

Public

# Data Specification Document

**Settlements**

**Slow Reserve Performance Metering Data File Specification**

**Version 0.4**

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## 1. Revision Information

Classification: External Use

Author	Version	Date	Comments
STAR Data Services	0.1	04/06/2025	Initial version
STAR Data Services	0.2	10/06/2025	Update the column names and description to be consistent with CSV examples.
STAR Data Services	0.3	06/08/2025	<a href="mailto:box.settlement.queries@neso.energy">box.settlement.queries@neso.energy</a> is the new email address for the Settlements Team.
STAR Data Services	0.4	18/11/2025	Change in token endpoint of CIAM.

## 2. Document Purpose

This data specification document describes the proposed solution for National Energy System Operator (NESO) to accept and store Slow Reserve Performance Metering data from individual Service Provider (SPs).

The Slow Reserve (SR) requirement for Performance Metering Data for both **BM and NBM** units is expected with a 15 second granularity minimum but may be more granular (1 second granularity) so that the meter value provided can be used for the settlement purposes. The STAR system will only process and store 15 second level data for settlement.

This document specifies the interface data and transmission requirements that Service Providers must meet. It describes the concept of operations for the interface, defines the message structure and protocols that govern the interchange of data, and identifies the communication paths from which NESO expects data to flow.

The intended audience of this document are external Service Providers and NESO internal teams associated with development and operations of the systems connected to the interface.

The data design specification provides the following information:

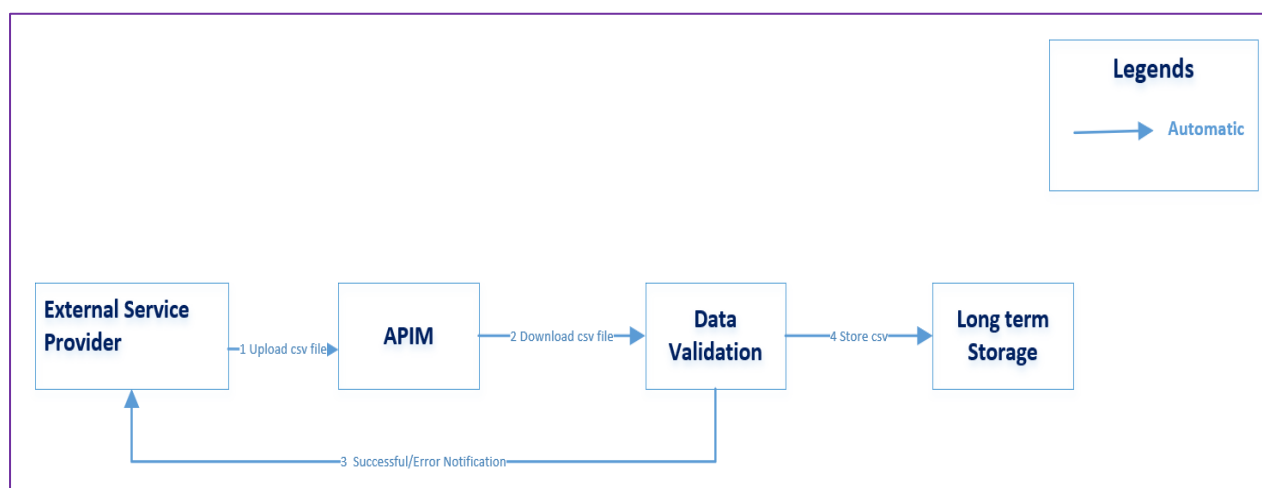
## Interface Design Document

- a general description of the interface.
- data specifications including source, target and validation details, data formats and classification.
- a description of the transport characteristics including transfer, data exchange, interface processing requirements, flow control and security.

### 3. Overview

Service Providers will be required to upload daily Performance Metering data file in CSV format via the STAR API. The data will then be ingested, validated, stored and used for settlement purposes. NESO will send a status of the file, either as rejected or successful.

