# Regulation Signal Samples – Description Document

## Description

The regulation signal sample data file contains samples of the aggregated frequency regulation signal for Ancillary Service Providers spanning the full year of 2025 and the first half of 2026. The regulation signal has been normalized to the total regulation capacity provided from existing regulation service providers in real-time. Historical total regulation capacity provided in real-time can be viewed in the *Adequacy Reports* in the IESO's Data Directory.

The regulation signal is provided by the IESO for the benefit of all interested parties wishing to better understand the nature of the IESO's regulation signal. The regulation signal sample data provides interested parties with an opportunity to analyze various characteristics of the regulation signal such as upward/downward bias and volatility as well as to simulate the way resources/facilities could respond to the signal.

## How to use the data

*Let:*

$N_t = normalised\ regulation\ signal\ at\ time\ t$

$RC = intended\ regulation\ capacity\ (MW)$

$RS_t = scaled\ regulation\ signal\ (MW)$

$BP_t = basepoint\ (energy\ schedule)\ (MW)$

$SP_t = simulated\ setpoint\ (MW)$

$RR_{up} = upward\ ramp\ rate\ (MW\ per\ second)$

$RR_{down} = downward\ ramp\ rate\ (MW\ per\ second)$

$\Delta t = time\ interval\ (seconds)$

The historical regulation signal is provided on a one-second basis.

$$N_t = normalised\ regulation\ signal\ at\ time\ t$$

To simulate regulation setpoints for a prospective resource, the signal should be scaled to the intended regulation capacity.

$$RS_t = N_t \times RC$$

The setpoints vary up or down relative to the energy schedule, or basepoint.

$$SP_t = BP_t + RS_t$$

Actual regulation setpoints are typically transmitted up to every four seconds. When the resulting change in the scaled signal exceeds the physical response capability of the resource, such as its ramp rate either up or down, the simulated setpoint should be limited to reflect the resource's actual physical operating characteristics.

$$-RR_{down}\Delta t \leq SP_t - SP_{t-1} \leq RR_{up}\Delta t$$

The regulation signal is further described in *IESO Market Manual 6: Participant Technical Reference Manual,* section 4.2 ("AGC Operational RTU Specifications").

**Table 1 – Filenames and timespans**

| Filenames: | Timespan: | File size |
|---|---|---|
| regulation signal normalised Jan25-Jun26.csv | January 1, 2025, through June 30, 2026. | 1.7GB |

**Delivery format:** CSV format

**Scope:** Covers the entire, normalised aggregated regulation range for the IESO controlled grid on a one-second granularity. It should be noted that regulation signals to individual resources/facilities should be scaled as described above. File size is too large to open and analyse in Excel. Use an appropriate tool such as Python to open an analyse the data.

**Number of fields:** Two – as described in Table 2 below

**Table 2 – Field description for regulation sample data files**

| Field Name | Type | Format | Description |
|---|---|---|---|
| timestamp | Time Stamp | YYYY/MM/DD HH:MM:SS AM/PM (In Eastern Standard Time (EST)). | The time at which the signal was issued in one-second granularity. |

| Field Name | Type | Format | Description |
|---|---|---|---|
| regulation signal normalised to total provided regulation capacity | Floating point decimal | Varies between -1 and +1. | The normalized regulation signal for the IESO controlled grid (unitless), ranging from −1, indicating maximum downward regulation, to +1, indicating maximum upward regulation, while 0 indicates no regulation request. |

- **End of Document** -