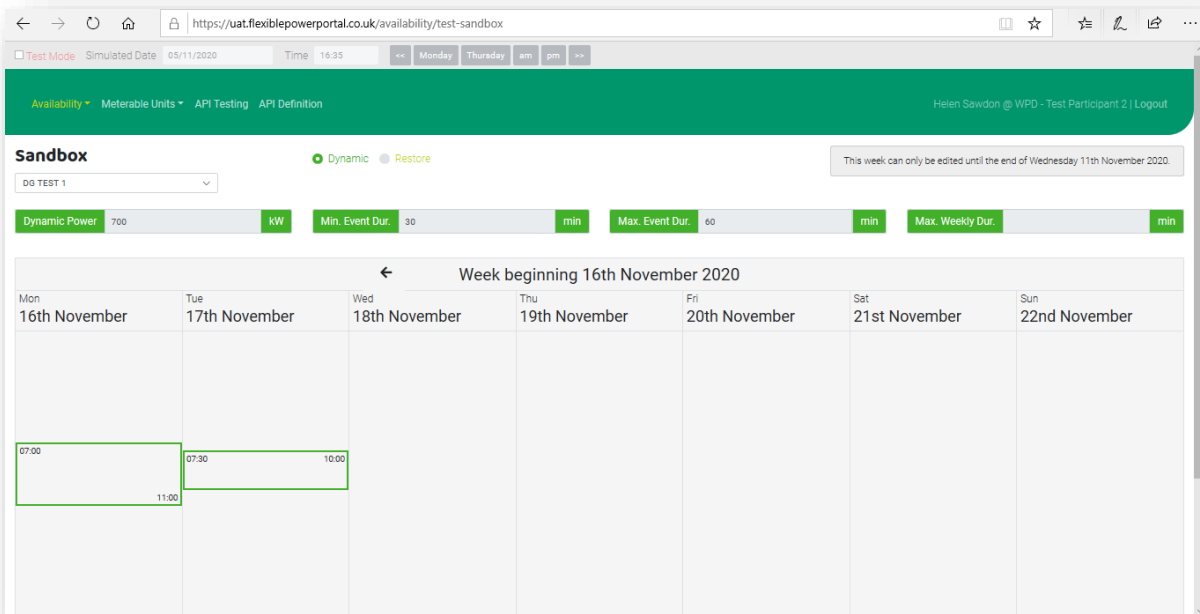
Step 5. Click on a day in the calendar to create a declaration for that day. Complete the form with your availability declaration, then press save.

Step 6. Continue adding windows within your selected DG. If you have multiple DGs you can select another and repeat. The declaration will then display as an empty block. Declared windows can be edited or deleted by clicking on them again.
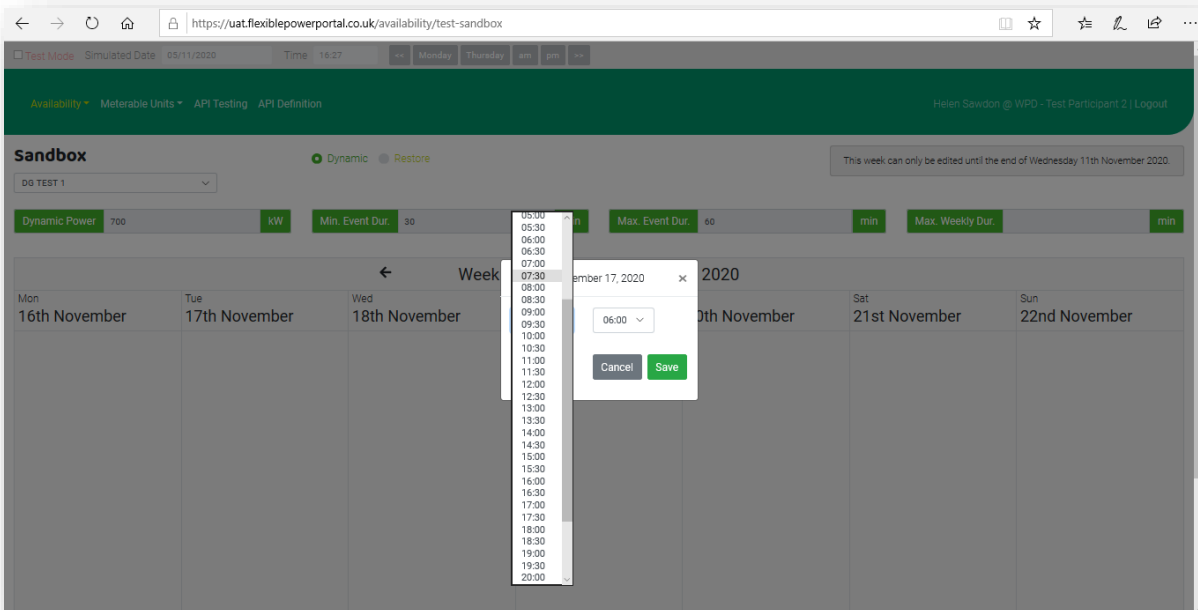
This is the limit of what a user can achieve with 'self-testing' as they are unable to carry out the weekly acceptance that will be done by Flexible Power and WPD's Control Operators on a Thursday morning. We have however shown a sample screen below of what accepted windows appear like to help familiarise users with the formatting.