#### Data Flow overview:



The following are the high-level process steps:

1. If not already registered, as a pre-requisite to submitting Performance Metering file to NESO, Service Providers need to be registered in the Ping Identity (CIAM) as an application to be able to access Settlement API using CIAM credentials. Please refer to **section 5 API Specification** for the registration and file upload process in more details. After registration, service providers attach a .csv file for both BM and NBM per unit using the NESO API. Note that Quick and Slow Reserve Performance Metering should be in separate files.
2. NESO will download the file(s) and perform data validations.
3. NESO will send a success or failure notification to Service Providers based on the data validation results.
4. If the file(s) meets all data validation criteria, NESO will process the file(s) and store the data.

## 4. Business Purpose and Specifications

### 4.1. Business Purpose

All providers (**both BM and NBM**) will be required to submit Performance Metering data to NESO by no later than 24 hours following the end of the service day. This data is required to ensure operational security of the network and to validate the performance where units are dispatched to deliver an instruction for the Firm and Optional Slow Reserve services.

Performance Metering data should be submitted to NESO at the end of the operational day for each contracted and/or optional settlement period plus the subsequent settlement period (for crossovers) not later than 24 hours following the end of the relevant Service Day on which SR was provided. Where Performance Metering data is not received within the specified time NESO will withhold Availability Payments and/or Energy Utilisation Payments in respect of the Operational Day, as no data will be available to derive energy delivery.

Where the Performance Metering file is unavailable for submission by the agreed IT interface, the Service Provider shall identify and agree an alternative method of submission of Performance Metering data which is satisfactory to NESO not later than five calendar days after the SR Service Day on which SR was provided. This is only where there has been a technical issue with submission with the IT interface.

Where no valid alternative metering data which is satisfactory to NESO has been received within the time specified NESO will withhold Availability Payments and/or Energy Utilisation Payments in respect of the period during which SR dispatch is unavailable for the purposes of such monitoring and metering.

Please note that if an issue is identified within the file, NESO will send a real-time notification with an error code to the provider to resend the file. If file validation checks have passed, then NESO will send a successful notification, and this will be in real-time. Please refer to data validation section 4.4 Data Validations.

## 4.2. File Specifications

**Filename:** SR\_UID\_YYYYMMDD(Contracted\_Day).csv

where SR stands for Slow Reserve, *UID* is a unique unit identifier reference, and YYYYMMDD is contracted day.

**File Format:** Comma delimited text file

**File Size:** <10 MB

**Frequency:** Daily

**File Contents:** File will contain

- Data for Unit per file per day
- Comma delimited records in a text file format
- One header record followed by data records.

### General Information

The daily file will represent 1 submission per unit, for a given day, for contracted or optional settlement periods plus the subsequent settlement period (for Crossovers), with either 1 data point recorded per second or one record per every 15-seconds. Where a contract is issued for the last settlement period of an EFA day, the subsequent settlement period data will be provided in a separate file on the next working day.

**A file containing a combination of 1 second and 15 second data is not allowed.**

### 15 Second interval data:

For a contracted day, NESO expects data to be provided during 23:00:00 to 22:59:59 and for BST the data will be provided during 22:00:00 to 21:59:59. The file will contain the previous day metering data for contracted or optional periods plus the subsequent settlement period (for crossovers), but the file should not contain more than 5,760 records, if providing 15-second interval metering data.

**Note:** *During the March clock change, we do not expect the file to contain more than 5,520(23hrs\*60 mins\*4 data points per min) records.*

*During the October Clock change, we do not expect the file to contain more than 6,000(25hrs\*60 mins\*4 data points per min) records.*

Files containing more records than expected will result in a failure.

### 1 second interval data:

For a contracted day, NESO expects data to be provided during 23:00:00 to 22:59:59 and for BST the data will be provided during 22:00:00 to 21:59:59. The file will contain the previous day metering data for contracted or optional periods plus the subsequent settlement period (for crossovers), but the file should not contain more than 86,400 (24hrs\*60 mins\*60 seconds) records, if providing 1-second interval metering data.

**Note:** During the March clock change, we do not expect the file to contain more than 82,800(23hrs\*60 mins\*60 seconds) records.

During the October Clock change, we do not expect the file to contain more 90,000(25hrs\*60 mins\*60 seconds) records.

Files containing more records than expected will result in a failure.

