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Performance Monitoring CSV File Format

Version History

Date	Version	Comments	Author
1/09/2020	1	Initial release	National Grid ESO
5/10/2020	2	Example Changes and soe description update	National Grid ESO
21/10/2020	3	Clarification on data rows and csv example update	National Grid ESO
29/09/2021	4	Availability field updates	National Grid ESO
08/11/2021	5	DM DR updates	National Grid ESO
13/01/2022	6	Updated Mandatory/Optional Fields and error in example	National Grid ESO
31/01/2022	7	Updated Mandatory/Optional Fields and addition of import capacity	National Grid ESO
09/07/2025	8	Updated guidance regarding SOE values, NESO branding and emails, improved file upload clarity, updated armed status guidance	NESO
01/02/2026	9	Updated guidance on resubmission window	NESO

File Naming

CSV files shall be named in the format **UID_Timestamp_FREQ_perfmonv1.csv**.

The following parts of the filename should be dynamically constructed:

- UID is the unique identifier assigned to the Response Unit (Unit ID).
- Timestamp is the start of the performance data hour (UTC) and is in the format YYYYMMDDHHMMSS where:
 - YYYY is the 4-digit year
 - MM is the month of the year zero padded to 2 characters (01-12)
 - DD is the day of the month zero padded to 2 characters (01-31)
 - HH is the hour of day in 24-hour format zero padded to 2 characters (00-23)
 - MM is the minutes past hour zero padded to 2 characters (00-59)
 - SS is the seconds past minute zero padded to 2 characters (00-59)
- FREQ is the Frequency of the Data in Hertz (e.g. 20Hz for 20Hz data, 01Hz for 1Hz Data)

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An example filename for UID "ABCDE", timestamp "15/05/2025 17:00:00" collected at "20Hz" is:

ABCDE_20250515170000_20Hz_perfmonv1.csv

The same file but with data collected at "1Hz" would be:

ABCDE_20250515170000_01Hz_perfmonv1.csv

File Size and Creation Frequency

Each CSV file contains data for a single Response Unit.

Each CSV file may contain a maximum of 1 hour of data (i.e. elapsed delta between first and last timestamp supplied in the file).

File Structure

Text Encoding

CSV files shall be formatted in accordance with RFC 4180, encoded using ISO 8859-1 text encoding (no byte order mark) and using CR LF line endings.

Headers

The first line of the CSV file shall contain the header line.

The headers are listed below. All headers must be in lower case and must match the exact naming and order specified. All headers must be included even if some are not applicable to the unit.

Field	Description	Example	Min Value	Max Value	Optional / Mandatory
unit	Unique identifier assigned to the Response Unit (Unit ID)	ABCDE	1 Characters	10 Characters	Mandatory
t	ISO 8601 timestamp in UTC including milliseconds	2025-04-04T16:56:46.500Z	24 Characters	24 Characters	Mandatory
f_hz	Input frequency in Hz to 3 decimal places	49.992	40	60	Mandatory
baseline_mw	Baseline in MW to 4 decimal places	5.1256	-1000	1000	Mandatory
p_mw	Measured active power output or	10.5678	-1000	1000	Mandatory

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	demand in MW to 4 decimal places				
soe_import_mwh	State of energy (MWh) – (Capacity to Import) to 4 decimal places	17.6125	0	1000	Mandatory
soe_export_mwh	State of energy (MWh) – (Capacity to Export) to 4 decimal places	12.5175	0	1000	Mandatory
import_capacity_mw	Contracted available power to import (in MW) to 4 decimal places	17.6125	0	1000	Optional
export_capacity_mw	Contracted available power to export (in MW) to 4 decimal places	12.5175	0	1000	Optional
availability	Flag field to indicate availability of the unit	7	0	63	Mandatory
armed	Flag field to indicate armed status of the unit	15	0	63	Optional

Table 1 – CSV Headers

Data Rows

The lines following the header line shall contain the captured performance monitoring data.

Data rows should be included in the file in timestamp ascending order, with one row per timestamp with the relevant interval between each timestamp – e.g.

- 50ms interval between each timestamp for 20 Hz
- 1000ms interval between each timestamp for 1Hz

Uploaded files should contain exactly one hour's worth of data rows (e.g. 72000 for 20Hz, 3600 for 1Hz) or they will be rejected. If meter connection issues occur and there are missing rows, wait until a full set of data is available prior to upload.

