BiTraDER Platform Live Trials Specification

WP10 Transition from Replica Environment to Real Life Trading

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Abbreviations

ANM – Active Network Management

API – Application Programming Interface

BAU – Business As Usual

DNO – Distribution Network Operator

DSO – Distribution System Operator

ENA – Energy Networks Association

ENWL – Electricity North West Limited

MOL – Merit Order List

NESO – National Energy System Operator

UI – User Interface

1 Introduction

This document is a summary report of the intended updates to be made to the BiTraDER trading platform for live trials. It provides an overview of the existing platform components, the components which will be added for the live trials, and which processes will be carried out off-platform. It also outlines the improvements to be made if the market transitions to business-as-usual (BAU).

2 BiTraDER Platform Enhancements for Live Network Trials

2.1 BiTraDER Live Trials Process Summary

The BiTraDER live trials are designed to thoroughly test the end-to-end process with participants and validate the integration between the trading platform and the Active Network Management (ANM) system. Furthermore, a key objective is to gain insights into trading dynamics within a realistic environment, specifically:

- Participant considerations when pricing bids and offers,
- Scenarios impacting trading capacity,
- Potential barriers encountered by participants.

The live trials will be instrumental in determining the viability of the BiTraDER market as a BAU product, intended to operate alongside existing DSO flexible services and NESO energy markets.

To enable the live trials, the project team made several key decisions:

1. Constraints on the ENWL network will be simulated.
2. Trade verification will not be conducted during the live trial phase.
3. Dispatch instructions will be manually issued by the market operator via the trading platform throughout the live trials.
4. Settlement calculations for the live trials will be performed off-platform.

During the asset recruitment phase for the live trials, it became evident that achieving the necessary market liquidity would be challenging if participants were required to have assets connected to the same network segment. Furthermore, BiTraDER is designed to address future network challenges, and ENWL's current network does not experience a high frequency of constraints. Consequently, it would not have been

feasible to operate the BiTraDER live trials using assets physically connected to genuinely constrained network areas.

Therefore, the project team opted to simulate constraints on the ENWL network (Decision 1). This approach still allows for realistic asset curtailment, facilitating testing of asset dispatch procedures and enabling the collection of valuable participant feedback on this process.

The rationale behind decisions 2-4 are outlined in Section 3.

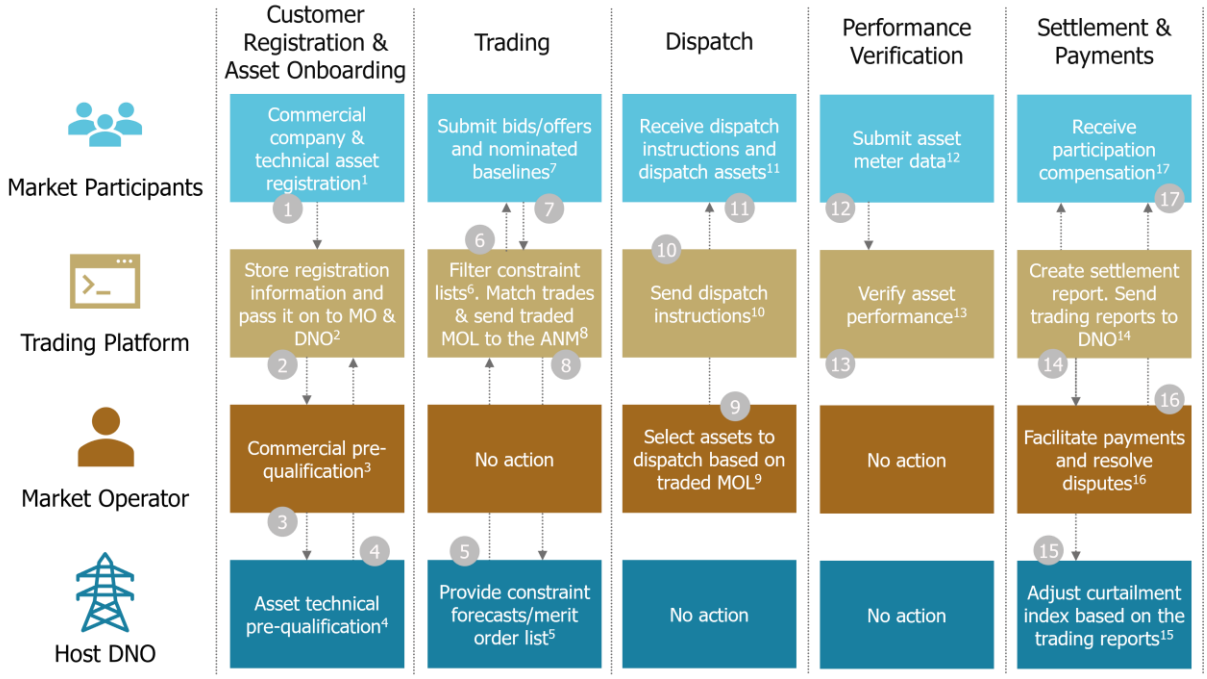


Figure 1 BiTraDER end-to-end market process for live trials. Source: Electron.

The end-to-end BiTraDER market process for the live trials consists of six steps.

Customer registration and asset onboarding is the first step of the process. The BiTraDER project leverages the existing commercial and technical qualification processes for flexible services, as defined by the ENA, as its foundational framework.

Given the short-term nature of the trial, participants will be exempted from the standard commercial qualification process. Instead, their commitment and adherence to trial terms will be secured through a direct contract with ENWL. Technical suitability will be verified using the standard asset registration form from the ElectronConnect platform, supplemented by participant interviews to gather further asset details and inform the scope of simulated constraints.

Trading is the second step of the market process. During the live trials, constraints will be simulated over a defined participation period. Participants will monitor the platform

over this period for day-ahead constraint forecast information provided by the BiTraDER platform.

Participants will submit bids or offers informed by the provided constraint information and their asset's daily operational and financial considerations. Once the bidding period is over, the trading platform will match bids and offers via the trading algorithm.

Participants will also upload nominated baselines for their assets to the BiTraDER platform before any curtailment occurs.

Dispatch is the third step of the market process. The traded Merit Order List (MOL) generated by the BiTraDER platform will be sent to ENWL's ANM system. On the day of the predicted constraint, the market operator will use the BiTraDER trading platform to dispatch sellers depending on the 'real-time' constraint size and timings from the ANM system.

Performance verification is the fourth step of the market process. In this step, participants will submit asset meter readings to the trading platform and the trading platform will measure and verify trade performance against the nominated baseline. Any disputes will be addressed by the market operator.

The settlement and payment process is the last step of the market process. Performance verification data from the trading platform will be analysed to determine the payments that would have been paid by buyers to sellers under the constraint scenario.

2.2 Existing Elements in the BiTraDER Platform

2.2.1 Participant Organisation and Asset Onboarding

Existing elements in the BiTraDER trading platform are adapted from the ElectronConnect flexibility market platform.

The BiTraDER platform contains functionality for:

Participant organisation registration. The platform contains the standard form used to register flexible service providers (FSPs) on the ElectronConnect platform.