### 4.3. Source Data

Service Providers will submit the previous days Performance Metering data for contracted or optional settlement periods plus the subsequent settlement period (for crossovers), with each file containing either second-by-second records or one record per every 15-second interval. Please refer to the table below for the file structure.

A reminder that a file cannot **contain a combination of 1 second and 15 second data.**

Column Name	Column Description	Data Type	Mandatory/ Optional	Sample Value
NESOUnitID	NESO Unit Code	String	Mandatory	ABCD-1
DateTimeofMeterReading	Datetime of the meter reading in GMT and format is YYYY-MM-DDTHH24:mm:ss	Date	Mandatory	2024-10-17T23:00:00
MeterReading	Meter reading in MW	Numeric (up to 6 dec. places)	Mandatory	3.9

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Please see an example of the csv delimited text file below which contains one data point at every **15 seconds** interval data.

```
1 NESOUnitID,DateTimeofMeterReading,MeterReading
2 ABCD-1,2024-10-17T23:00:00,3.3
3 ABCD-1,2024-10-17T23:00:15,3.3
4 ABCD-1,2024-10-17T23:00:30,3.3
5 ABCD-1,2024-10-17T23:00:45,3.5
6 ABCD-1,2024-10-17T23:01:00,3.7
7 ABCD-1,2024-10-17T23:01:15,3.9
8 ABCD-1,2024-10-17T23:01:30,4.1
9 ABCD-1,2024-10-17T23:01:45,4.3
10 ABCD-1,2024-10-17T23:02:00,4.5
11 ABCD-1,2024-10-17T23:02:15,4.7
12 ABCD-1,2024-10-17T23:02:30,4.9
13 ABCD-1,2024-10-17T23:02:45,5.1
14 ABCD-1,2024-10-17T23:03:00,5.3
15 ABCD-1,2024-10-17T23:03:15,5.5
16 ABCD-1,2024-10-17T23:03:30,5.7
17 ABCD-1,2024-10-17T23:03:45,5.9
18 ABCD-1,2024-10-17T23:04:00,5.9
```

Please see an example of the csv delimited text file below which contains **second by second** interval data.

```
1 NESOUnitID,DateTimeofMeterReading,MeterReading
2 ABCD-1,2024-10-17T23:00:00,3.3
3 ABCD-1,2024-10-17T23:00:01,3.3
4 ABCD-1,2024-10-17T23:00:02,3.3
5 ABCD-1,2024-10-17T23:00:03,3.5
6 ABCD-1,2024-10-17T23:00:04,3.7
7 ABCD-1,2024-10-17T23:00:05,3.9
8 ABCD-1,2024-10-17T23:00:06,4.1
9 ABCD-1,2024-10-17T23:00:07,4.3
10 ABCD-1,2024-10-17T23:00:08,4.5
11 ABCD-1,2024-10-17T23:00:09,4.7
12 ABCD-1,2024-10-17T23:00:10,4.9
13 ABCD-1,2024-10-17T23:00:11,5.1
14 ABCD-1,2024-10-17T23:00:12,5.3
15 ABCD-1,2024-10-17T23:00:13,5.5
16 ABCD-1,2024-10-17T23:00:14,5.7
```



## 4.4. Data Validation

The validations below will be made with the NESO middleware on receipt of a file. Each field will be validated against the specifications, including field type, and where the field is mandatory etc. Please refer below for file validation and error handling rules.

**File and Data Validation:** NESO will use an Azure middleware layer that will receive Service Provider files and validate their schema to ensure the data submitted adheres to the required structure.

### Validations Carried Out

- General validation –
  - File was not uploaded after submission window has closed
- File & Size validation –
  - Filename is in correct format:  
SR\_UID\_YYYYMMDD(Contracted\_Day).csv.
  - File size is not larger than 10MB.
- Header Validation –
  - Header line is included.
  - The header line includes all mandatory fields.
  - Header line does not include unknown fields.
- Data Row Validation –
  - Unit ID value is not missing.
  - Unit ID value matches Unit ID in the filename.
  - Effective date and time (GMT) Format should be - YYYY-MM-DD'THH:MM:SS.
  - Meter value should be numeric (up to 6 decimal places).
  - Value is included for all mandatory fields.
  - Number of records does not exceed the maximum number of records per contracted day.