11.   Emergency Stop by Users

An optional signal is provided for users that is not mandatory in order to provide Flexible Power with DSR capacity.   It is provided as a facility to users who would appreciate the capability to ensure sites can rapidly 'opt out' in the event of an emergency. This is not intended to be used as a regularly accessed facility to decide whether or not to deliver DSR based on commercial outcomes or convenience. It has been provided so that in the event of unexpected events occurring during an accepted availability window or armed period there is a single point control where a user can cease an event or prevent a dispatch which could otherwise have a negative impact on their core activities.

Users can issue an emergency stop using the template curl command in https://uat.flexiblepowerportal.co.uk/testing 'Emergency Stop Signal' tab for the programme secure and the zone that the secure declaration was made in.

As this signal is sent via the API it is entirely up to a user as to what form of trigger will initiate the signal and from what type of device. When the signal is received, Flexible Power will record that time as the end of expected delivery for that day is during a DSR event and withdraw availability for the issue of any events in that zone. This will be automatically reset for the following day, so if the issues at site can't be resolved they would be expected to contact Flexible Power to request a longer period of 'opt-out'. It does however provide time to prioritise resources and to address and assess any issues without the pressure of having to try and contact Flexible Power.

12.   Live Production Environment

If the user is happy that they are ready one of the Flexible Power developers will confirm receipt of metering and UAT signals. The user will then be granted access to the live environment but without access to the constraint zones.   A final test will be carried out in conjunction with a member of Flexible Power technical support using the 'sandbox' facility. This provides limited access where users can experiment safely to interact with the live API connection.

This simply repeats what has already been proven in UAT but the API key and endpoint requires to be created so as to connect to the live system. Once proven, the user will have all the zones in which they have been awarded capacity to participate within added to their CMZ drop down menu.

NOTE: Once a user has completed the initial set up and testing within the UAT environment they will be provided with a log in to the full production environment. This will require the user to modify the API to reflect the 'end point' and "access token" so that they are able to receive the signals to their chosen device and send metering signals / emergency stop to Flexible Power's live environment.

13.   Baselines

After testing has been completed and users are set up in the full Production environment they will have access to all the CMZs in which they have been awarded capacity. For each MU within a CMZ a baseline will be used to measure the delivery during DSR events.

When first setting up a zone it is necessary for users to either provide one month of historic data or nominate their own estimated baseline which will be used for the first month of operation. During the first month, Flexible Power will collect the metering data provided for that zone in order to automatically calculate and update the monthly baseline thereafter.

14.   Reports

Event performance and earnings reports are created shortly after the close of each dispatch event. Examples of these reports can be viewed on the 'Reports' page in UAT by clicking on the appropriate tab in the navigation bar.

15.   Help & reporting an issue

If you need help or have any problems with the portal you can report them via email to your DNO as detailed in section 3. Responses from these mailboxes can take up to 3 working days, if you have an urgent query please call your DNO appointed contact as detailed in your contract.

The following help and support is available to Flexibility Providers for the API development:

- Documentation available on the website: https://www.flexiblepower.co.uk
- Technical support for Flexibility Providers and help with API development. For further information, contact your DNO as detailed in section 3.

Change Log

Please note that Portal is under continuous development and as such will be updated on a regular basis. See the change log below for a summary of the latest changes.

KEY CHANGES	DATE
Addition of DNO & CFP controlled MUs.	October 2021
General review of content and adjustment of order to make more readable.	October 2021