Daily Adjustment Factor

Demand Estimation
October 2024

Glossary of Terms

- Non-Daily Metered (NDM) – of the c.25m Gas Supply Meter Points the majority are Non-Daily Metered

- Daily Metered (DM) – Supply Meter Points that are read Daily - usually very high consumption

- Annual Quantity (AQ) – An estimate of the amount of gas (in kWh) that a Supply Meter Point will use in the coming year under seasonal normal weather conditions

- End User Category (EUC) – Categorise gas consumers by their different usage patterns. Each NDM supply point belongs to an EUC.
  - For Lower consumption Bands (0 to 293 MWh pa) this includes separate EUCs for Domestic and Non-Domestic and Pre-Payment and Non-Prepayment meters
  - Higher Consumption Bands (>293 MWh pa) are grouped into 4 separate EUCs based on their Winter/Annual Consumption Ratio (WAR) which provides an indication of the consumption seasonality

- Local Distribution Zone (LDZ) - Each LDZ represents a geographical area of the country. Each LDZ is 'owned' by a specific gas transporter and determine the area for which they distribute gas.
  Here is a helpful LDZ Map.

Daily Adjustment Factor – What is it?

- A Daily Adjustment Factor (DAF) is one of the key outputs from the Demand Estimation process, as described in Section H of UNC:

*The "**Daily Adjustment Factor**" for an End User Category for a Day is a factor representing the sensitivity of demand in that End User Category on that Day to weather as represented by the Composite Weather Variable.*

- So, the Daily Adjustment Factor is a daily value which represents typically how an EUC's gas demand reacts to changes in the weather – i.e. weather sensitivity

- Each End User Category (EUC) will have its own set of Daily Adjustment Factors

- DAFs are always equal to or less than zero (typically ranges from 0 to -0.9) and represents the proportion of Seasonal Normal Demand lost for an increase in CWV of 1 degree, expressed as a decimal

- For example, if the End User Category were to lose 10% of its demand with an increase of 1 degree in CWV, the DAF would be -0.1

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Daily Adjustment Factor – Why is it needed? (1 of 2)

- The Daily Adjustment Factor's primary function is a key parameter in the formula which is used to calculate the bottom-up estimate of daily demand for the NDM population in Gemini

- The NDM Supply Meter Point Demand formula is:

$$\text{NDM Demand}_t = (AQ/365) * ALP_t * (1 + (\mathbf{DAF}_t * WCF_t))$$

For each day 't' where: ALP = Annual Load Profile and WCF = Weather Correction Factor

- The DAF alongside the WCF provides a means to apply weather correction to the Seasonal Normal Demand which is calculated by the formula (up to the ALP)

- The NDM demand formula is required for NDM Nomination and Allocation processes:
  - NDM Nominations are forecasts of demand **ahead** of the Gas Day
  - NDM Allocations are estimates of demand **after** the Gas Day

- The formula is applied each day to each LDZ/EUC combination

Daily Adjustment Factor – Why is it needed? (2 of 2)

- The Daily Adjustment Factor is also used in UK Link for AQ Calculation and Read Estimation processes

- The NDM AQ formula is:

AQ = Metered Quantity * 365 / Sum [ALP * (1 + (**DAF** * WCF))]

  – This formula allows for differing time periods between meter reads and corrects for the weather conditions over the periods to provide a 'Seasonal Normal' AQ
  – The weather correction is performed using the Weather Adjusted Annual Load Profile (WAALP) in this part of the formula Sum [ALP * (1 + (**DAF** * WCF))]

- The Read Estimation processes in UK Link also use the WAALP as a means to calculate estimated meter readings for a relevant period

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Timetable

Each August a set of industry approved Daily Adjustment Factors are required for each End User Category for the new Gas Year

Gemini and UK Link are updated in readiness for calculating NDM Demand and Rolling AQ respectively for the new Gas Year

Daily Adjustment Factor – How is it calculated?

- The Daily Adjustment Factor for each EUC is calculated as:

$$DAF_t = \frac{\text{Weather Variable Coefficient (WVCE)}_t}{\text{Seasonal Normal Demand for the EUC (SNDE)}_t}$$

where:

- $WVCE_t$ is the value of the Weather Variable Coefficient in the Demand Model for the EUC
- $SNDE_t$ is the Seasonal Normal Demand for the EUC for Day 't'

- Estimates of Seasonal Normal Demand are derived from EUC Demand Models, another key output from the annual Demand Estimation process

- The Demand Estimation Sub Committee (DESC) is responsible for the production of the Annual Load Profiles each year, including any changes to the formula which is set out in the UNC document: "NDM Demand Estimation Methodology" – see final slide for link

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Daily Adjustment Factor Example

EUC: WM:E2401BND
Gas Day: 19 June 2025:
DAF: -0.53218

$$DAF = \frac{-2,234.1}{4198.0} = -0.53218$$

where:

- $WVCE_t$ for 19 June 2025 is -2,234.1
- SND_t for 19 June 2025 is 4,198.0

EUC Demand Model – Background

- The derivation of the EUC Demand Model is the responsibility of DESC

- Each year DESC sets out the principles to be followed in its 'Modelling Approach' document