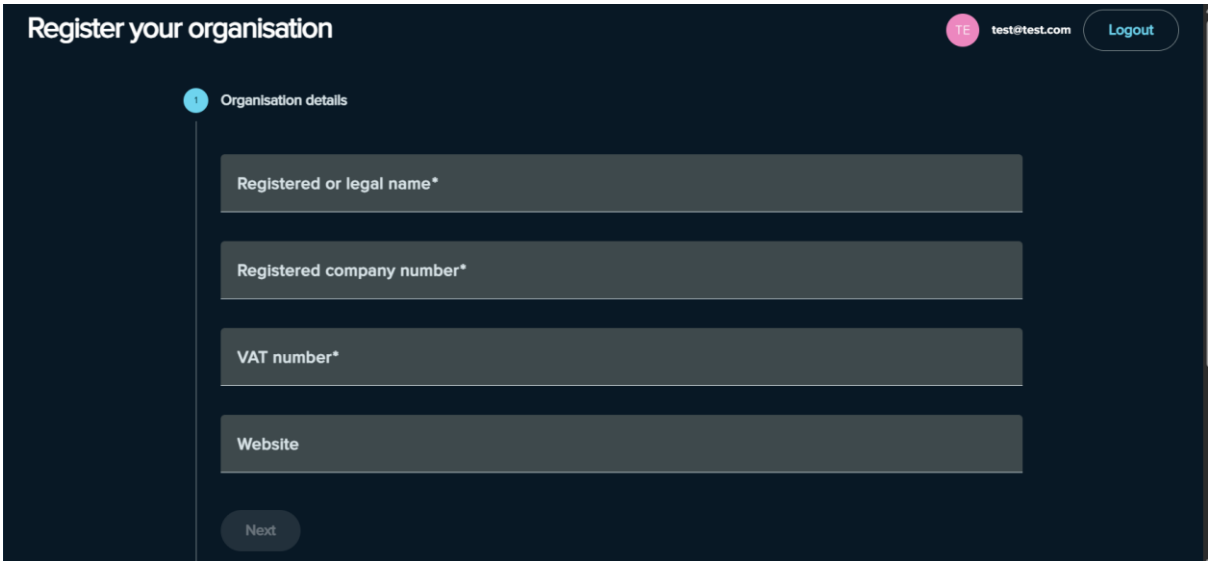


Figure 2 Participant registration form. Source: Electron.

Participant commercial qualification. The contract between ENWL and the participant can be stored in the BiTraDER platform on the Market Qualification page, with the status set to 'approved' to signify that the participant is commercial qualified for the BiTraDER market.

Figure 3 Participant commercial qualification. Source: Electron.

Asset registration and technical qualification. The BiTraDER Platform offers asset registration workflows supported by the ElectronConnect platform. The registration form follows the ENA ON Flexibility Service Pre-qualification Standard Template, ensuring consistency with industry standards. Once assets are registered, they can be reviewed and qualified for the BiTraDER Market via the Asset Details page.

Figure 4 Example participant assets table. Source: Electron.

2.2.2 Trading Opportunities and Bid/Offer Submission

The BiTraDER platform presents day-ahead constraint forecast information, as well as useful trading contextual information including the opportunity type and the MWs ahead of the participant in the MOL.

It allows the user to submit bid/offer prices and volume up to the asset capacity.

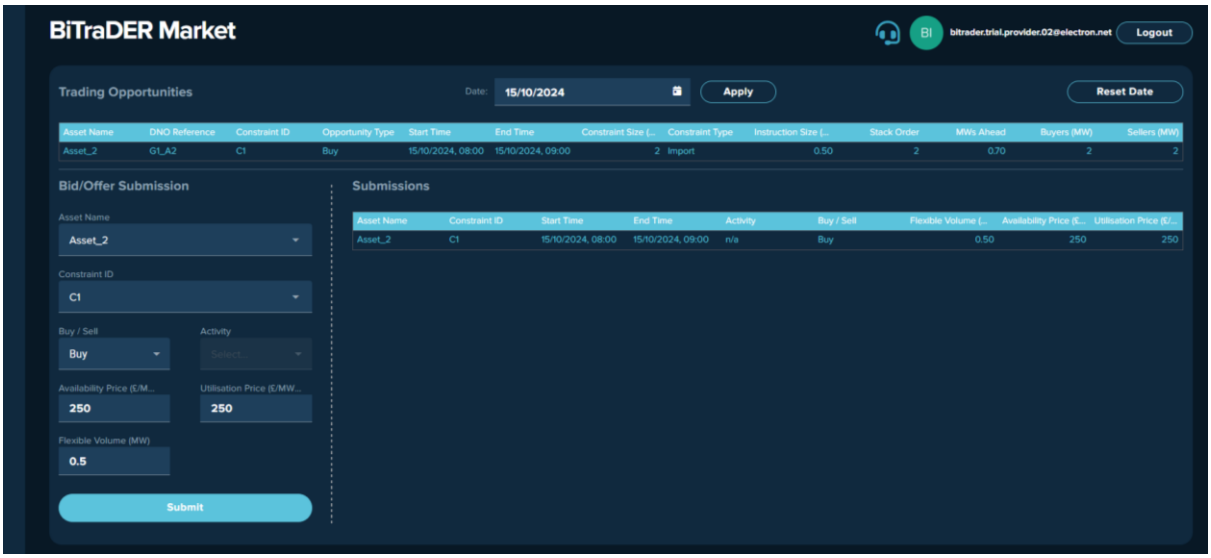


Figure 5 The Market Operations view for market participants. Source: Electron.

The BiTraDER Platform then matches bids and offers using the trading algorithm outlined in the BiTraDER Trading Rules report.

2.2.3 Baseline and Meter Reading Upload

The BiTraDER platform utilises ElectronConnect functionality to allow participants to upload meter readings and nominated baselines. Both pages include a csv upload template and a user guide to support participants successfully submit the required information.

Figure 6 The Meter Readings tab. Source: Electron.

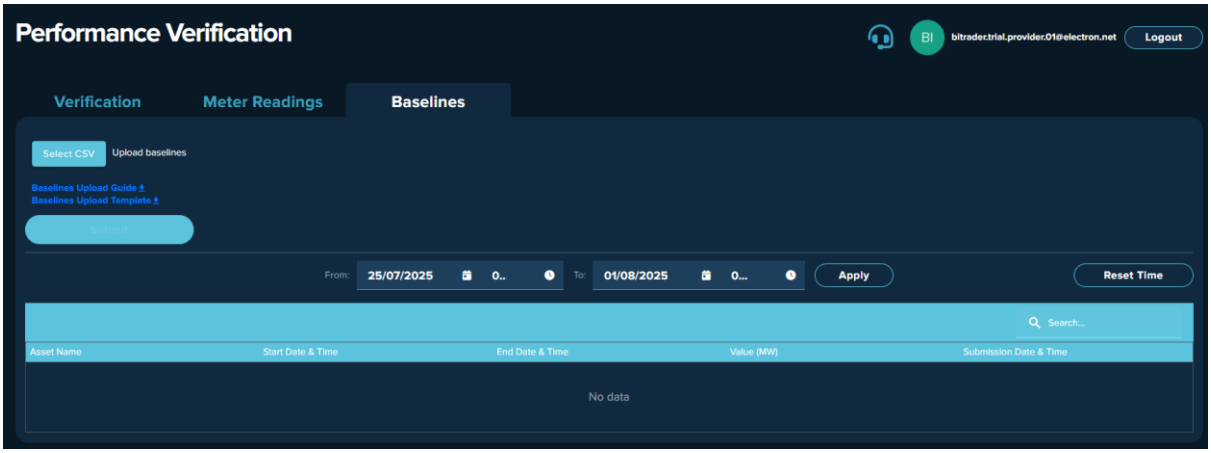


Figure 7 The Baselines tab. Source: Electron.