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Resubmission Window (applicable until 31 Jan 2026)

In the event of delayed or incorrect data, you have until 5th of the next month at 00:00:00 UTC to upload correct or amended data before it is considered final. For example, if data for 2021-03-04 16:30 UTC and 2021-03-31 05:00 UTC require resubmission, provider can resubmit this data until 2021-04-05 00:00:00 UTC.

Resubmission Window (applicable from 01 Feb 2026)

In the event of delayed or incorrect data, you have 72 hours from the end of the delivery window to upload correct or amended data before it is considered final. For example, if data for 2025-03-04 16:30 UTC require resubmission, provider can resubmit this data until 2025-03-07 17:29 UTC. This ensures that final data is available at an earlier stage and helps prevent overloading systems associated with longer resubmission windows.

If there are missing data points that are recorded by the unit but not transmitted to NESO system successfully, then it is highly suggested that a second attempt is made to submit a complete file. If there are missing data points and no good replacement for the missing data is available, then it is advised that the missing data points are replaced with default values (that is 50.000 for frequency "f_hz" and 0 for the fields "baseline_mw", "p_mw", "soe_import_mwh", "soe_export_mwh").

A value should always be included for every field in the data row, empty cells are treated as invalid.

For fields containing more decimal places than required, the numbers should be rounded to the nearest appropriate value.

Service Unavailability

For any unavailability period declared in the performance monitoring CSV data, the associated rows with the unavailability should have 0 submitted as the "availability" field against the correct timestamp "t" and unit id "unit "

The remaining fields could have the metered data as normal or, if they are not available, they should be defaulted to 50.000 for frequency "f_hz" and 0 for the fields "baseline_mw", "p_mw", "soe_import_mwh" and "soe_export_mwh".

If a file for a full hour is not submitted, the unit will be considered "Unavailable" for that full hour.

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State of Energy

The state of energy variables, “soe_import_mwh” and “soe_export_mwh”, refer to the amount of response energy (MWh) the unit can provide at the boundary point. Providers should calculate this using their best estimates for the losses incurred during the import/export of energy from/to the boundary point.

Example 1: If a unit has 10MWh of footroom available in its battery and the efficiency between the battery and the grid connection point is estimated to be 90%, then it should report a value of 9MWh in the “soe_export_mwh” field.

Example 2: If a unit has 8MWh of headroom available in its battery and the efficiency between the battery and the grid connection point is estimated at 90% then it should report a value of 8.8888MWh in the “soe_import_mwh” field.

Availability Status

The Availability Status field should be calculated by setting the relevant bits for Available Services to ‘1’ and leaving the bits for Unavailable Services to ‘0’.

Bit	Service	Availability Bit Value
0	Dynamic Containment, Low Frequency	1
1	Dynamic Containment, High Frequency	2
2	Dynamic Moderation, Low Frequency	4
3	Dynamic Moderation, High Frequency	8
4	Dynamic Regulation, Low Frequency	16
5	Dynamic Regulation, High Frequency	32

Example: If a unit is available for Dynamic Containment, Low Frequency, and Dynamic Containment, High Frequency, bits 0 and 1 should be set, giving a field value of 3, calculated by adding the bit values for each service together (1 and 2 respectively).

Armed / Disarmed Status

The Armed/Disarmed Status field should be calculated by setting the relevant bits for Armed Services to ‘1’ and leaving the bits for Unarmed Services to ‘0’. NESO advises to use a default submitted value of 63; indicating that the unit is armed for all services, even if it is not contracted for all services. The value should only be changed if the unit is instructed by ENCC to disarm/rearm for one or multiple services.

Bit	Service	Armed Bit Value
0	Dynamic Containment, Low Frequency	1
1	Dynamic Containment, High Frequency	2

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2	Dynamic Moderation, Low Frequency	4
3	Dynamic Moderation, High Frequency	8
4	Dynamic Regulation, Low Frequency	16
5	Dynamic Regulation, High Frequency	32

Example: If a unit becomes disarmed for DML and DMH by ENCC it should set the values of bits 2 and 3 to 0. This gives an updated field value of 51, calculated by adding the bit values for each service together. When the unit becomes rearmed for DML and DMH, it should set the values of bits 2 and 3 to 1. This gives a field value of 63.

