

EnergyAustralia Large Business Demand Response

How is a Customer's CAISO10 Baseline calculated?

The CAISO10 Baseline was developed by the California Independent System Operator (CAISO) and is widely used in Australia. The "10" refers to using the most recent historical data of 10 similar days to calculate a baseline of what a customer's expected consumption would be had a demand response event not been called.

The CAISO10 Baseline is calculated in the following steps:

Step 1: Identify the 10 Previous Similar Days

The 10 Previous Similar Days to the Demand Response Event are defined as being either the 10 most recent business days, if the DR event takes place on a business day, or the 10 most recent weekend days, if the DR event occurs on a weekend or public holiday. It is a prerequisite that none of the selected days have a demand response event within them.

Step 2: Calculate the Deemed Baseline from the 10 Previous Similar Days

The Deemed Baseline is constructed by calculating the average of each Trading Interval within the period of the Demand Response Event based on the 10 Previous Similar Days.

Step 3: Calculate the Baseline Adjustment for the Deemed Baseline to reflect conditions on the day of the demand response event

The Baseline Adjustment to the Deemed Baseline is defined as the MOA Offset divided by the number of Trading Intervals during the Morning of Adjustment (MOA) period.

The MOA period is defined as the first three hours in the 4-hour period leading up to the Demand Response Event. The energy consumption during the MOA period on the day of the event is summed. Similarly, the energy consumption for all the MOA period for the 10 Previous Similar Days is summed and divided by the number of days (i.e. 10) to identifying the average consumption across these 10 days.

The MOA Offset is calculated by taking the MOA consumption of the Demand Response Event less the average MOA consumption of the 10 Previous Similar Days. This number can be either a positive or negative number.

Step 4: Calculate the CAISO10 Baseline

The CAISO10 Baseline is the Deemed Baseline for each Trading Interval plus the Baseline Adjustment.

5-minute settlement example, used from 1st October 2021, to calculate the CAISO10 Baseline of a Demand Response Event

If a demand response event was held between 2pm to 4pm on Friday, 28 January 2022. There also was a demand response event a day prior (i.e. Thursday, 27 January 2022).

1. The 10 Previous Similar Days are:
 - Wed 12, Thu 13, Fri 14, Mon 17, Tue 18, Wed 19, Thu 20, Fri 21, Mon 24 and Tue 25 January 2022.
 - Note that 26 and 27 January are not included because the 26th was a public holiday while the 27th had a demand response event on that day.
2. The Customer's Deemed Baseline is constructed for each Time Interval of the Demand Response Event. As an example for one time interval:
 - The Deemed Baseline for 2.00-2.05pm is calculated by adding the consumption between 2.00–2.05PM from the 10 Previous Similar Days identified above (e.g. 80 kWh) and calculating the average (i.e. 8 kWh).
 - To calculate the Baseline Adjustment, the MOA period is first defined as 10am to 1pm (i.e. the first 3 hours in the four hours before the start of the Demand Response Event at 2.00pm). The Customer's energy consumption between 10am-1pm on 28 January is summed (e.g. 340 kWh). The energy consumption for the 10 Previous Similar Days between 10am-1pm is summed (e.g. 2680 kWh) to calculate the average (i.e. 268 kWh). The MOA Offset is therefore 72 kWh (340 kWh – 268 kWh) and the resulting Baseline Adjustment is 2 kWh (72 kWh / 36 Time Intervals).
 - The CAISO10 Baseline is therefore 10 kWh (i.e. 8 kWh + 2 kWh) for the Trading Interval 2.00 – 2.05PM.
3. The process of calculating the CAISO10 Baseline for the other Time Intervals within the Demand Response Event is repeated (i.e. 2.05-2.10pm, 2.10-2.15pm up until 3.55-4.00pm).

30-minute settlement example, used up to 30th September 2021, to calculate the CAISO10 Baseline of a Demand Response Event

A demand response event was held between 2pm to 4pm on Friday, 29 January 2021. There also was a demand response event a day prior (i.e. Thursday, 28 January 2021).

1. The 10 Previous Similar Days are:
 - Wed 13, Thu 14, Fri 15, Mon 18, Tue 19, Wed 20, Thu 21, Fri 22, Mon 25 and Wed 27 January 2021.
 - Note that 26 and 28 January are not included because the 26th was a public holiday while the 28th had a demand response event on that day.
2. The Customer's Deemed Baseline is constructed for each Time Interval of the Demand Response Event. As an example for one time interval:
 - The Deemed Baseline for 2.00-2.30pm is calculated by adding the consumption between 2.00–2.30PM from the 10 Previous Similar Days identified above (e.g. 440 kWh) and calculating the average (i.e. 44 kWh).
 - To calculate the Baseline Adjustment, the MOA period is first defined as 10am to 1pm (i.e. the first 3 hours in the four hours before the start of the Demand Response Event at 2.00pm). The Customer's energy consumption between 10am-1pm on 29 January is summed (e.g. 277 kWh). The energy consumption for the 10 Previous Similar Days between 10am-1pm is summed (e.g. 2530 kWh) to calculate the average (i.e. 253 kWh). The MOA Offset is therefore 24 kWh (277 kWh – 253 kWh) and the resulting Baseline Adjustment is 4 kWh (24 kWh / 6 Time Intervals).
 - The CAISO10 Baseline is therefore 48 kWh (i.e. 44 kWh + 4 kWh) for the Trading Interval 2.00 – 2.30PM.
3. The process of calculating the CAISO10 Baseline for the other Time Intervals within the Demand Response Event is repeated (i.e. 2.30-3.00pm, 3.00-3.30pm up until 3.30-4.00pm).