2.3 Live Trial Platform Enhancements

2.3.1 Dispatch

The BiTraDER platform will utilise existing dispatch functionality from the ElectronConnect platform.

The platform will use the traded MOL generated by the BiTraDER matching algorithm to define assets that are available for dispatch. The market operator can define the Instruction volume, update this volume by sending a further instruction, and send a stop instruction when the constraint is resolved. They can view all ongoing dispatch events for multiple assets in the current instructions table.

To receive dispatch instructions, BiTraDER participants will configure a webhook URL (see Appendix A). Participants will acknowledge instructions by sending an HTTPS 200 response. If no response is received, ElectronConnect will resend unacknowledged instructions every 30 seconds for up to 30 minutes. After the retry period, the instruction is considered failed.

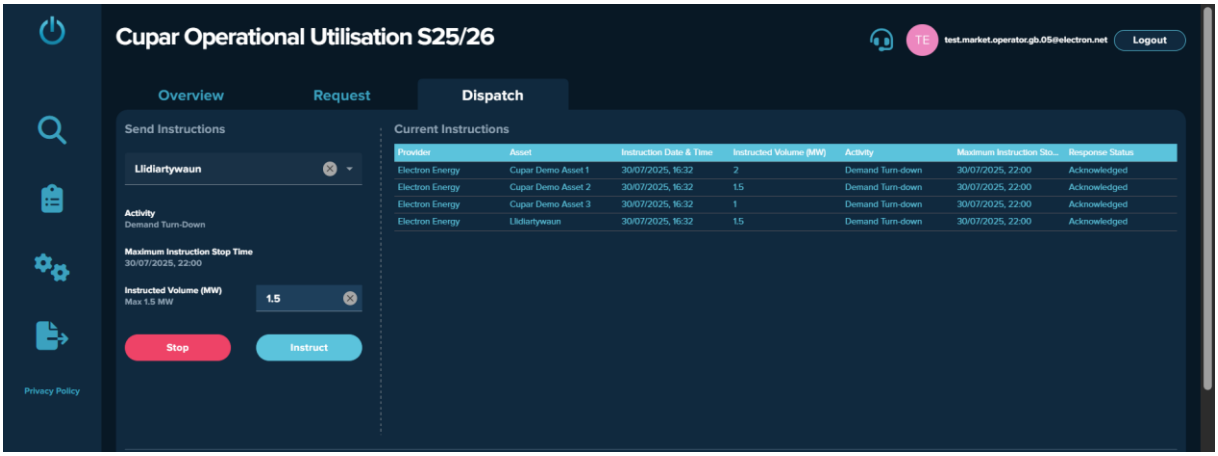


Figure 8 The Dispatch tab. Source: Electron.

2.3.2 Performance Verification

The BiTraDER platform will utilise existing performance verification functionality from the ElectronConnect platform.

The Performance Verification mechanism used in the ElectronConnect platform follows the process defined in the ON ENA Standardised DNO Settlement Methodology. This uses instructed volume, meter reading, and baseline values to calculate the minute-by-minute delivery % for every dispatch event the asset took part in. These calculations are done per dispatch event and can be exported by the market operator as a csv file. Previous dispatch events are displayed to participants via the Performance Verification UI.

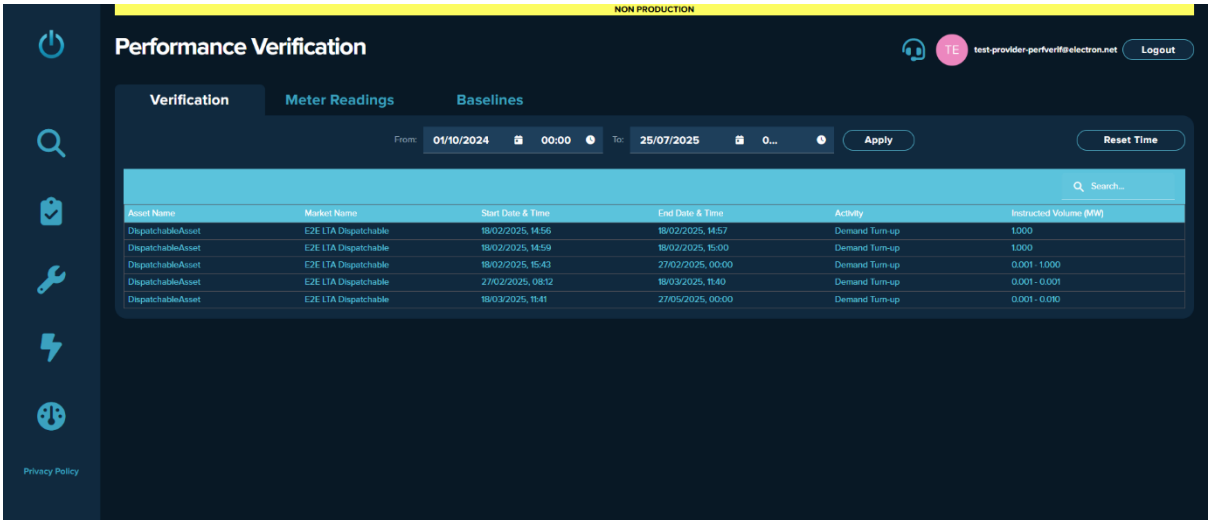


Figure 9 The Performance Verification tab. Source: Electron.

2.3.3 Partial Trade Functionality

Through discussions with potential BiTraDER live trial participants during recruitment, the team identified that some generator assets lack the capability for partial dispatch; they can either export at full capacity or be switched off.

The existing BiTraDER algorithm calculates matches bids and offers on ‘all-in’ price. The matched volume is based on the minimum bid/offer volume. This design allows for participants to be matched at a lower volume than submitted, rendering the current algorithm unsuitable for assets that cannot dispatch partial volumes.

Consequently, for the live trials, the BiTraDER platform will be enhanced to allow participants to specify their asset's partial dispatch capability and dispatch increments.

2.3.4 Transition from Simulation to a Live Trials Environment

The BiTraDER simulation trials involved hypothetical trades with simulated assets, where no actual curtailment occurred and no financial transactions took place for demand or generation adjustments. In contrast, the upcoming live trials will involve real assets connected to the ENWL network. These assets will undergo curtailment based

on the traded MOL generated by the BiTraDER platform, with participants receiving payment for their involvement.