- Typically, EUC Demand Models are based on 3 individual years of analysis of daily demand data collected from a sample of consumers within the relevant EUC

- The behaviours learned from the 3 years are then averaged or 'smoothed' in order to produce an EUC Demand Model which provides year on year stability, by minimising impacts of single warmer or colder years

- Seasonal Normal Demand (SNDt) from the EUC Demand Model is calculated as follows:

$$SND_t = P_t * (C_1 + C_2 * SNCWV_t)$$

- where:

  C_1 is the constant derived from the smoothed EUC Demand Model
  C_2 is the weather sensitivity from the smoothed EUC Demand Model
  $SNCWV_t$ is the seasonal normal value of the CWV on day_t
  P_t is a factor which represents weekend and holiday effects

More Information

For more information on the Demand Models see the Demand Estimation home page here
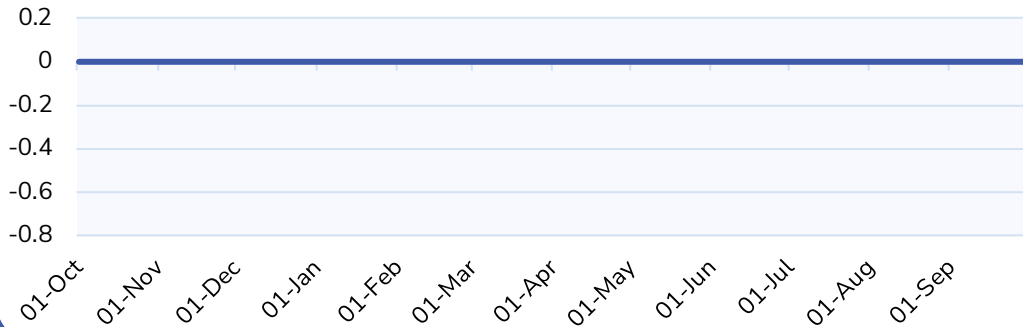
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Daily Adjustment Factor – How do they differ?

Domestic Example DAF (NE 01BND)
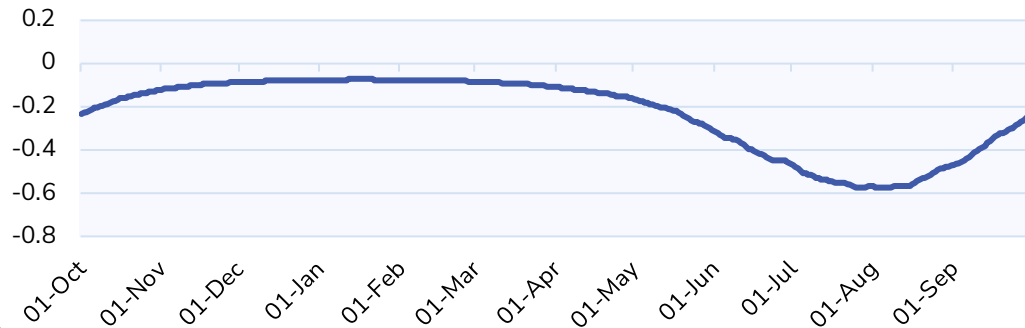
- Winter values are small with changes in temperature resulting in little percentage changes to forecast consumption volume

- Summer values are larger, but work in conjunction with much smaller forecast volumes

Large I & C Example DAF (SE 07W01)

- No seasonality for this EUC, with changes in temperature having no impact on forecast consumption values

Daily Adjustment Factor – Why do the values change?

- Each Gas Year DESC will produce a revised set of Daily Adjustment Factors which have been derived from the latest set of EUC Demand Models

- As part of the annual process, the following factors can result in changes to the Daily Adjustment Factors (when compared to the previous year):

    - DESC may change the Demand Modelling principles

    - New individual single year model will replace oldest year model which will naturally mean different sample sites (2 of the 3 years used in smoothing will remain the same)

    - Gas Industry weather history will have 'moved on' by one year

    - An update to the Seasonal Normal basis (normally every 5 years)

- The approach of applying model smoothing minimises year on year volatility

Daily Adjustment Factor – Where to find more information

- Uniform Network Code (UNC): Section H (Paragraph 2.4: Daily Adjustment Factor)

- UNC Related Document: NDM Demand Estimation Methodology (Paragraph 3.5)

- NDM Algorithms Booklet - Section 9: UK Link Docs: Folder 18. NDM Profiling and Capacity Estimation Algorithms / Gas Year / 4 NDM Algorithms Booklet

- Demand Estimation Sub Committee (DESC): Terms of Reference

- Daily Adjustment Factors for current Gas Year available on the Demand Estimation page of Xoserve.com. Select Download "Latest derived factors" from right hand side of page. File name begins ALPDAFyy and also contains the Annual Load Profiles (ALPs)

- Please raise any questions on Daily Adjustment Factors via the Help Centre on Xoserve.com here and your query will be directed to the CDSP's Demand Estimation Team