Timestamps

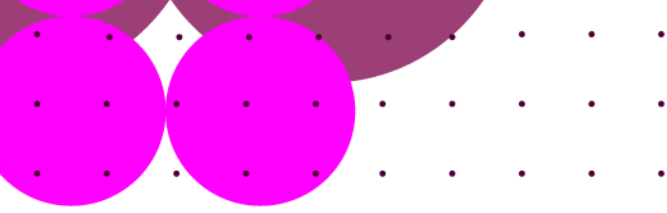
Timestamps should be formatted according to RFC 3339 and in UTC time zone. This will give timestamps of exactly 24 characters in length and in the format YYYY-MM-DDTHH:MM:SS.nnnZ where:

- YYYY is the 4-digit year
- MM is the month of year zero padded to 2 characters (01-12)
- DD is the day of month zero padded to 2 characters (01-31)
- T is a fixed separator character between the date and time parts
- HH is the hour of day in 24-hour format zero padded to 2 characters (00-23)
- MM is the minutes past hour zero padded to 2 characters (00-59)
- SS is the seconds past minute zero padded to 2 characters (00-59)
- nnn is the milliseconds past second padded to 3 characters (000-999)
- Z is a fixed time zone identifier to indicate the timestamp is in UTC time zone

The first data row should have a timestamp of the start of the performance data hour with 0 seconds and 0 milliseconds. Subsequent timestamps should then be synchronised so, if for example we're providing 20Hz data, they are provided at exactly 50ms intervals (i.e. subsequent milliseconds are 000, 050, 100, 150, 200, 250, etc).

Example CSV File Format

```
unit,t,f_hz,baseline_mw,p_mw,soe_import_mwh,soe_export_mwh,availability,armed
ABCDE,2020-08-04T16:00:00.000Z,49.800,0.0000,5.0000,25.0000,25.0000,3,3
ABCDE,2020-08-04T16:00:00.050Z,49.792,-0.0500,4.9500,25.0100,24.9900,2,3
ABCDE,2020-08-04T16:00:00.100Z,49.785,-0.1000,4.9000,25.0300,24.9700,2,3
ABCDE,2020-08-04T16:00:00.150Z,49.777,-0.1500,4.8500,25.0500,24.9500,3,3
ABCDE,2020-08-04T16:00:00.200Z,49.770,-0.2000,4.8000,25.1000,24.9000,3,3
ABCDE,2020-08-04T16:00:00.250Z,49.762,-0.2500,7.1250,25.1500,24.8500,3,3
ABCDE,2020-08-04T16:00:00.300Z,49.755,-0.3000,9.4500,25.2000,24.8000,3,3
```

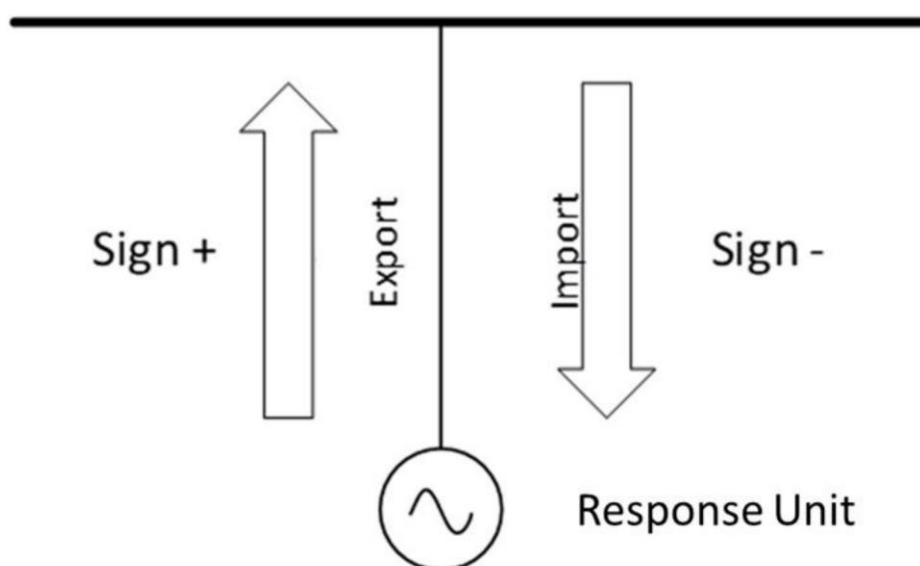


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Sign Convention

Both Baseline (MW) and Active Power (MW) signals are directional and must follow the following sign convention:



File Upload

The CSV will need to be uploaded via an API using HTTP POST request over HTTPS in the proceeding hour, with a random delay after the delivery period end to help stagger the data influx. This helps ensure that the systems handling the API requests do not become overwhelmed with all requests coming at the same time immediately after the delivery period ends.

To obtain API connection details, contact commercial.operation@neso.energy.