Consequently, the BiTraDER platform will undergo necessary updates to accommodate live customer data. The platform will adhere to the same stringent data protection and retention standards as all ElectronConnect production environments.

2.4 Off-Platform Processes

2.4.1 Settlement Methodology

The ElectronConnect Platform adheres to the ON ENA Standardised DNO Settlement Methodology, which extends to the BiTraDER Platform. This methodology defines specific settlement parameters for different standard flexibility products in the UK, including grace factors and performance multipliers.

For the live trials, the team will evaluate the suitability of standard settlement parameters for BiTraDER's many-to-many trading model and the implications of any deviations from the ENA's standardised methodology. The project team's analysis will help determine whether the existing methodology can effectively support BiTraDER's market design or if customisations are required.

Consequently, the project team opted to conduct settlement calculations externally to the BiTraDER platform. This approach provides the necessary flexibility to rapidly update calculation methodologies based on trial feedback.

2.4.2 Participant Onboarding and Training

Participants in the live trials will receive comprehensive training on the BiTraDER trading platform. The existing platform user guide, developed for the simulation trials (see Appendix B), will be updated to include instructions for baseline and meter reading uploads, as well as asset dispatch based on platform instructions.

The BiTraDER team will arrange dedicated meetings with participants to support the configuration of a webhook URL for receiving dispatch instructions, with detailed guidance provided in the ElectronConnect Dispatch API Documentation (see Appendix A). Participants will also receive a unique secret to validate the authenticity of these instructions. A full end-to-end test dispatch will be conducted with each participant prior to the live trials. Furthermore, Electron's API experts will provide on-hand support throughout the live trials to assist with any technical difficulties.

3 Future Development for BAU Operations

3.1 Trade Verification

As discussed in Section 2.1, trade verification has been deferred for the live trials. Trade verification confirms the continued validity and dispatchability of trades agreed upon the preceding day. This step is crucial for ensuring sellers can provide effective services to buyers, particularly when network conditions change. Should trade counterparties no longer be connected to the same part of the network after verification, their trade would be cancelled as the service can no longer be effectively provided.

For the BiTraDER live trials, network constraints will be simulated to ensure market liquidity. Consequently, the impact of network topology changes on trading is not being tested during this phase.

In a BAU scenario, constraints would be based on specific network areas and could manifest outside the defined trade delivery window. Therefore, trade verification will be a necessary function within the BiTraDER platform for BAU operations. To achieve this, ENWL's ANM system will provide an updated Constraint Look-Ahead, indicating whether matched buyers and sellers remain connected to the constrained part of the network. If a disconnection is identified, the trading platform will re-order the MOL, transmit the revised MOL back to ENWL, and notify relevant participants of any trade cancellations.

3.2 Automatic Dispatch via ANM

For the BiTraDER live trials, the project team agreed that dispatch instructions would be manually issued by the market operator, ENWL, directly from the BiTraDER platform. While the ANM system is integrated with the BiTraDER platform, enabling automated dispatch triggers during a constraint, this functionality will be tested at a later stage.

In a BAU scenario, such automation would be essential for scalable market operations. However, the project team decided this functionality was not required for the live trials, with a relatively small number of participants.

3.3 Settlement Report Generation and Participant Dispute System

Upon the finalisation of settlement calculations for the BiTraDER market, automating the settlement process for BAU operations will become feasible. The BiTraDER platform could use performance verification data to automatically generate settlement reports for participants, supporting scalable market operations in BAU.

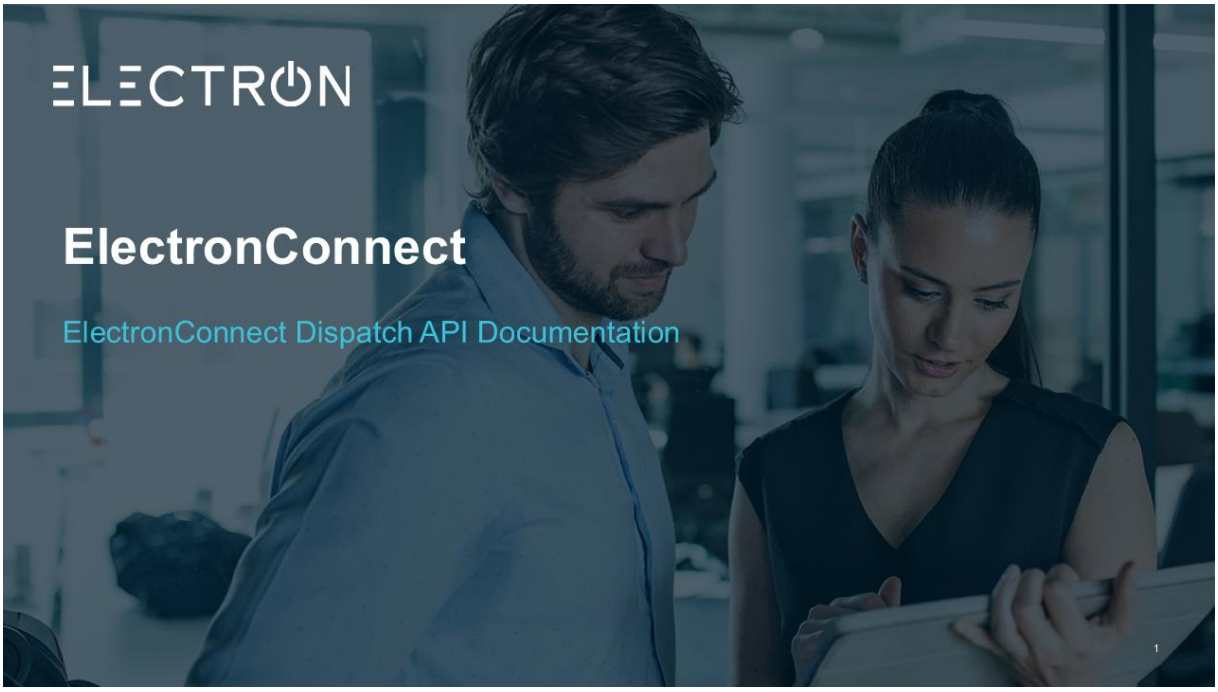
Additionally, the BiTraDER platform could be enhanced to include functionality for participants to dispute settlement calculation results. Further discussion is required to determine responsibility for mediating and resolving these disputes within a peer-to-peer market framework.

3.4 Market Operator Overview

Both simulation and live trials have primarily focused on developing an intuitive user interface (UI) to guide BiTraDER participants (buyers and sellers) through the end-to-end process. For a BAU scenario, the platform's user experience will be enhanced for market operators. This will include the addition of an overview page displaying submitted bids and offers, granting market operators control to initiate matching, and presenting matched trades alongside trade verification results.

4 Appendices

Appendix A. ElectronConnect Dispatch API Documentation



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ELECTRON

ElectronConnect Webhooks

ElectronConnect Webhooks (1/3)

Format

All webhook events on ElectronConnect are sent via a ***HTTP POST*** request.

Most webhook events share a common format:

```
{
  event: 'string',
  data: {...}
}
```

Where ***event*** is the event name and ***data*** is the event data.