**Validation Pass Response:** As this is a synchronous REST API where all schema validations have passed, the service will send a **200 OK** synchronously after the data has reached the REST end point successfully. Example of the structure is shown on the next page.

**Error Handling and Response:** Should any errors be detected during this schema validation; error messages will be sent back to Service Providers, and you will be required to correct the files where errors are identified.

Once corrected, Service Providers should resubmit the file which will then follow the validation process as stated above and where no errors are present, a successful response will be sent back to providers.

**Validation Error Response:** If any errors occur such as invalid timestamps or incorrect file formats, a **4xx or 5xx error message** is synchronously generated and sent back to you. This will help you identify and address any issues that may arise. Please refer to below tables for more details:

- **Response Structure:**

The following will be the typical response object structure of the API:

Field Name	Type	Description	Example
Status	String	Success / Failure status of API	Success
Message	String	Descriptive status message	Successfully uploaded the file
Errors	Object Array (Optional)	Error with issues	In case of multiple errors provide that in array

- **HTTP Status Code**

The following table details the HTTP status code from the API response:

HTTP Code	Description
200	OK – for Successful Uploads
401	Unauthorized – For Unauthorized Request
415	Unsupported Media Type – If content type of file is invalid
500	Internal Server Error – Unexpected errors during processing

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The following table elaborates the error response issued by the API in case of failure in file processing –

Category	Error Message
File Name & Size	Invalid file name. File name is not expected format
	File contains invalid timestamp
	Invalid File Size. Maximum allowable limit is 10MB
File Structure	Bad csv Data
Headers	[Line ?][Column ?] Invalid header count. Expected at least [X], actual [X]
	[Line ?][Column ?] Header [header name] is not supported
	[Line ?][Column ?] Missing header [header name]
	[Line ?][Column ?] Invalid heading. Expected [header name]
Data Row	File Contains No Data
	maximum number of records has been breached

## 5. API Specification

The below steps will provide a guide on how to use the API:

1. As a pre-requisite to submitting the Settlement file(s) to NESO, Service Providers need to be registered in the Ping Identity (CIAM) as an application to be able to access Settlement API using CIAM credentials. If you don't have CIAM access, please get in touch with your Contract Manager, who can arrange this for you.
2. Further detailed instructions for registering to CIAM via this link [Getting started - Authentication](#).
3. The Azure APIM platform will be used to expose the onboarding API and Settlement API to the Service Provider. This will have API based policy to validate the JWT token (issued by Ping Identity Provider), which will be shared as HTTP "authorization" header bearer token as part of request. APIM will be configured with rate limit policy, and the number of requests for this policy will be number of service provider registered for API (approx. 100) at given time. In the case where more than rate limit requests come, the API will issue "429 error - too many request".
4. Post data validation, the system will issue 200 OK HTTP Code as part of successful response, however in case of invalid schema, it will issue appropriate error to the calling party.

## Interface Design Document

### Authentication Process

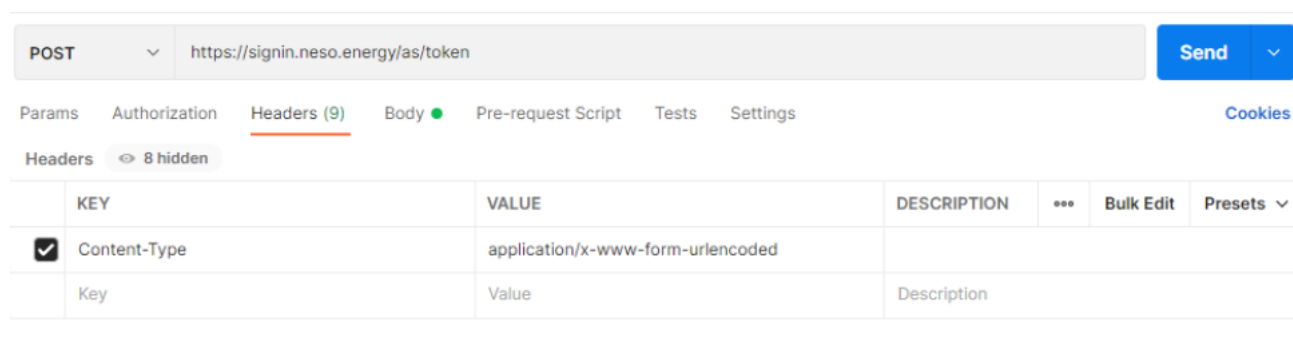
#### Step 1 – Obtaining authentication token