Note that when there is no additional data to be sent with a given event type (e.g. in the case of the ***Configure*** event), the data field will be excluded from the request body.

ElectronConnect Webhooks (2/3)

:identification_card: Event Name

Event name is a descriptive string informing you of what event you are receiving. The type of event will determine what action you need to perform, as well as what data to expect in the data field of the request.

Event Data

An object containing all of the information needed to act on a given event.

ElectronConnect Webhooks (3/3)

Headers

Each webhook event is sent with two accompanying headers that are relevant to the execution of the webhook:

- **X-Signature Header**

  This header contains the signature used to verify webhook payloads. For more information see Validating Webhook Payloads section below.

- **X-Correlation-ID Header**

  This is a unique identifier used by us to assist with debugging and troubleshooting issues.

Responding to Webhook Events

The expected response to a webhook event varies depending on the event type. Regardless of the event type, the responses should always be near-immediate so that the event can be successfully marked as acknowledged.

ELECTRON

Configuring a Webhook URL

Configuring a Webhook URL (1/2)

Configuring a Webhook URL

To receive event notifications from our platform, you need to register your webhook URL with our system. Here's how to do it:

1. **Submit Your Webhook URL:** Send your Webhook URL to us at ***support@electron.net.***
2. **Webhook Verification:** After you submit your URL, we'll test it to ensure it's properly configured. We'll send a test POST request to your URL with this payload:

```
{
  event: 'Configure'
}
```

Your endpoint should respond with a 200 OK status code to pass this test.

Configuring a Webhook URL (2/2)

Webhook Configuration Outcomes

If the test is successful:

- We'll save your webhook URL in our system and you will be prepared to receive messages via webhook whenever events occur.
- You'll receive a unique 26-character secret from us – keep this secret safe. You will need the secret to validate the contents of future webhook payloads.

If the test fails:

- You'll receive a ***400 Bad Request*** response with details about the failure (HTTP status code and error message):

```
{
  statusCode: int,
  error: "string"
}
```


ELECTRON

Validating Webhook Payloads

Validating Webhook Payloads (1/3)

Importance of Webhook Payload Validation

Webhook endpoints accept unauthenticated ***POST*** requests, which can potentially expose them to malicious actors sending fake events. To protect against this, you should always verify the authenticity of each webhook payload you receive from ElectronConnect.

Webhook Secret

During webhook URL configuration, ElectronConnect generates a unique 26-character webhook secret. This secret will be securely shared with you once and you should store it safely for future use in payload validation.

X-Signature Header

Each webhook payload is accompanied by an X-Signature header. This signature is generated using the webhook secret and the payload contents, allowing recipients to verify the payload's authenticity.

Validating Webhook Payloads (2/3)

Validating Webhook Payloads

To ensure the authenticity of incoming webhook payloads, follow these steps:

1. **Encode the webhook secret:** Convert the secret to a byte array using UTF-8 encoding.
2. **Encode the payload:** Convert the webhook request body into a byte array using UTF-8 encoding.
3. **Compute the hash:** Use the secret byte array as a key to calculate an HMACSHA256 hash of the request body byte array.
4. **Base64 encoding:** Encode the resulting hash value as base64.
5. **Compare signatures:** Compare the encoded hash value with the X-Signature header value. If they're identical, the payload is valid and safe to process.

Validating Webhook Payloads (3/3)

Handling Invalid Payloads

If the calculated signature doesn't match the X-Signature header value, the payload should be considered potentially fraudulent. In such cases:

1. Do not process or act on the payload contents.
2. Contact Electron's customer success team at support@electron.net for assistance in troubleshooting or addressing potential security concerns.

By implementing this validation process, providers can ensure they only act on authentic webhook events from Electron, maintaining the security and integrity of their systems.

ELECTRON

Dispatch Instructions

ElectronConnect Dispatch Instructions (1/6)

A dispatch instruction directs a provider's asset to start or stop delivering flexibility services at a specified volume for a given time period.

Event Structure

```
{
  event: 'DispatchInstruction',
  data: {
    dispatchInstructionId: 'string',
    marketName: 'string',
    providerName: 'string',
    marketOperatorOrganisationName: 'string',
    assetName: 'string',
    instructedTime: Date,
    instructedVolumeMW: '1.0',
    activity: 'string',
    maxStopTime: Date
  }
}
```


ElectronConnect Dispatch Instructions (2/6)

Data Fields

Field	Explanation
Dispatch Instruction ID	The unique identifier of the dispatch instruction.
Market Name	The name of the market.
Provider Name	The name of the provider to be instructed.
Market Operator Organisation Name	The name of the market operator's organisation.
Asset Name	The name of the asset to be instructed.
Instructed Time	The time when the asset needs to start providing the service.
Instructed Volume MW	The capacity to be dispatched, in MW, represented as a number.
Activity	The type of action to be performed (Generation Turn-up/Generation Turn-down/Demand Turn-up/Demand Turn-down).
Max Stop Time	The latest time the asset can be dispatched until.

ElectronConnect Dispatch Instructions (3/6)

Responding to the Event

The only valid response is a ***200 OK*** status code. Any other response is considered invalid. All responses are captured and stored in the database.

Important: Acknowledging Instructions

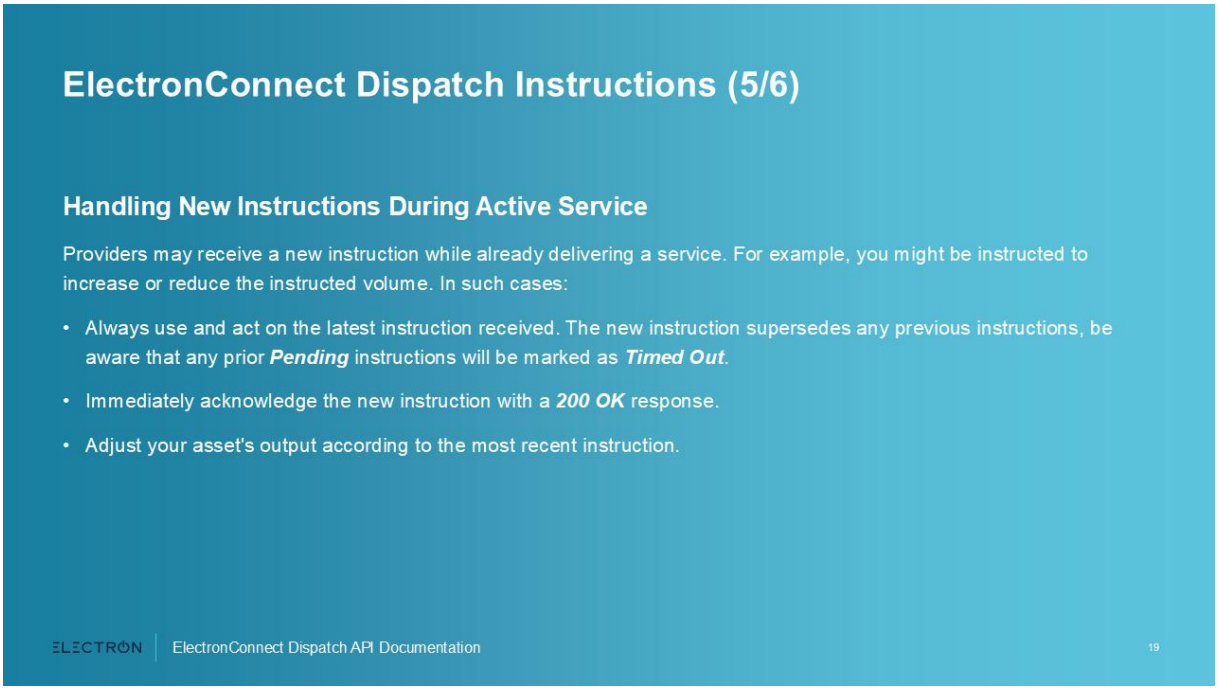
If an ***HTTP 200*** response is not received, all instructions within the message are considered unacknowledged:

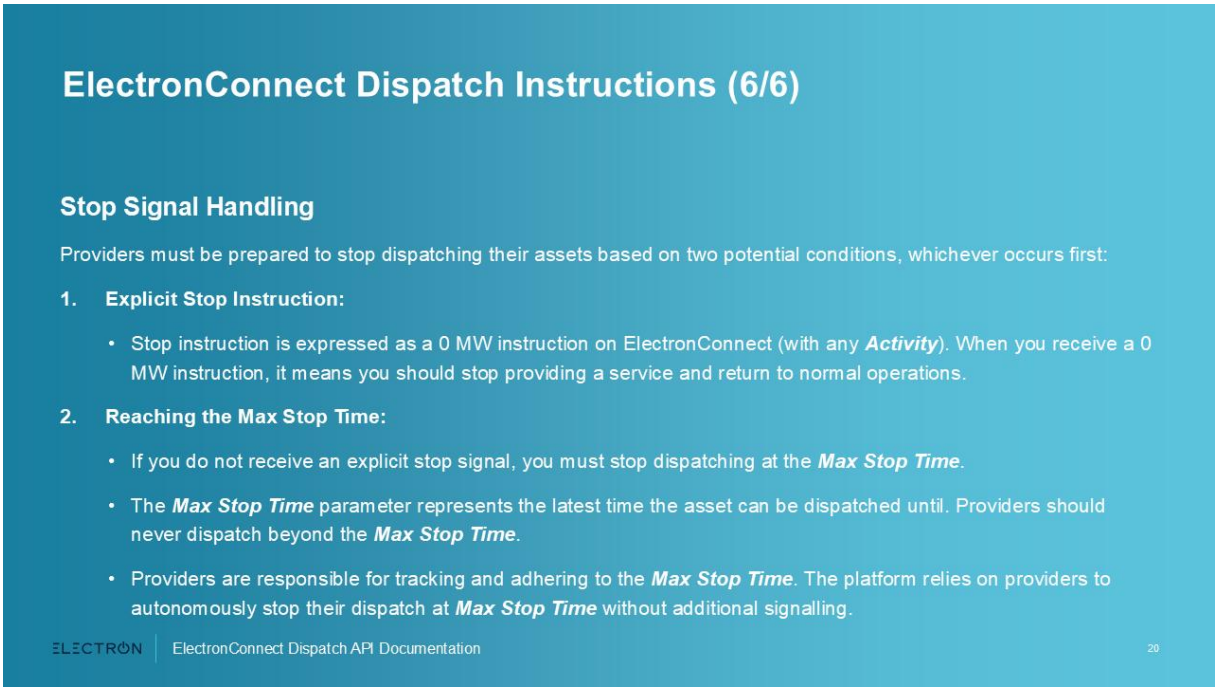
- ElectronConnect will resend unacknowledged instructions every 30 seconds for up to 30 minutes.
- After the retry period, the instruction is considered failed.

ElectronConnect Dispatch Instructions (4/6)

Instruction Statuses

- **Pending:** Default status when instruction is first sent. Remains until acknowledged or timed out.
- **Acknowledged:** Set when the provider accepts the instruction.
- **Timed Out:** Occurs if maximum number of retries is reached or a new instruction is received while the previous one is still pending.





Appendix B. Trading Platform User Guide

This section contains the existing user guide created for the simulation trials, which will be updated for the live trials.

ELECTRON

BiTraDER User Guide

30/10/2024

Contents

For support, please contact:

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Olivia Burt, Product Manager
olivia.burt@electron.net

Refresher of BiTraDER Trading Rules

Worked Example – assumes all bid/offer volumes = 1MW

- Buyers bid an availability and utilisation price – the maximum they are willing to pay.
- Submitted bids are ordered by the 'all in' bid = availability + utilisation price
- The higher the price they pay, the higher possibility of matching with a seller.

Submitted Bids

Buyer	'All in' Bid £/MW/h	Utilisation (£/MWh)	Max Availability (£/MW/h)
Asset A	200	190	10
Asset B	150	135	15
Asset C	100	80	20
Asset D	100	90	10
Asset E	50	45	5

Sorted highest to lowest

Refresher of BiTraDER Trading Rules

Worked Example – assumes all bid/offer volumes = 1MW

- Sellers offer an availability and utilisation price – the minimum they are willing to accept.
- Seller offers are prioritised based on the lowest required availability price first, then lowest 'All-in'.
- Offers will be accepted if:
  - The required availability < maximum buyer availability price
  - The required 'All-in' offer < maximum buyer 'All-in' bid
- Sellers who offer a lower availability payment are more likely to be matched with the buyers bidding the highest 'all in' price.

Submitted Offers

Seller	'All in' Offer £/MW/h	Required Utilisation (£/MWh)	Required Availability (£/MW/h)
Asset F	50	40	10
Asset G	75	45	30
Asset H	100	95	5
Asset I	100	85	15
Asset J	150	140	10

Refresher of BiTraDER Trading Rules

Worked Example – assumes all bid/offer volumes = 1MW

Submitted Bids

Buyer	'All in' Bid £/MW/h	Utilisation (£/MWh)	Max Availability (£/MW/h)
Asset A	200	190	10
Asset B	150	135	15
Asset C	100	80	20
Asset D	100	90	10
Asset E	50	45	5

Submitted Offers Sorted highest to lowest

Seller	'All in' Offer £/MW/h	Min Utilisation (£/MWh)	Min Availability (£/MW/h)
Asset F	50	40	10
Asset G	75	45	30
Asset H	100	95	5
Asset I	100	85	15
Asset J	150	140	10

Matched Trades (all bids/offers = 1 MW)

Asset H matched first as lowest required availability

Buyer	Bid £/MW/h	Seller	Offer £/MW/h	'All in' clearing price (pay-as-bid)	Availability clearing price (one-to-many pay-as-clear)	
Asset A	200; 10	Asset H	100; 5	200	5	✓
Asset B	150; 15	Asset F	50; 10	150	10	✓
Asset C	100; 20	Asset I	100; 15	100	15	✓
Asset D	100; 10	Asset J	150; 10	n/a	n/a	✗
Asset E	50; 5	Asset G	75; 30	n/a	n/a	✗

Didn't get matched because of high required availability

Refresher of BiTraDER Trading Rules

Worked Example – assumes all bid/offer volumes = 1MW

- Asset H is matched first due to lowest availability price.
- Assets F and J have the same availability price – therefore prioritised by lowest 'all-in.' Therefore, asset F is matched next.
- Seller Asset J cannot be matched with Buyer Asset C because its 'all-in' price is too high. Asset I is matched with Asset C with a higher availability price, but a lower 'all-in' offer, as both values are below the buyer's maximum bid.

Matched Trades (all bids/offers = 1 MW)

Buyer	Bid £/MW/h	Seller	Offer £/MW/h	'All in' clearing price (pay-as-bid)	Availability clearing price (one-to-many pay-as-clear)	
Asset A	**200**; 10	Asset H	100; **5**	**200**	**5**	✓
Asset B	**150**; 15	Asset F	50; **10**	**150**	**10**	✓
Asset C	**100**; 20	Asset I	100; **15**	**100**	**15**	✓
Asset D	100; 10	Asset J	150; 10	n/a	n/a	✗
Asset E	50; 5	Asset G	75; 30	n/a	n/a	✗


Refresher of BiTraDER Trading Rules
Price Considerations
• The bid or offer values must be balanced against the opportunity cost.
• For buyers (most likely renewable generators), the 'all-in' bidding price must be less than value gained by not being curtailed.
• For sellers, the 'all-in' offer price must be balanced by the opportunity to sell into another, more lucrative market.
BiTraDER User Guide

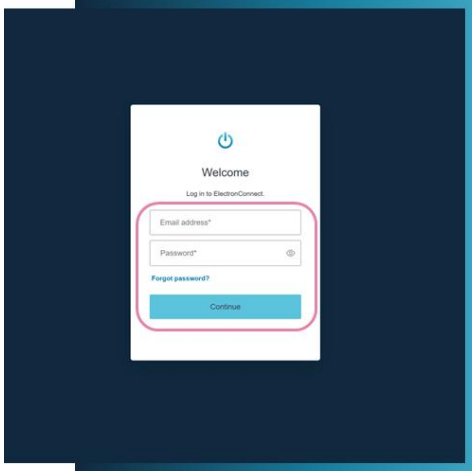

Refresher of BiTraDER Trading Rules
Price Considerations
• To support participation in this trial scenario, we are proving a guide 'all-in' price of £500
• This is a suggested buyer minimum price, and a seller maximum price
• However, you could also consider what you would bid or offer based on your real-world experiences
Your market and pricing expertise will provide valuable insights into how this peer-to-peer trading will function in reality
BiTraDER User Guide

BiTraDER User Guide
How to make a bid or offer

- Go to the URL https://ncm.bitrader-trial.electronconnect.io/
- From the BiTraDER home page, click 'Login.'

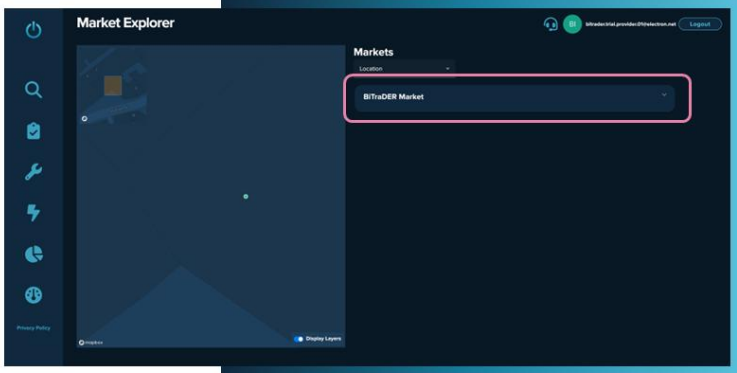
BiTraDER User Guide
How to make a bid or offer

- Enter your assigned email address and password.
- Press 'Continue.'



BiTraDER User Guide
How to make a bid or offer

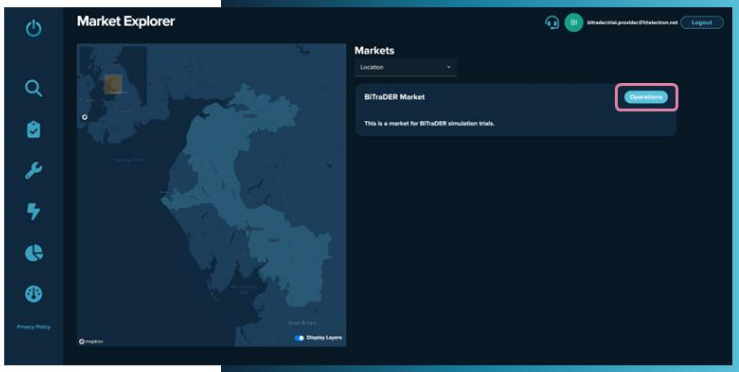
- You will see the Market Operator page.
- Click on the BiTraDER Market tile.



BiTraDER User Guide
How to make a bid or offer

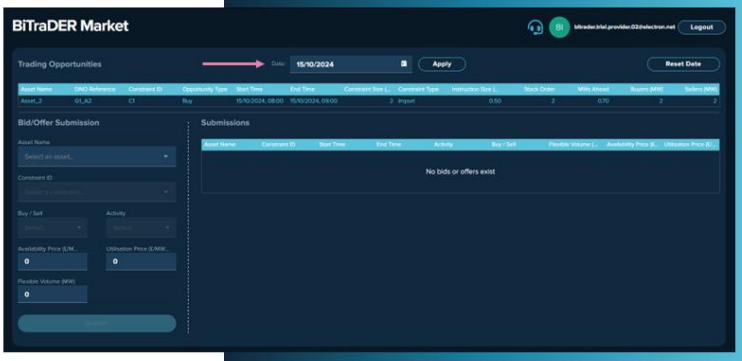
- Click on 'Operations.'

Sellers, go to slide 17



Trading Opportunities
Buyers

- You will see the BiTraDER Market page
- This page will automatically default to the next day, as BiTraDER is a day-ahead market.
  - If this is not the date of the constraint scenario, please adjust this date and click 'Apply.'
- You should see relevant trading opportunity information in the Trading Opportunities table.



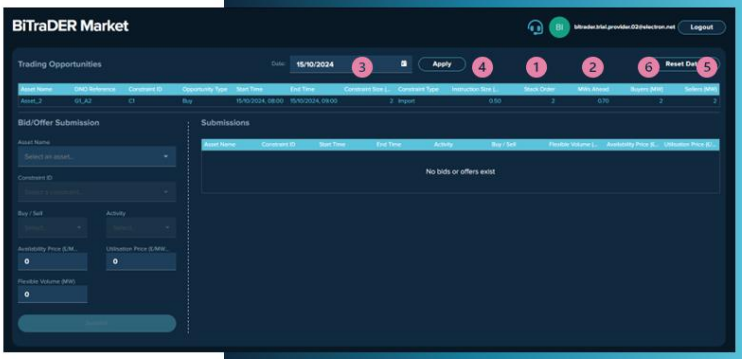
Trading Opportunities
Buyers

Consider:

Likelihood of curtailment: In this example, the buyer is second in the merit order list (1), with 0.7MW ahead of them to be curtailed (2). Since the constraint size is 2MW (3), the buyer is likely to be curtailed if the constraint occurs.