- SP will send POST request to token endpoint of CIAM  
(Production URL: <https://signin.neso.energy/as/token>)
- Build request as below –

1.1 Under **'Headers'** add key value pair as below:

Key	Value
Content-Type	application/x-www-form-urlencoded

Screenshot for reference –



1.2 Under **'Body'**, add key value pairs as below:

Key	Value
client_id	****client_id****
client_secret	**** client_secret ****
grant_type	client_credentials
Scope	star-api

Screenshot for reference –

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POST <https://signin.neso.energy/as/token> Send

Params Authorization Headers (9) **Body** Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL

<input checked="" type="checkbox"/>	grant_type	client_credentials	
<input checked="" type="checkbox"/>	client_id	ade*****	
<input checked="" type="checkbox"/>	client_secret	xoP*****	
<input checked="" type="checkbox"/>	scope	star-api	
	Key	Value	Description

- Once above details are populated under Headers and Body, click on send button to obtain the token.
- JWT token will be received in the response with the default expiration period of 15 minutes for idle time and session expiration in 24 hours.

### Step 2 – Onboarding step: required only in Production Environment.

Before submitting the actual Performance Metering file to the new API, **new Service Providers**, if not already onboarded for the Quick Reserve service, need to complete onboarding and pre-qualification process by submitting a 'test' file to the onboarding API.

#### Accessing Onboarding API and submission of test file

- Service Provider will send second POST request to Onboarding API (Production URL - <https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/onboarding>)
- Build request as below:

2.1 Under '**Headers**' add key value pair as below:

Key	Value
Ocp-Apim-Subscription-Key	88fde4b88d38443289d9946d13326828
Authorization	Bearer <<JWT Token>>

<<JWT token>> as received in Step 1 – to be provided as HTTP "Authorization" header Bearer token in this request.

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Screenshot for reference –

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Ocp-Apim-Subscription-Key	88fde4b88d38443289d9946d13326828	
<input checked="" type="checkbox"/> Authorization	Bearer eyJraWQlOiJmYjRiNGRmMC1kMzlj...	
Key	Value	Description

2.2 Under '**Body**' add key value pair in form-data as below:

Key	Value
File	Attach <b>Test</b> file in csv format

Screenshot for reference –

POST <https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/onboarding> Send

Params Authorization Headers (10) **Body** Scripts Settings Cookies

☐ none ☒ form-data ☐ x-www-form-urlencoded ☐ raw ☐ binary ☐ GraphQL

Key	Value	Description	...	Bulk Edit
<input checked="" type="checkbox"/> file	File <input type="text" value="SR_ABCD-1_20250309.csv"/>			
Key	Text <input type="text" value="Value"/>	Description		

- Once the above details are populated, submit the request.
- Onboarding API will validate the token against CIAM. If credentials get successfully validated, file will then be validated against validation rules before getting accepted in STAR.
- Service Provider will receive the synchronous response back for successful/ failure notifications.
- If the file is successfully received, an email notification will be sent to Contract Managers for completing Settlements Pre-qualification check.

### Step 3 – Accessing Settlements API and submission of performance metering file

## Interface Design Document

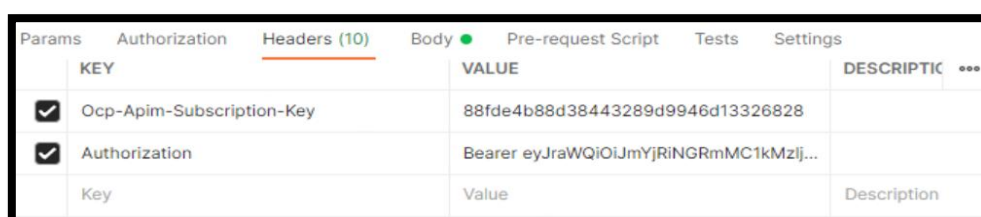
- Service Provider will send second POST request to the Settlements API (Production URL - <https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/submitdata>))
- Build request as below –

2.3 Under '**Headers**' add key value pair as below:

Key	Value
Ocp-Apim-Subscription-Key	88fde4b88d38443289d9946d13326828
Authorization	Bearer <<JWT Token>>

<<JWT token>> as received in Step 1 – to be provided as HTTP “Authorization” header Bearer token in this request.