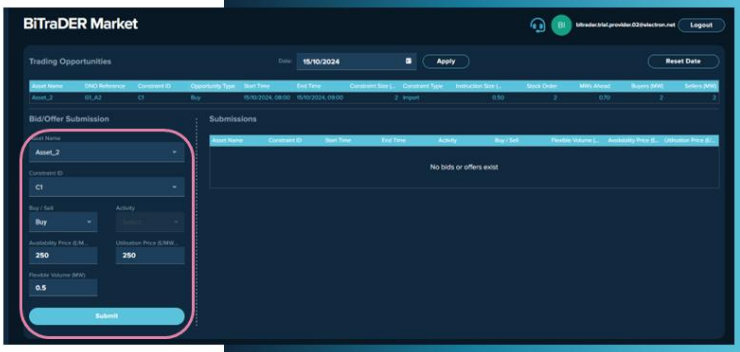
Seller volume (opportunity): The buyer has a maximum volume (4) of 0.5MW, and there are 2MW of sellers available to match with (5).

Buyer volume (competition): The total buyer volume is 2MW (6), meaning there is an opportunities for all buyers to be matched with all sellers – but there are also 1.5MWs of other buyer volume for this buyer to compete with.



Making a bid
Buyers

- Fill in the relevant information to make a bid
  - For guidance on pricing, please see Refresher of BiTraDER Trading Rules
- If there are multiple constraints, choose which one you are bidding against.
- You may bid for a volume up to your instruction size.
- When making a bid, first consider the maximum 'All-in' you're willing to pay and the maximum availability payment.
- Once you have filled in all relevant information, press 'Submit.'

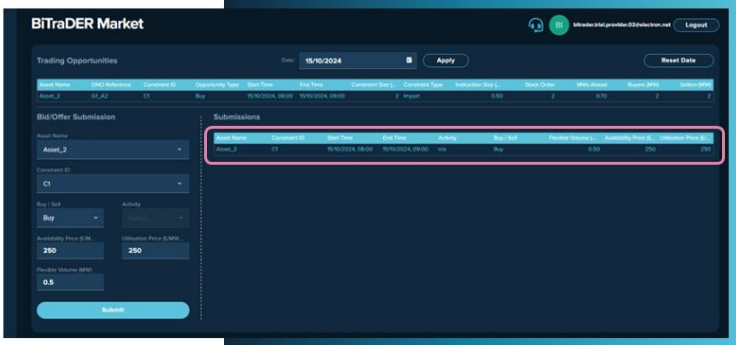


Making a bid
Buyers

- The bid will appear in the submissions table.
- If you have any issues making a bid, please contact Electron:

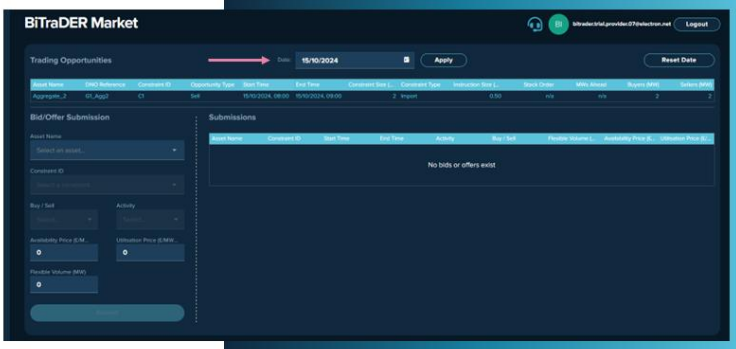
Emilis Srage, Product Manager
emilis.srage@electron.net

Olivia Burt, Product Manager
olivia.burt@electron.net



Trading Opportunities
Sellers

- You will see the BiTraDER Market page
- This page will automatically default to the next day, as BiTraDER is a day-ahead market.
  - If this is not the date of the constraint scenario, please adjust this date and click 'Apply.'
- You should see relevant trading opportunity information in the Trading Opportunities table.



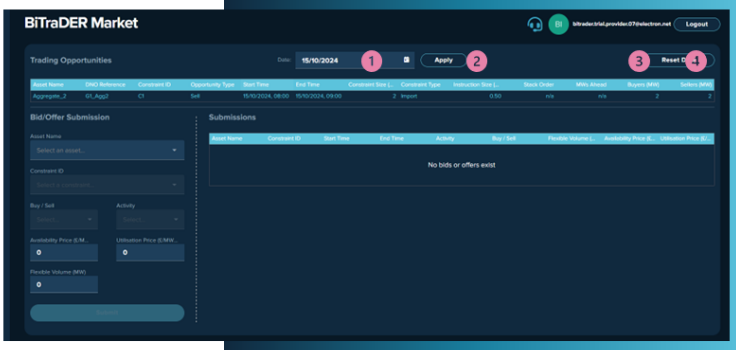
Trading Opportunities
Sellers

Consider:

Buyer volume (opportunity): The constraint size is 2MW (1) and there are 2MW of total buyers. Therefore, all buyers are likely to want to trade to reduce their probability of curtailment.

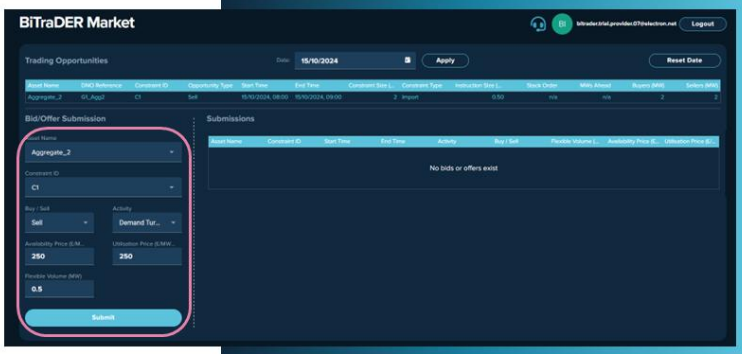
The seller has a maximum volume of 0.5MW (2) and there 2MW of buyers to match with (3).

Seller volume (competition): The total seller volumes is 2MW (4), meaning there is an opportunity for all sellers to be matched with all buyers – but there are also 1.5MWs of seller volume to compete with.



Making an offer
Sellers

- Fill in the relevant information to make an offer
  - For guidance on pricing, please see Refresher of BiTraDER Trading Rules
- If there are multiple constraints, choose which one you are offering against.
- Choose which activity your asset can offer: demand turn-down or generation turn-up
- When making an offer, first consider the maximum 'All-in' payment you require and the required availability payment.
- You may offer a volume up to your instruction size.
- Once you have filled in all relevant information, press 'Submit.'



Making an offer
Sellers

- The offer will appear in the submissions table.
- If you have any issues making an offer, please contact Electron:

Emilis Srage, Product Manager
emilis.srage@electron.net

Olivia Burt, Product Manager
olivia.burt@electron.net