Screenshot for reference –

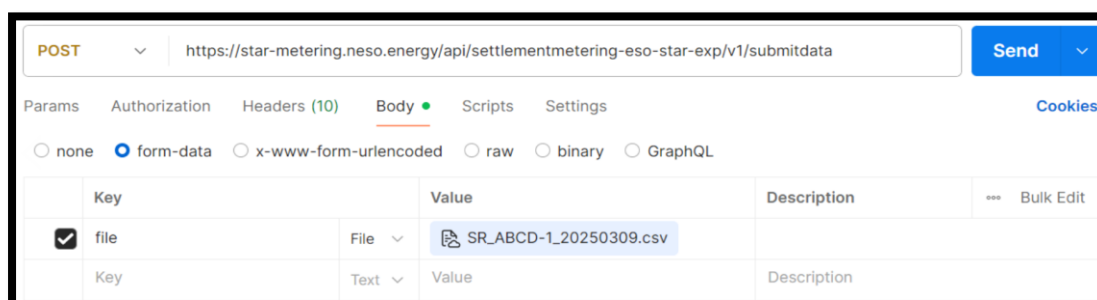


KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Ocp-Apim-Subscription-Key	88fde4b88d38443289d9946d13326828	
<input checked="" type="checkbox"/> Authorization	Bearer eyJraWQIQiJmYjRiNGRmMC1kMzlj...	
Key	Value	Description

2.4 Under '**Body**' add key value pair in form-data as below:

Key	Value
File	Attach <b>Performance metering</b> file in csv format

Screenshot for reference –



POST	<a href="https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/submitdata">https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/submitdata</a>	Send
Params	Authorization	Headers (10)
Body	Scripts	Settings
<input type="radio"/> none <input checked="" type="radio"/> form-data <input type="radio"/> x-www-form-urlencoded <input type="radio"/> raw <input type="radio"/> binary <input type="radio"/> GraphQL		
Key	Value	Description
<input checked="" type="checkbox"/> file	File <input type="text" value="SR_ABCD-1_20250309.csv"/>	
Key	Text <input type="text" value="Value"/>	Description

- Once above details are populated, submit the request.
- Settlements API will validate the token against CIAM. If credentials get successfully validated, the file will then be validated against validation rules before getting accepted in STAR.
- Service Provider will receive the synchronous response back for successful/ failure notifications.

Following section details out the API Specification.

Name	Endpoint (Production)	Method
Token endpoint API	<a href="https://signin.neso.energy/as/token">https://signin.neso.energy/as/token</a>	Post
Onboarding API	<a href="https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/onboarding">https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/onboarding</a>	Post
Settlements API	<a href="https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/submitdata">https://star-metering.neso.energy/api/settlementmetering-eso-star-exp/v1/submitdata</a>	Post

## 6. Support

Please contact the Settlements Team ([box.settlement.queries@neso.energy](mailto:box.settlement.queries@neso.energy)) for any queries and concerns.

## 7. Glossary

Abbreviation	Description
SR	Slow Reserve
BM	Balancing Mechanism



## Interface Design Document

NBM	Non-Balancing Mechanism
APIM	Azure API Management
CSV	Comma Separated Value text file
DNO	Distribution Network Operator
HTTPS	Hyper Text Transfer Protocol Secured
SP	Service Provider
NESO	National Energy System Operator
SFTP	Secure File Transfer Protocol
APIM	Application Programming Interface Management
API	Application Programming Interface
JWT	JSON Web Token
EFA	Electricity Forward Agreement
CIAM	Customer identity and access management